

Barry L. Zink

CONTACT

Department of Physics and Astronomy
University of Denver
2112 E. Wesley Ave.
Denver, CO 80208
(303) 871-3025
barry.zink@du.edu

EDUCATION

Ph.D. in Materials Science and Engineering	UC San Diego, 2002
M.S. in Physics	UC San Diego, 1998
B.S. in Physics	UC Santa Cruz, 1996

APPOINTMENTS

University of Denver Associate Professor, Department of Physics and Astronomy	Sept. 2011-
University of Denver Associate Dean, Natural Sciences and Mathematics	Sept. 2011-Dec. 2011
University of Denver Assistant Professor, Department of Physics and Astronomy	Sept. 2006-Aug. 2011
National Institute of Standards and Technology Postdoctoral Researcher, Quantum Sensors Project	Dec. 2002-Aug. 2006
UC San Diego Graduate Student Researcher, Frances Hellman Lab	Jul. 1996-Dec. 2002

HONORS AND AWARDS

National Science Foundation CAREER Award	2009
National Research Council Postdoctoral Fellow	2002-04
Honors in Physics, UC Santa Cruz	1996
NSF REU Student, Santa Cruz Institute for Particle Physics	1995
Dean McHenry Scholar, UC Santa Cruz	1992-93

RESEARCH INTERESTS

Experimental condensed matter and materials physics, focusing on understanding order and disorder in novel materials and small structures by probing thermal, electronic, and thermoelectric properties. Current projects center on fundamental studies of thermal transport and thermopower in amorphous semiconductor systems, magnetic and superconducting thin films, and nanostructures. Applications of interest range from thermoelectric materials to spintronic devices to gamma-ray detectors for nuclear security.

CURRENT AND PENDING SUPPORT

National Nuclear Security Agency, (DOE) “Materials Research for High-Resolution Gamma-Ray Detectors for Nonproliferation Applications”	2009-2013
National Science Foundation, CAREER “CAREER: Electrons, Phonons, and Magnons in Nanostructures and Novel Materials”	2009-2014
Department of Energy SBIR (sub-contract from Plasma Controls, LLC) “Measurement Services for Thin Film Thermoelectric Generators”	2010-2013
National Consortium of MASINT Research FY12 Research Opportunity “Ultra-High Energy Resolution Microcalorimeter Gamma Imagers: Proof of Concept”	2012-2013
Intelligence Community Postdoctoral Program “High Atomic Number Absorbers: A Path for Gamma-Ray Microcalorimeters to Exceed the Efficiency of Germanium Sensors (CO-PI with J. Ullom, NIST Boulder)”	2012-14
National Science Foundation, ENG-EPMD “Collaborative Research: Approaching Perfect Absorbance in Radiometric Detectors Via Integrated Carbon Nanotube Forests” (CO-PI with T. C. Shen, Utah State University Physics, and (unfunded) CO-I John H. Lehman, NIST Boulder)	(pending)
Semiconductor Research Corporation “Low Cost, High Performance Thermoelectric Thin Films for On-Chip Energy Harvesting”	(pending)
Nanoelectronics Research Initiative “Colorado Front Range Alliance for Microwave-Enabled Spintronics (C-FRAMES)” (Proposed Center includes CU Boulder, CSU, UCCS, and DU. PI: Margaret Murnane, CU Boulder, BLZ is PI of DU effort)	(pending)

PREVIOUS SUPPORT

National Consortium for MASINT Research (NCMR) “Thermal pathways in ultra-high resolution gamma-ray detector materials for nuclear material detection”	2008-11
Nano Electronics Research Corporation (NERC) “Direct measurement of thermal spin currents and torques in nanoscale systems” (CO-PI with M. R. Pufall, NIST Boulder)	2008-10
American Chemical Society, Petroleum Research Fund, Type G ”Exploring Improved Petroleum Utilization Via Nanoscale Thermal Engineering of Thermoelectric Materials”	2007-09
University of Denver, PROF “Exploring Better Energy Efficiency Through Thermal Engineering of Nanoscaled Materials”	2007-09
NIST (sub-contract under NASA Grant NDPR NNG04WF06I) “Magnetic Microcalorimeters and Thermometers”	FY 2007

RESEARCH GROUP

Robert Horansky (*Postdoctoral Scholar*)

Jason Underwood (*Postdoctoral Scholar*)

Azure Avery (*Ph.D. student*)

Dain Bassett (*Ph.D. student*)

Sarah Mason (*Ph.D. student*)

Alex Hojem (*Ph.D. student*)

Devin Wesenberg (*Introduction to Research student*)

