DOUGLAS NATELSON

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Professional Appointments

7/22-9/22	**Interim Vice President for Research**, Rice University
7/16-6/22	**Chair**, Department of Physics and Astronomy, Rice University
7/10-present	**Professor**, Department of Physics and Astronomy, Rice University; member, Rice Quantum Institute; courtesy appointment, Dept. of Electrical and Computer Engineering. Since 1/14, also courtesy appointment, Dept. of Materials Science and Nanoscale Engineering.
7/06-7/10	**Associate Professor**, Department of Physics and Astronomy, Rice University; member, Rice Quantum Institute; courtesy appointment, Dept. of Electrical and Computer Engineering.
8/00-7/06	**Assistant Professor**, Department of Physics and Astronomy, Rice University; member, Rice Quantum Institute; courtesy appointment (9/01) Dept. of Electrical and Computer Engineering.

Education and Training

10/98-8/00	**Postdoctoral Member, Technical Staff**, Bell Laboratories, with Dr. R.L. Willett
9/93-8/98	**Stanford University**, Stanford, CA - Ph.D. in Physics, "Collective behavior of tunneling systems in amorphous solids", advisor: Prof. D.D. Osheroff
9/89-6/93	**Princeton University**, Princeton, NJ - BSE in Mechanical and Aerospace Engineering, Program in Engineering Physics, *summa cum laude*

Principal Academic Service and Accomplishments

Interim VP for Research July-Sept 2022

- Conducted self-study of Office of Research organization, worked with incoming VPR to prepare detailed request for positions and resources needed to support aggressive growth of research capabilities.
- Served as Research Integrity Officer and Institutional Official
- Oversaw commitments of costsharing for major grant programs
- Engaged with staff to address challenges including IRB and IUCUC, COI
- Served on search committee for new AVP for Compliance

Chair, Department of Physics and Astronomy 2016-2022

- USNWR ranking rose from 28th to 21st overall, ranked 8th in AMO physics, 19th in Condensed Matter, $14M annual research funding (direct+indirect); 40 T/TT faculty, 5 NTT teaching faculty, 3 NTT research faculty, 9 administrative staff, ~105 doctoral students, ~ 60 undergraduate majors
- Hired 8 TT faculty, 1 NTT teaching faculty, 1 NTT research faculty, 4 administrative staff
- Led development and adoption of departmental long-range strategic plan (2022)
- Worked to help organize founding of Rice Quantum Initiative (faculty hiring across university)

- Established departmental Diversity/Equity/Inclusion committee, departmental DEI statement; led departmental engagement with APS TEAM-UP
- Led capital project which allowed outfitting of additional graduate student office space to accommodate growth
- Navigated department through Hurricane Harvey, COVID pandemic
- Worked with School of Natural Sciences to develop school-wide strategic plan

Rice Advanced Materials Institute steering committee (member) 2022-present
Smalley-Curl Institute steering committee (member) 2022-present
James A. Baker III Institute for Public Policy (scholar) 2020-present

Associate Chair for the PHYA Graduate Program 2014-2016

- Reorganized finances and policies as university changed financial model
- Updated and expanded advisory committee roles
- Led graduate program committee in revising and updating program handbook
- Implemented vacation policy

Chair, University Committee on Research 2011-2014

- Led drafting of university data management policy
- Launched faculty survey of research needs
- Shepherded revision of university research misconduct policy
- Steered revision of university policies on conflict of interest and commitment

PHYA faculty search committee chair 2006-2007
PHYA faculty search committee co-chair 2012-2013
PHYA long-range planning committee (member) 2013-2014

Shared Equipment Authority 2002-present

- Chair 2011-2016
  Secured endowment funding and annual funds to replace and upgrade shared research infrastructure
  Responsible for 12 staff scientists + admin support, ~$20M of shared infrastructure, ~$1M annual operations and maintenance expenses
- Ad hoc cleanroom committee 2017-2018
  Supervised design and creation of new Rice cleanroom