Gail Cotteril (*Undergraduate Research Assistant*)

FORMER RESEARCH STUDENTS/POSTDOCTORAL SCHOLARS

Rubina Sultan <i>Measurement of Thermoelectric Properties of Amorphous Silicon Based Thin Films</i>	Ph.D. 2010
Farhana Baset <i>Defect and Magnetic States in Amorphous Magnetic Semiconductors</i>	M.S. 2007
Nikhil Jethava <i>Thermal Pathways in Low Temperature Detector Materials</i>	Post-doc, Jan-Mar, 2009

Abby Johnson	(Undergraduate Research Assistant, 2008-09)
Andrew Bacino	(Undergraduate Research Assistant, 2009)
Greg Stiehl	(Undergraduate Research Assistant, 2008-2010), B. S. 2010 <i>Measurement and Reduction of Sensitivity to External Magnetic Fields for NIST SQUID amplifiers</i>
Erik Partridge	(Undergraduate Research Assistant, 2009-10), B. S. 2010 <i>Exploring Temperature Dependent Resistance of Semiconducting Thin Film Thermometers</i>
Di Wei	(Undergraduate Research Assistant, 2010-2012), B. S. 2012 <i>Measurements of Thin Film and Nano Hybrid Thermoelectric Materials</i>
Joseph Rauch	(Undergraduate Research Assistant, 2010-2012), B. S. 2012
Jessica Olson	(Visiting Researcher, Cherry Creek High School Physics Teacher)

ZINK RESEARCH LAB DEVELOPMENT

Below is a brief description of experimental capabilities and facilities available at the University of Denver. For more information, see <http://portfolio.du.edu/ZinkLab>.

UHV Deposition Chamber A flexible, load-locked, cryo- and ion-pumped vacuum system with base pressure of $\sim 10^{-10}$ Torr, designed for co-deposition of two materials, one via thermal evaporation and the other by e-beam evaporation. Both evaporations are controlled and separately monitored, and special features are planned for optimal control of alloy composition.

e-Beam Nanolithography We use a commercial hardware/software package (NPGS) to perform e-beam lithography using a 40 kV Scanning-Electron Microscope installed in our lab. We have demonstrated < 80 nm linewidths and continue to improve our techniques.

LN₂ Cryostats Two modified commercially available sample-in-vacuum liquid nitrogen cryostats allow measurements from 77 – 350 K. Custom designed sample mounts include radiation shields, and provide a highly stable reference temperature for careful thermal experiments. Measurements can be made in applied magnetic fields up to ~ 1 kOe.

Low Temperature Facilities Measurements from 100 K to 300 mK are enabled by a self-contained, sorption-pumped ³He refrigerator in a sample-in-vacuum insert. An Adiabatic Demagnetization Refrigerator cryostat is equipped with two separate two-stage SQUID amplifier channels that allow measurements and detector characterization to temperatures below 50 mK. We have recently acquired a 7 Tesla superconducting split-pair magnet cryostat that allows experiments from 2-300 K in high magnetic fields.

Supporting Equipment In addition to the central growth, processing and measurement equipment, an ultrasonic wire-bonder, thermal evaporator, spin-coater, oven, and limited wet-chemistry facilities are available for device and sample preparation.

PUBLICATIONS IN PREPARATION OR SUBMITTED

(* indicates DU student author)

- a. “Probing non-equilibrium effects in FM thin films via Peltier cooling (working title),” A. D. Avery, M. R. Pufall, and **B. L. Zink**, in preparation
- b. “Low temperature thermal conductance and heat capacity in suspended Si-N microstructures via noise thermometry (working title),” D. Bassett, J. M. Underwood, S. Cho, D. Swetz, J. N. Ullom, and **B. L. Zink**, in preparation.
- c. “Fabrication dependence of phonon transport in suspended thin film Si-N structures (working title),” S. Mason, J. M. Underwood, A. D. Avery, D. Bassett, and **B. L. Zink**, in preparation.
- d. “Calorimetry on a Chip (working title),” **B. L. Zink** and F. Hellman, invited review article in preparation for *Review of Scientific Instruments*.
- e. “Heat Transport by Long Mean Free Path Vibrations in Amorphous Silicon-Nitride Near Room Temperature (working title),” R. Sultan*, A. D. Avery*, D. Bassett*, and **B. L. Zink**, (submitted to *Physical Review B*)

JOURNAL PUBLICATIONS

Note that entering the text string “Zink BL OR (Zink B AND Basov)” in the Author search field of ISI Web of Science gives the full list of publications that appear below. A google scholar profile is also available at <http://scholar.google.com/citations?user=Ibx-KckAAAAJ>

37. “Predicting the Planar Nernst Effect From Magnetic Field Dependent Thermopower and Resistance in Nickel and Permalloy Thin Films,” A. D. Avery*, M. R. Pufall, and **B. L. Zink**, *Physical Review B* **86** 184408 (2012).
36. “Observation of the Planar Nernst Effect in Permalloy and Nickel Thin Films with In-plane Thermal Gradients.” A. D. Avery*, M. R. Pufall, and **B. L. Zink**, *Physical Review Letters* **109** 196602 (2012)
35. “Time-division SQUID Multiplexers with Reduced Sensitivity to External Magnetic Fields,” G. M. Stiehl*, H. M. Cho, G. C. Hilton, K. D. Irwin, J. A. B. Mates, C. D. Reintsema, and **B. L. Zink**, *IEEE Transactions on Applied Superconductivity*, **21** 298 (2011).
34. “Thermopower and resistivity in ferromagnetic thin films near room temperature,” A. D. Avery*, Rubina Sultan*, D. Bassett*, D. Wei*, and **B. L. Zink**, *Physical Review B–Rapid Communications* **83** 100401(R) (2011)
33. “Exploring Thermoelectric Effects and Wiedemann-Franz Violation in Magnetic Nanostructures Via Micromachined Thermal Platforms” **B. L. Zink**, A. D. Avery*, R. Sultan*, D. Bassett*, and M. R. Pufall, *Solid State Communications* **150** 514 (2010) (*invited*)
32. “Electronic and Vibrational Density of States Through the Metal-Insulator Transition in Amorphous Yttrium-Silicon Alloy Thin Films,” **B. L. Zink** and F. Hellman, *Physical Review B* **79** 235105 (2009)

31. “Thermal conductivity of micromachined low-stress silicon-nitride beams from 77 – 325 K,” R. Sultan*, A. Avery*, G. Stiehl*, **B. L. Zink**, *Journal of Applied Physics* **105** 043501 (2009). (Also featured in *Virtual Journal of Nanoscale Science and Technology* **19**, March 2, 2009.)
30. “Design, Fabrication, and Multiplexing of Magnetic Calorimeter X-ray Detectors with High-Efficiency SQUID Readout” R. Sultan*, **B. L. Zink**, K. D. Irwin, G. C. Hilton, J. N. Ullom, L. R. Vale, *Journal of Low Temperature Physics* **151** 363 (2008).
29. “Toward a 256-pixel array of gamma-ray microcalorimeters for nuclear-materials analysis,” W. B. Doriese, J. N. Ullom, J. A. Beall, W. D. Duncan, L. Ferreira, G. C. Hilton, R. D. Horansky, K. D. Irwin, J. A. B. Mates, C. D. Reintsema, D. R. Schmidt, L. R. Vale, Y. Xu, Y., **B. L. Zink**, M. K. Bacrania, A. S. Hoover, C. R. Rudy, M. W. Rabin, C. A. Kilbourne, K. R. Boyce, L. E. Brown, J. M. King, F. S. Porter, *Journal of Low Temperature Physics* **151** 754 (2008)
28. “Application of calorimetry on a chip to high-pressure materials,” A. Navrotsky, M. Dorogova, F. Hellman, D. W. Cooke, **B. L. Zink**, C. E. Leshner, J. Boerio-Goates, B. F. Woodfield, and B. Lang, *Proceedings of the National Academy of Sciences*, **104** 9187 (2007).
27. “14-pixel, multiplexed array of gamma-ray microcalorimeters with 47 eV energy resolution at 103 keV,” W. B. Doriese, J. N. Ullom, J. A. Beall, W. D. Duncan, L. Ferreira, G. C. Hilton, R. D. Horansky, K. D. Irwin, J. A. B. Mates, C. D. Reintsema, L. R. Vale, Y. Xu, **B. L. Zink**, A. S. Hoover, M. W. Rabin, C. R. Rudy, and D. T. Vo, *Applied Physics Letters*, **90** 193508 (2007).
26. “Multiplexed microcalorimeter arrays for precision measurements from microwave to gamma-ray wavelengths,” J. N. Ullom, W. B. Doriese, J. A. Beall, W. D. Duncan, L. Ferreira, G. C. Hilton, R. D. Horansky, K. D. Irwin, T. Jach, B. Mates, N. A. Miller, G. C. O’Neill, C. D. Reintsema, N. Ritchie, D. R. Schmidt, L. R. Vale, Y. Xu, **B. L. Zink**, A. Hoover, C. R. Rudy, D. M. Tournear, D. T. Vo, and M. W. Rabin, *Nuclear Instruments and Methods in Physics Research A*, **579** 161-164 (2007).
25. “Superconducting absorbers for use in ultra-high resolution gamma-ray spectrometers based on low temperature microcalorimeter arrays,” R. D. Horansky, J. N. Ullom, J. A. Beall, W. B. Doriese, W. D. Duncan, L. Ferreira, G. C. Hilton, K. D. Irwin, C. D. Reintsema, L. R. Vale, **B. L. Zink**, A. Hoover, C. R. Rudy, D. M. Tournear, D. T. Vo, and M. W. Rabin, *Nuclear Instruments and Methods in Physics Research A*, **579** 169-172 (2007).
24. “Excess modes and enhanced scattering in rare-earth doped amorphous silicon thin films,” **B. L. Zink**, R. Islam, D. J. Smith, F. Hellman, *Physical Review B*, **74** 205209 (2006).
23. “An array-compatible transition-edge sensor microcalorimeter γ -ray detector with 42 eV energy resolution at 103 keV,” **B. L. Zink**, J. N. Ullom, J. A. Beall, K. D. Irwin, W. B. Doriese, W. D. Duncan, L. Ferriera, G. C. Hilton, R. D. Horansky, C. D. Reintsema, and L. R. Vale, *Applied Physics Letters* **89**, 124101 (2006). (Also featured in *Virtual Journal of Applications of Superconductivity* **11**, Oct. 1, 2006.)
22. “Specific heat and thermal conductivity of thin-film amorphous silicon,” **B. L. Zink**, R. Pietri, and F. Hellman, *Physical Review Letters*, **96**, 055902 (2006).
21. “Erbium-doped Gold Sensor Films for Magnetic Microcalorimeter X-ray Detectors,” **B. L. Zink**, K. D. Irwin, G. C. Hilton, J. N. Ullom and D. P. Pappas, *Journal of Applied Physics*, **99**, 08B303 (2006).