Sloan NSCI Professional Masters oversight committee (member) 2001-2020
Smalley-Curl Institute advisory committee (member) 2015-present
Rice Quantum Institute steering committee (member) 2005-2015
Applied Physics Graduate Program (chair) 2002-2010
Applied Physics Graduate Program (committee member) 2010-2018
University Committee on Research (chair) 2011-2016
Ad Hoc Biological Research Collaborative Committee (member) 2014-2015
Keck Program in Quantum Materials (co-director) 2006-2010
Research Administration Advisory Group (member) 2007-2014
Search committee for Dean of Graduate and Postdoctoral Studies 2006-2007
University Council (member) 2006-2010
University Parking Committee (member) 2002-2005
Wiess College Faculty Associate 2000-present
Outstanding Associate 2002, 2020

Principal Honors

APS Fellow (Division of Condensed Matter Physics) 2012
AAAS Fellow (Physics) 2012

Defense Sciences Study Group	2010-2011
Discovery Magazine's "Top 20 Scientists under 40"	2008
Alfred P. Sloan Foundation Research Fellowship	2004
NSF CAREER award	2003
David and Lucille Packard Fellowship	2003
Hertz Fellowship	1993
NSF Graduate Fellowship (declined for Hertz)	1993
Goldwater Scholarship	1991

Selected Professional Activities

- Associate editor, *Nano Letters* (ACS), (1/23-present)
- Blogger (nanoscale.blogspot.com) about nanoscale and condensed matter physics (2005-present)
- Defense Sciences Study Group alumni board (12/18-present)
- Co-organizer, Rice Center for Quantum Materials workshop on strange metals and correlations (2022)
- Co-organizer, 2022 Meeting of the TX Section of the APS (fall 2022)
- External review committee, Emory University Department of Physics (2018)
- Authored textbook, *Nanostructures and Nanotechnology* (Cambridge University Press, 2015). ISBN: 9780521877008.
- Advisory board, IOP journal *Nanotechnology* (10/17-10/19)
- Member at Large; member, Fellowship Committee, APS Division of Condensed Matter Physics (3/16-3/19)
- Organizer, workshop on "Interacting Quantum Systems Out of Equilibrium", Rice University, May, 2016
- Co-organizer, ARO-sponsored workshop at Rice on "Heavy Fermion Materials and Quantum Phase Transitions", December, 2013
- Co-organizer, ARO-sponsored workshop at Rice on "Surface Plasmons, Metamaterials, and Catalysis", October, 2013
- Organizer of APS DMP invited symposium (2008 March APS Meeting)
- Organizer of APS DMP invited symposium (2005 March APS Meeting)
- Member, APS, AAAS, MRS, ACS

RESEARCH

Research Interests

Using nanoscale tools to address open problems in condensed matter physics; coherence and correlations in systems of reduced dimensionality; quantum and molecular electronics; plasmonics; electronic, magnetic, and optical properties of materials; novel device fabrication methods.

Publications (http://natelson.rice.edu/publications.html)

[ORCID 0000-0003-2370-9859; h-index = 60, total citations > 13000, google scholar]

Submitted:

- Yunxuan Zhu, Jiawei Yang, Jaime Abad-Arredondo, Antonio I. Fernandez-Dominguez, Francisco Garcia-Vidal, and Douglas Natelson, "Electroluminescence as a probe of strong exciton-plasmon coupling in few-layer WSe_2", in review (2023).

In revision:

- Renjie Luo, Tanner J. Legvold, Liyang Chen, Henry Navarro, Ali C. Basaran, Deshun Hong, Changjiang Liu, Anand Bhattacharya, Ivan K. Schuller, and Douglas Natelson, "Low temperature spin Seebeck effect in non-magnetic vanadium dioxide", in revision (2023).
- Renjie Luo, Xuanhan Zhao, Tanner J. Legvold, Liyang Chen, Changjiang Liu, Deshun Hong, Anand Bhattacharya, and Douglas Natelson, "The challenges of measuring spin Seebeck noise", in revision.

In print:

- Liyang Chen, Dale T. Lowder, Emine Bakali, Aaron M. Andrews, Werner Schrenk. Monkia Waas, Robert Svagera, Gaku Eguchi, Lukas Prochaska, Yiming Wang, Chandan Setty, Shouvik Sur, Qimiao Si, Silke Paschen, and Douglas Natelson, "Shot noise in a strange metal", *Science*, in press (2023).
- Shusen Liao, Yunxuan Zhu, Qian Ye, Stephen Sanders, Jiawei Yang, Alessandro Alabastri, and Douglas Natelson, "Quantifying efficiency of remote excitation for surface-enhanced Raman spectroscopy in molecular junctions", *J. Phys. Chem. Lett.* **14**, 7574-7580 (2023).
- Mahdiyeh Abbasi, Shusen Liao, Yunxuan Zhu, and Douglas Natelson, "Engineering the directionality of hot carrier tunneling in plasmonic tunneling structures", *Appl. Phys. Lett.* **122**, 231103 (2023).
- Renjie Luo, Tanner J. Legvold, Liyang Chen, and Douglas Natelson, "Nernst-Ettinghausen effect in thin Pt and W films at low temperatures", *Appl. Phys. Lett.* **122**, 182405 (2023).
- Yunxuan Zhu, Longji Cui, Mahdiyeh Abbasi, and Douglas Natelson, "Tuning light emission crossovers in atomic-scale aluminum plasmonic junctions", *Nano Lett*. **22**, 8068-8075 (2022)
- Douglas Natelson, "Intra-molecular switching for memory and logic", *Nat. Mater*. **21**, 839-840 (2022).
- Renjie Luo, Xuanhan Zhao, Henry Navarro, Ivan K. Schuller, and Douglas Natelson, "Spin Seebeck effect at low temperatures in the nominally paramagnetic insulating state of vanadium dioxide", *Appl. Phys. Lett*. **121**, 102404 (2022).
- Charlotte I. Evans, Rui Yang, Lucia T. Gan, Mahdiyeh Abbasi, Xifan Wang, Rachel Traylor, Jonathan A. Fan, and Douglas Natelson, "Detection of trace impurity gradients in noble metals by the photothermoelectric effect", *J. Phys. Chem. C* **125**, 17509-17517 (2021).
- Longji Cui, Yunxuan Zhu, Peter Nordlander, Massimiliano Di Ventra, and Douglas Natelson, "Thousand-fold Increase in Plasmonic Light Emission via Combined Electronic and Optical Excitations", *Nano Lett.* **21**, 2658-2665 (2021).
- Yunxuan Zhu, Douglas Natelson, and Longji Cui, "Probing energy dissipation in molecular-scale junctions via surface enhanced Raman spectroscopy: vibrational pumping and hot carrier enhanced light emission", *J. Phys.: Condens. Matt.* **33**, 134001 (2021).
- Mahdiyeh Abbasi, Charlotte I. Evans, and Douglas Natelson, "Single metal photodetectors using plasmonically-active asymmetric gold nanostructures", *ACS Nano* **14**, 17535-17542 (2020).
- Yunxuan Zhu, Longji Cui, and Douglas Natelson, "Hot-carrier enhanced light emission: The origin of above-threshold photons from electrically driven plasmonic tunnel junctions", *J. Appl. Phys* **128**, 233105 (2020).