20. "Optimization of transition-edge calorimeter performance," J. N. Ullom, J. A. Beall, W. B. Doriese, W. D. Duncan, L. Ferreira, G. C. Hilton, K. D. Irwin, C. D. Reintsema, L. R. Vale and **B. L. Zink**, *Nuclear Instruments and Methods in Physics Research A*, **559**, 422 (2006).
19. "Microwave SQUID multiplexers for low-temperature detectors," K. D. Irwin, J. A. Beall, W. B. Doriese, W. D. Duncan, G. C. Hilton, J. A. B. Mates, C. D. Reintsema, D. R. Schmidt, J. N. Ullom, L. R. Vale, **B. L. Zink** and K. W. Lehnert, *Nuclear Instruments and Methods in Physics Research A*, **559**, 802 (2006).
18. "Fabrication of prototype imaging arrays for SCUBA-2," G. C. Hilton, J. A. Beall, W. B. Doriese, W. D. Duncan, L. S. Ferreira, K. D. Irwin, C. D. Reintsema, J. N. Ullom, L. R. Vale, Y. Xu, **B. L. Zink**, W. Parkes, A. S. Bunting, C. C. Dunare, A. M. Gundlach, J. T. M. Stevenson, A. J. Walton, E. Schulte, E. Corrales, J. P. Sienicki, Dan Bintley, P. A. R. Ade, Rashmi V. Sudiwala, Adam L. Woodcraft, Mark Halpern, W. Holland, M. D. Audley and M. Macintosh, *Nuclear Instruments and Methods in Physics Research A*, **559**, 513 (2006).
17. "Si-N membrane-based microcalorimetry: heat capacity and thermal conductivity of thin films," B. Revaz, **B. L. Zink** and F. Hellman, *Thermochimica Acta* **432**, 158-168 (2005).
16. "Measurement of thermal conductivity of thin film samples using micromachined Si-N membrane calorimeters," **B. L. Zink**, B. Revaz, J. J. Cherry, F. Hellman, *Review of Scientific Instruments* **76**, 024901 (2005).
15. "Specific heat and thermal conductivity of low-stress amorphous Si-N membranes" **B. L. Zink**, F. Hellman, *Solid State Communications* **129**, 199-204 (2004).
14. "Lithographically patterned magnetic calorimeter x-ray detectors with integrated SQUID read-out" **B. L. Zink**, K. D. Irwin, G. C. Hilton, D. P. Pappas, J. N. Ullom and M. E. Huber, *Nuclear Instruments and Methods in Physics Research A* **520**, 52-55 (2004).
13. "Thermodynamic properties of excess-oxygen-doped $\text{La}_2\text{CuO}_{4.11}$ near a simultaneous transition to superconductivity and long-range magnetic order" G. A. Jorge, M. Jaime, L. Civale, C. D. Batista, **B. L. Zink**, F. Hellman, B. Khaykovich, M. A. Kastner, Y. S. Lee and R. J. Birgeneau, *Physical Review B* **69**, 174506 (2004).
12. "Numerical simulation of the heat transfer in amorphous silicon nitride membrane-based microcalorimeters" B. Revaz, **B. L. Zink**, D. O'Neill, L. Hull and F. Hellman, *Review of Scientific Instruments* **74**, 4389-4403 (2003).
11. "Mean-field behavior with Gaussian fluctuations at the ferromagnetic phase transition of SrRuO_3 " D. Kim, **B. L. Zink**, F. Hellman, S. McCall, G. Cao and J. E. Crow, *Physical Review B* **67**, 100406(R) (2003).
10. "Finite size effects on the moment and ordering temperature in antiferromagnetic CoO layers," Y. J. Tang, D. J. Smith, **B. L. Zink**, F. Hellman and A. E. Berkowitz, *Physical Review B* **67**, 054408 (2003).
9. "Magnetic moments and interactions near the metal-insulator transition in amorphous magnetic semiconductors," **B. L. Zink**, V. Preisler, D. R. Queen and F. Hellman, *Physical Review B* **66**, 195208 (2002).
8. "Thin film microcalorimeter for measurement of specific heat in high magnetic fields," **B. L. Zink**, B. Revaz, R. Sappey and F. Hellman, *Review of Scientific Instruments* **73**, 1841 (2002).