- Liyang Chen, Panpan Zhou, Yoav Kalcheim, Ivan K. Schuller, and Douglas Natelson, "Percolation and nanosecond fluctuators in V_2O_3 films within the metal-insulator transition", *APL Materials* **8**, 101103 (2020).
- Charlotte I. Evans, Rui Yang, Lucia T. Gan, Mahdiyeh Abbasi, Xifan Wang, Rachel Traylor, Jonathan A. Fan, and Douglas Natelson, "Thermoelectric response from grain boundaries and lattice distortions in crystalline gold devices", *Proc. Nat. Acad. Sci. US* **117**, 23350-23355 (2020).
- Panpan Zhou, Liyang Chen, Ilya Sochnikov, Tsz Chun Wu, Matthew S. Foster, Anthony T. Bollinger, Xi He, Ivan Božović, and Douglas Natelson, "Tunneling spectroscopy of c-axis epitaxial cuprate junctions", *Phys. Rev. B* **101**, 224512 (2020)
- Longji Cui, Yunxuan Zhu, Mahdiyeh Abbasi, Arash Ahmadivand, Burak Gerislioglu, Peter Nordlander, and Douglas Natelson, "Electrically driven hot-carrier generation and above-threshold light emission in plasmonic tunnel junctions", *Nano Lett.* **20**, 6067-6075 (2020) .
- Xuanhan Zhao, Panpan Zhou, Liyang Chen, Kenji Watanabe, Takashi Taniguchi, and Douglas Natelson, "Tunneling noise and defects in exfoliated hexagonal boron nitride", *AIP Adv.*, **9**, 105218 (2019).
- Panpan Zhou, Liyang Chen, Yue Liu, Ilya Sochnikov, Anthony T. Bollinger, Myung-Geun Han, Yimei Zhu, Xi He, Ivan Božović, and Douglas Natelson, "Electron pairing in the pseudogap state revealed by shot noise in copper-oxide junctions", *Nature* **572**, 493-496 (2019).
- Loah A. Stevens, Tingxin Li, Rui-Rui Du, and Douglas Natelson, "Noise processes in InAs/Ga(In)Sb Corbino structures", *Appl. Phys. Lett.* **115**, 052107 (2019).
- Jiangtan Yuan, Andrew Balk, Hua Guo, Qiyi Fang, Sahil Patel, Xuanhan Zhao, Tanguy Terlier, Douglas Natelson, Scott A. Crooker, and Jun Lou, "Room temperature magnetic order in air-stable ultra-thin iron oxide", *Nano Lett.* **19**, 3777-3781 (2019).
- Charlotte I. Evans and Douglas Natelson, "Remote excitation of hot electrons via propagating surface plasmons", *J. Phys. Chem. C* **123**, 10057-10064 (2019).
- Douglas Natelson, "Commentary: Condensed matter's image problem", *Physics Today* online (2018).
- Xifan Wang, Charlotte I. Evans, and Douglas Natelson, "Photothermoelectric detection of gold oxide non-thermal decomposition", *Nano Lett.* **18**, 6557-6562 (2018).
- Douglas Natelson, Charlotte I. Evans, and Pavlo Zolotavin, "Photovoltages and hot electrons in plasmonic nanogaps", Proceedings Volume 10540, Quantum Sensing and Nano Electronics and Photonics XV; 105400S (2018)
- Shi Chen, Zhaowu Wang, Lele Fan, Yuliang Chen, Hui Ren, Heng Ji, Douglas Natelson, Yingying Huang, Jun Jiang, and Chongwen Zou, "Sequential insulator-metal-insulator phase transitions of VO_2 triggered by hydrogen doping", *Phys. Rev. B* **96**, 125130 (2017).
- Charlotte I. Evans, Pavlo Zolotavin, Alessandro Alabastri, Jian Yang, Peter Nordlander, and Douglas Natelson, "Quantifying remote heating from propagating surface plasmon polaritons", *Nano Lett.* **17**, 5646-5652 (2017).
- Pavlo Zolotavin, Charlotte I. Evans, and Douglas Natelson, "Substantial local variation of Seebeck coefficient in gold nanowires", *Nanoscale* **9**, 9160-9166 (2017).
- Pavlo Zolotavin, Charlotte I. Evans, and Douglas Natelson, "Photothermoelectric effects and large photovoltages in plasmonic Au nanowires with nanogaps", *J. Phys. Chem. Lett.* **8**, 1739-1744 (2017).

- Panpan Zhou, Will J. Hardy, Kenji Watanabe, Takashi Taniguchi, Douglas Natelson, "Shot noise detection in hBN-based tunnel junctions", *Appl. Phys. Lett.*, **110**, 133106 (2017).
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Conference papers:

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Invited Presentations

10/23 *Seminar*, Laboratoire de Physique des Solides, University of Paris-Sud, "Shot noise in a strange metal"

10/23 *Invited talks*, Summer school, Institute for Science and Technology of Austria, Klosterneuberg, Austria, "A guide to (electronic) noise measurements in condensed matter physics", "Shot noise as a probe of unusual emergent excitations in condensed matter physics"

9/23 *Invited talk*, DOE Experimental Condensed Matter PI meeting, "Shot noise in a strange metal"

9/23 *Invited talk*, Kavli Institute for Theoretical Physics, "Shot noise in a strange metal"

7/23 *Invited talk*, Aspen Center for Physics, "Shot noise in a strange metal"

7/23 *Invited talk*, ONR program review, "Molecular-scale plasmonic light emission sources"

6/23 *Invited talk*, Electronic Transport in Molecular Quantum Conductors, Weizmann Institute, Rehovot, Israel, "Electroluminescence and remote Raman excitation in atomic-scale tunnel junctions"

5/23 *Invited talk*, Rice Paris workshop, Paris, "Spin Seebeck response in vanadium oxides"

3/23 *Invited talk*, APS March Meeting, Las Vegas, "Shot noise indicates a lack of quasiparticles in a strange metal"

9/22 *Invited talk*, RCQM-UBC workshop, "Shot noise indicates a lack of quasiparticles in a strange metal"

7/22 *Invited talk*, SuperFluctuations 2022, Padova, Italy, "Shot noise indicating pairing at temperatures above T_c and energies above the gap in LSCO" (virtual)

5/22 *Invited talk*, Spin Caloritronics XI, University of Illinois Urbana-Champagne, "Magnon shot noise in a longitudinal spin Seebeck device"

5/22 *Invited talk*, International Symposium on Physics, Monterey Tec, "Noise and what it can tell us about when electrons stop acting like electrons" (virtual)

4/22 *Invited talk*, Frontiers of Condensed Matter Physics joint course, Columbia University, "Shot noise to examine what transports charge in non-Fermi liquids" (virtual)

4/22 *Invited presentation*, Wiess School of Natural Sciences Communications Symposium, "Science communication and outreach: What I do and why"

12/21 *Invited talk*, Pacifichem conference, "Plasmons and light emission from tunneling structures: Very hot electrons"

9/21 *Colloquium*, Baylor University, "Shot noise to examine what transports charge in non-Fermi liquids"

7/21 *Invited talk*, Telluride Workshop on Quantum Transport in Nanoscale Systems, "Light emission from atomic-scale plasmonic junctions"

3/21 *Invited talk*, APS March Meeting, "Shot noise in cuprate tunnel junctions: Evidence for pairing in the pseudogap"

4/20 *Colloquium*, Carnegie Mellon University, "New surprises in high-T_c tunnel junctions"

3/20 *Chez Pierre seminar*, Massachusetts Institute of Technology, "New surprises in high-T_c tunnel junctions"

10/19 *Invited talk*, joint Rice-Mainz workshop, "Noise reveals unusual pairs in cuprate superconductors"

9/19 *Invited presentation*, DOE Experimental Condensed Matter Physics PI meeting, "Nanostructures studies of correlated quantum materials"

8/19 *Invited talk*, ACS meeting, San Diego, CA, "Plasmons and hot electrons: Open-circuit photovoltages and bias-driven light emission"

2/19 *Colloquium*, University of Texas Rio Grande Valley, "Noise reveals unusual pairs in superconductors"

10/18 *Condensed matter seminar*, Northwestern University, "Nanostructures and strongly correlated materials"

4/18 *Colloquium*, University of Houston, Department of Physics, "Heating, thermoelectricity, and hot electrons at the nanoscale"