7. "Tricritical point and the doping dependence of the order of the ferromagnetic phase transition of $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$," D. Kim, B. Revaz, **B. L. Zink**, F. Hellman, J. J. Rhyne and J. F. Mitchell, *Physical Review Letters* **89**, 227202 (2002).
6. "Critical behavior of $\text{La}_{0.75}\text{Sr}_{0.25}\text{MnO}_3$," D. Kim, **B. L. Zink**, F. Hellman and J. M. D. Coey, *Physical Review B* **65**, 214424 (2002).
5. "Infrared probe of metal-insulator transition in $\text{Si}_{1-x}\text{Gd}_x$ and $\text{Si}_{1-x}\text{Y}_x$ amorphous alloys in magnetic field," D. N. Basov, A. M. Bratkovsky, P. F. Henning, **B. Zink**, F. Hellman, Y. J. Wang, C. C. Homes, and M. Strongin, *Europhysics Letters* **57**, 240-246 (2002).
4. "Enhancement of the electronic contribution to the low-temperature specific heat of a Fe/Cr multilayer," B. Revaz, M.-C. Cyrille, **B. L. Zink**, Ivan K. Schuller, and F. Hellman, *Physical Review B* **65**, 094417 (2002).
3. "Spin-glass freezing and RKKY interactions near the metal-insulator transition in amorphous Gd-Si alloys," F. Hellman, D. R. Queen, R. M. Potok and **B. L. Zink**, *Physical Review Letters* **84**, 5411-14 (2000).
2. "Large magnetic entropy in giant magnetoresistive amorphous gadolinium silicon," **B. L. Zink**, E. Janod, K. Allen and F. Hellman, *Physical Review Letters* **83**, 2266-9 (1999).
1. "Low-temperature magnetoresistance in insulating $a\text{-Gd}_x\text{Si}_{1-x}$ alloys," P. Xiong, **B. L. Zink**, S. I. Applebaum, F. Hellman and R. C. Dynes, *Physical Review B* **59**, R3929-R3933 (1999).

INVITED TALKS

- "Planar Nernst effects and the search for thermal spin currents with in-plane thermal gradients (working title)"
August 2013, Spintronics VI Symposium of the SPIE Optics & Photonics Conference, San Diego, CA (pending)
- "Planar Nernst effects and the search for thermal spin currents in ferromagnetic metals (working title)"
May 2013, Fifth International SpinCaloritronics Workshop, Columbus, Ohio (pending)
- "Search for thermal spin currents in ferromagnetic metals with in-plane thermal gradients"
April 22-23 2012, DFG Spin Caloric Transport Conference, Bad Honnef, Germany (pending)
- "Observation of the Planar Nernst Effect in Permalloy and Nickel Thin Films with In-plane Thermal Gradients."
March 2013, March Meeting of the American Physical Society (pending)
- "The Planar Nernst Effect and the Search for Thermal Spin Currents in Ferromagnetic Metals,"
March 2013, DPG (German Physical Society) Spring Meeting (pending)
- "Title???"
January 29, 2013, JPL Microdevice Lab Seminar (pending)
- "The Planar Nernst Effect and the Search for Thermal Spin Currents in Ferromagnetic Metals"
October 26, 2012, Fall 2010 Meeting of the American Physical Society Four Corners Section, Socorro, NM

“The Planar Spin Seebeck Effect?”