4/18 *Invited seminar*, Harvard Center for Integrated Quantum Materials, "Nanostructures and strongly correlated materials"

1/18 *Invited talk*, SPIE meeting/Photonics West, "Photovoltages and hot electrons in plasmonic nanogaps"

9/17 *Invited presentation*, DOE Experimental Condensed Matter Physics PI meeting, "Nanostructures studies of strongly correlated materials"

7/17 *Invited talk*, International meeting, Quantum Transport in Nanoscale Molecular Systems, Telluride, CO, "Photothermoelectricity and hot electron photocurrents in nanoscale junctions"

1/17 *Colloquium*, Ohio University, "Heating and thermoelectricity at the nanoscale"

12/16 *Seminar*, Ginzton Seminar Series, Stanford University, "Heating and photothermoelectricity in nanoscale junctions"

6/16 *Invited talk*, Harvard/MIT Center for Integrated Quantum Materials, Frontiers in Quantum Materials and Devices 2016 workshop at RIKEN, Tokyo, "Nanoscale devices to examine correlated materials"

5/16 *Invited talk*, Rice Center for Quantum Materials, Interacting Quantum Systems Out of Equilibrium workshop, "Nanostructures biased out of equilibrium: Heating and other effects"

4/16 *Plenary talk*, Pittsburgh Quantum Institute, PQI 2016 – Quantum Challenges, "Heating and vibrations at the molecular scale"

2/16 *Seminar*, Department of Chemistry, University of Pennsylvania, "Plasmonic junctions: Vibrational tuning and heating at the nanoscale"

2/16 *Colloquium*, Department of Physics, Oklahoma State University, "How does heating work at the nanoscale?"

1/16 *Seminar*, Department of Physics, National Chiao-Tung University, Taiwan, "How does heating work at the nanoscale?"

11/15 *Invited presentation*, Spring Wood High School STEM symposium, "Physics – what it is, and why you should care"

11/15 *Invited presentation*, Smalley-Curl Institute Graphene Day, "2d Materials: Opportunities for Electronics, Magnetism, and Optics"

6/15 *Invited talk*, the Batsheva de Rothschild Seminar on Molecular Electronics 2015, "Tuning vibrational energies in single-molecule junctions"

4/15 *Colloquium*, Department of Physics, University of Kentucky, Lexington, KY, "How does heating work at the nanoscale?"

4/15 *Colloquium*, Department of Physics, Tulane University, New Orleans, LA, "Nanostructures and strongly correlated materials"

3/15 *Invited talk*, American Chemical Society national meeting, Denver, CO, "Nanogap plasmonic structures for Raman studies of single molecules and heating"

2/15 *Colloquium*, Department of Physics, Louisiana State University, Baton Rouge, LA, "Heating in atomic- and molecular-scale junctions"

12/14 *Condensed matter seminar*, Department of Physics, Columbia University, "How does heating work at the nanoscale?"

10/14 *Invited talk*, Rice University NorTex US-Norway conference, "Vanadium dioxide: A switchable permeable membrane for hydrogen"

9/14 *Invited talk*, University of Konstanz, international workshop on "Controlled Charge and Heat Transport at the Molecular Scale", "Raman, noise, and resistance measurements to assess heating at the nanoscale"

7/14 *Poster*, Gordon Research Conference on Strongly Correlated Materials, Mt. Holyoke, "Hydrogen-stabilized metallic states in VO2: structure and transport"

5/14 *Invited talk*, University of Buffalo *Physics at the Falls* workshop on oxides, "Vanadium dioxide and hydrogen: Doping and the metal-insulator transition"

4/14 *Colloquium*, Department of Physics, SUNY Binghamton, "How does heating work at the nanoscale?"

1/14 *Invited talk*, NerdNite Houston, "Presenting science to the public: 'It's late; we're all tired; why should any of us care about anything you're saying?'"