June 2012, Fourth International Spincaloritronics Workshop, Sendai, Japan

“Nanoscience and Nanotechnology: What’s So Big About Small?”

October 1, 2011, University of Denver Alumni Symposium

“Measuring thermoelectric effects in magnetic thin films and nanostructures via micromachined thermal isolation platforms”

May 2011 Third International Spincaloritronics Workshop, Leyden, The Netherlands

“Thermoelectric Effects and Thermal Spin Currents in Magnetic Nanostructures”

October 19, 2010, Texas A&M University, Physics Colloquium

“Thermoelectric effects and thermal spin currents in magnetic nanostructures”

August 31, 2010, Nanoelectronics Research Initiative, e-Workshop

“Heating Up Thin Films and Nanostructures: New Measurements of Thermal Properties for Thermoelectrics and Spintronics,”

April 26, 2010, Arizona State University, Nanoscience Seminar

March 8, 2010, University of South Florida, Physics Colloquium

June 17 2009, University of Texas, Dallas Physics Colloquium

“Electron and Phonon Transport in Thermoelectric Thin Films and Nanostructures,”

April 2, 2009, Colorado State University Mechanical Engineering Seminar

September 24, 2008, University of Colorado, Boulder, Physics Colloquium

“Electrons, Phonons, and Magnons in Thin Films and Nanostructures,”

February 6, 2009, SUNY Stony Brook, Solid State Physics Seminar

“Electron, Phonon, and Magnon Heat Transport in Thin Films and Nanostructures,”

November 21, 2008, University of Wyoming, Physics and Astronomy Colloquium

“Electron and Phonon Transport in Thermoelectric Thin Films and Nanostructures,”

Fall 2008 Meeting of the American Physical Society Four Corners/Texas Sections, El Paso, TX

“Thermal Pathways in Ultra-high Resolution Gamma-ray Detector Materials for Nuclear Material Detection,”

Intelligence Community Academic Summit, June 2008

“In Search of a Tunable Tunneling State: Thermal Properties of Amorphous Silicon Alloys,”

December 10, 2007, MRSEC Seminar, University of Minnesota

“Nanoscience and Nanotechnology: What’s So Big About Small?”

September 5, 2007, University of Denver Discoveries All Campus Lecture

“Thermal Adventures in Amorphous Thin Films,”

August 27, 2007, Physics Colloquium, Colorado State University

“Tunneling States, Excess Modes, and Other Thermal Adventures in Amorphous Thin Films,”

July 20, 2007, Imperial College, London

February 21, 2006, Condensed Matter Seminar, Oregon State University

- “Quantum Calorimeter Gamma-ray Detectors: New Tools for Non-proliferation,”
March 2007 Meeting of the American Physical Society, Denver, CO
- “Quantum Calorimetry for Non-proliferation,”
April 3, 2006, Physics Colloquium, University of Denver
February 20, 2006, Physics Colloquium, Oregon State University
January 26, 2006, Chemical Engineering and Materials Science Department, UC Davis
January 23, 2006, Physics Colloquium, University of Central Florida
December 16, 2005, Quantum Devices Group Seminar, NIST
November 17, 2005, Condensed Matter Physics Seminar, CU Boulder
- “Development of Magnetic Microcalorimeter X-ray Detectors at NIST,”
April 30, 2004, Cryogenic Particle Detection Group Seminar, Kirchoff-Institut für Physik,
University of Heidelberg, Germany
- “Si-N Membrane Microcalorimetry: Thermal Conductivity and Specific Heat of Thin Films from
2 – 500 K in Magnetic Fields to 8 Tesla,”
March 2003 Meeting of the American Physical Society, Austin, TX

ZINK GROUP CONTRIBUTED TALKS/POSTERS

- “GMAG PhD Dissertation Research Award: Observation of the Planar Nernst Effect in Permalloy
and Nickel Thin Films With In-Plane Thermal Gradients,” (invited)
(presented by A. D. Avery) March 2013, March Meeting of the American Physical Society
(pending)
- “Thermal properties of Silicon Nitride membranes using Johnson Noise Thermometry from 50mK,”
(presented by D. Bassett) 2012 Applied Superconductivity Conference, October 2012, Port-
land, OR
- “Heat Transport by Long Mean Free Path Vibrations in Amorphous Silicon-Nitride near Room
Temperature,” PHONONS 2012 (XIV International Conference on Phonon Scattering in Con-
densed Matter), July 12, 2012, Ann Arbor, Michigan
- “Nanoscale Thermal Transport Measurements: Bridging Ultrafast and Steady State,”
(poster presented by M. Siemens), PHONONS 2012 (XIV International Conference on Phonon
Scattering in Condensed Matter), July 12, 2012, Ann Arbor, Michigan
- “Spin Seebeck Effect Measurements on Ferromagnetic Thin Films Using Micromachined Thermal
Isolation Platforms,” (presented by A. D. Avery) APS March Meeting 2012, Boston, MA
- “Detection of the Transverse Voltage Associated with the Spin Seebeck Effect in Ferromagnetic
Thin Films,”
(presented by A. Avery) APS March Meeting 2011, Dallas, TX
- “Thermal Transport and Surface Sensitivity in Suspended Amorphous Silicon-Nitride Thin Films,”
(presented by D. Bassett) APS March Meeting 2011, Dallas, TX
- “Exploration of Thermal Conductivity, Seebeck Coefficient, and Lorenz Number Deviations in Ni-
Fe Alloy Thin Films,”
(presented by A. Avery) APS March Meeting 2011, Dallas, TX

- “Measurements of Thermoelectric Properties in Thin Films as a Function of Temperature Using Micromachined Thermal Isolation Platforms,”
(presented by R. Sultan) APS March Meeting 2010, Portland, OR
- “Thermoelectric Measurements of Magnetic Nanostructures Using Thermal Isolation Platforms,”
(presented by A. Avery) APS March Meeting 2010, Portland, OR
- “Direct measurements of magneto-thermoelectric effects in thin films and nanostructures[†],”
(presented by A. Avery) 11th Joint MMM/Intermag Conference, Jan. 2010, Washington, D.C.
- “Measurements and Modeling of Thermal Transport in Microcalorimeter Detectors and Materials”,
13th International Workshop on Low Temperature Detectors, Stanford, CA, July 2009
- “Direct Measurements of Figure-of-Merit in Amorphous Silicon-based Thermoelectric Thin Films,”
(presented by R. Sultan) APS March Meeting 2009, Pittsburgh, PA
- “Thermoelectric Transport and Thermal Spin Currents in Ferromagnetic Films and Nanostructures,”
(presented by A. Avery) APS March Meeting 2009, Pittsburgh, PA
- “Thermal and Thermoelectric Transport in Thin Films and Nanostructures,”
APS March Meeting 2009, Pittsburgh, PA
- “Exploring Magnon Heat Transport and Thermal Spin Currents in Ferromagnetic Thin Films,”
53rd Annual Conference on Magnetism and Magnetic Materials, Austin, TX
- “Micromachined thermal isolation devices for measuring in-plane thermal conductivity of thin films from 77 to 325 K[†],”
(Presented by A. Azure) Fall 2008 Meeting of the American Physical Society Four Corners/Texas Sections, El Paso, TX
- “Direct measurements of thermoelectric properties of thin films and nanostructures[†],”
(Presented by R. Sultan) Fall 2008 Meeting of the American Physical Society Four Corners/Texas Sections, El Paso, TX
- “Micromachined tools for measuring thermopower and in-plane thermal conductivity of thermoelectric thin films,”
(Presented by A. Avery) APS March Meeting 2008, New Orleans, LA
- “Design, Fabrication, and Multiplexing of Magnetic Calorimeter X-ray Detectors with High-Efficiency SQUID Readout,”
12th International Workshop on Low Temperature Detectors, Paris, France, July 2007
- “SQUID-based magnetic thermometry for fundamental physics and applications below 1 K,”
(Presented by R. Sultan) APS March Meeting 2007, Denver, CO
- “Micro- and nanomachined tools for measuring in-plane thermal conductivity of thermoelectric thin films,”
APS March Meeting 2007, Denver, CO

[†] Winner of “Best Student Poster” Award.

OUTREACH/PRESS

Ninth Annual Cherry Creek High School Science Symposium

Judge, April 14, 2008

On the physics of baseball at high altitudes...

Live interview on KOA 850 AM Morning News Saturday, October 27th, 2007

Live interview on CBS 4 Denver Morning Show, October 27th, 2007

Quote in, "In the thick of the series, thin air may toss Sox a curve," by Colin Nickerson, *Boston Globe*, Saturday, October 27th, 2007

On the physics of Ubaldo Jimenez' pitching...

Interview by Alan Gionet for "That's a Good Question" series for CBS 4 Denver, Aired July, 2010

On simple cryogenics...

Live interview on FOX 31 Morning Show, October 23rd, 2007 (with Prof. Jennifer Hoffman and DU Physics majors Kathy Giese, Matt Dahl and Naomi Pequette)

On gamma-ray detectors for nuclear non-proliferation...

news@nature.com, "The quest for a finer gamma ray detector," by Sarah Tomlin, March 16, 2006

COURSES TAUGHT

PHYS 1211 <i>University Physics I</i>	Winter 2007
PHYS 1212 <i>University Physics II</i>	Spring 2007
PHYS 1213 <i>University Physics III</i>	Fall 2007
PHYS 1211 <i>University Physics I</i>	Winter 2008
PHYS 1212 <i>University Physics II</i>	Spring 2008
PHYS 1223 <i>University Physics III</i>	Fall 2008
PHYS 4001 <i>Introduction to Research</i> (Team-taught with several other P&A Faculty)	Fall 2008
PHYS 1211 <i>University Physics I</i>	Winter 2009
PHYS 1212 <i>University Physics II</i>	Spring 2009
PHYS 1213 <i>University Physics III</i>	Fall 2009
PHYS 3112 <i>Quantum Physics II</i>	Winter 2010
PHYS 4811 <i>Statistical Mechanics</i>	Spring 2010
PHYS 3111 <i>Quantum Physics I</i>	Fall 2010

PHYS 3112 <i>Quantum Physics II</i>	Winter 2011
PHYS 4811 <i>Statistical Mechanics</i>	Spring 2011
PHYS 4003 <i>Introduction to Research</i>	Spring 2011
PHYS 3111 <i>Quantum Physics I</i>	Winter 2012
PHYS 3112 <i>Quantum Physics II</i>	Spring 2012

TEACHING RELATED

- Participant in AAPT New Faculty Workshop Reunion, March 15, 2009
- Participant in AAPT Workshop for New Physics and Astronomy Faculty, Nov. 8-11, 2007
- Participant in DU Clicker Workshop, August 2007
- Participant in DU Center for Teaching and Learning New Faculty Workshop series, Fall 2006

SERVICE TO THE UNIVERSITY

Ammi Hyde Interview Team Leader	Fall 2006,2007; Winter 2007,2008
Undergraduate Committee, Department of Physics and Astronomy	Fall 2006-2009
Chairman, 2007-2008	
Physics and Astronomy Faculty Search Committee	2006-2007
IMLSB Biophysics Faculty Search Committee	2006-2007
Life Sciences Users Group	2007
IMLSB Biochemistry Faculty Search Committee	2006-2007
IMLSB Biophysics Faculty Search Committee	2007-2008
PROF Review NSM/SECS Area Review Group and Campus-wide Review Committee	2008
IMLSB Biophysics Faculty Search Committee	2008-2009
Center for Nanoscale Science and Engineering @ DU	2007-
Associate Director (Physics), 2008-	
Finance Committee Chairman, 2008-09	
Provost's General Education Review Committee	2008-09
Natural Science and Mathematics Inclusive Excellence Committee	2009-
Graduate Committee, Department of Physics and Astronomy	Fall 2009-
University Physics Committee, Department of Physics and Astronomy	Fall 2009-
Chairman, 2009-	
Physics and Astronomy Faculty Search Committee	2009-2010

Chairman

- DU Strategic Planning for Research Task Force 2010-2011
- DU Strategic Visioning: Research Committee 2011
- “Renew DU:” Research Committe 2012-

SERVICE TO THE SCIENTIFIC COMMUNITY _____

Journal Referee for *Physical Review Letters*, *Physical Review B*, *Applied Physics Letters*, *Reviews of Modern Physics*, *Philosophical Magazine*, *Journal of Applied Physics*, *Journal of Physics: Condensed Matter*, *AIP Advances*, *Solid State Communications*, *Review of Scientific Instruments*, *Nanotechnology*, *Journal of Physics D: Applied Physics*, and *Journal of Micromechanics and Microengineering*

Proposal Review for the National Science Foundation (DMP), American Chemical Society Petroleum Research Fund, Defense Threat Reduction Agency, and the NASA Postdoctoral Program

Member of the Editorial Board for *The Open Condensed Matter Physics Journal*

Member of the American Physical Society, Materials Research Society, American Association of Physics Teachers, and Sigma Xi

Elected Member-at-Large of the APS Topical Group on Instruments and Measurement Sciences (GIMS), 2011-2014

Program Committee, 2013 Joint MMM-Intermag Conference (Chicago, IL, January 2013)

Panelist for NSF-DMR Condensed Matter Physics Program, March 2012