12/13 *Invited talk*, ARO workshop on Heavy Fermion Materials and Quantum Phase Transitions, Rice University, "Nanoscale junctions to examine Kondo systems out of equilibrium"

10/13 *Condensed matter seminar*, Department of Physics, Texas A&M University, "Heating at the nanoscale: Vibrational and electronic processes"

09/13 *Presentation*, DOE Basic Energy Sciences experimental condensed matter physics PI meeting, "Nanostructure studies of strongly correlated materials"

09/13 *Poster*, 25th Anniversary Packard Fellows Meeting, Denver, CO, "Heating and electronic interactions approaching the atomic scale"

07/13 *Invited talk*, International meeting, Quantum Transport in Nanoscale Molecular Systems, Telluride, CO, "Electron heating (and voltage tuning of molecular properties) in nanoscale junctions"

04/13 *Invited talk*, International meeting, Building Blocks for Carbon-Based Electronics: From Molecules to Nanotubes, University of Regensburg, Germany, "Molecular-scale Raman as a tool: Bias-driven shifts of C_{60} vibrational states"

02/13 *Seminar*, Department of Chemistry, UCSD, San Diego, CA, "Molecular scale junctions out of equilibrium: Raman measurements"

02/13 *Colloquium*, Department of Physics, Pomona College, Claremont, CA, "Heating at the nanoscale"

01/13 *Colloquium*, Department of Physics, University of Alberta, Edmonton, "Molecular scale junctions out of equilibrium: Raman and noise measurements"

11/12 *Invited talk*, TransAtlantic Science Week, Houston, TX, "Nanoscale plasmonic junctions for sensing and optoelectronic applications"

07/12 *Invited talk*, International meeting, Molecular Electronics in Jerusalem, Hebrew University, Jerusalem, Israel, "Molecular scale junctions out of equilibrium: Raman and noise measurements"

05/12 *Invited talk*, International CECAM workshop on Quantum Transport in Molecular Nanostructures, Trinity College, Dublin, Ireland, "Molecular scale junctions out of equilibrium: Noise and Raman spectroscopy"

02/12 *Colloquium*, Department of Physics, University of Illinois at Urbana Champaign, "Nanoscale junctions: optical effects, heating, and taking the temperature on the nanometer scale"

12/11 *Seminar*, Lockheed Martin Advanced Technology Center, Palo Alto, CA, "Plasmonics: Optical antennas, chemical sensing, and photodetection"

10/11 *Final presentation*, Defense Sciences Study Group, Institute for Defense Analyses, Washington, DC, "Asymmetric space warfare"

08/11 *Keynote lecture*, SPIE Nanoscience and Engineering Conference, San Diego, CA, "Plasmonics: Metallic Nanostructures and Their Optical Properties IX" session

08/11 *Plenary talk*, Rice Quantum Institute Summer Research Colloquium, "Taking the temperature of single molecules via surface-enhanced Raman spectroscopy"

05/11 *Invited talk/Summer school*, Developments and Prospects in Quantum Impurity Physics Advanced School and Workshop, Max Planck Institute for Complex Systems, Dresden

04/11 *Seminar*, Department of Physics, Purdue University, "Nanoscale Junctions: Optical Effects, Heating and Taking the Temperature at the Nanometer Scale"

11/10 *Seminar*, Texas Center for Superconductivity, University of Houston, "Nanostructures to examine strongly correlated materials: magnetite"

10/10 *Invited talk*, 65th Birthday Symposium in Honor of D. D. Osheroff, Stanford University, "Nanoscale physics and what I learned at Stanford"

09/10 *Lecture*, School of Continuing Studies, Rice University, "Nanoscale electronics and quantum effects"

05/10 *Seminar*, Department of Chemistry, Northwestern University, "Atomic and molecular scale devices: beyond dc electronic transport"

02/10 *Seminar*, Center for Complex Quantum Systems, University of Texas, "Beyond dc transport in atomic and molecular scale junctions"

01/10 *Invited talk*, International Conference on Molecular Electronics, Emmetten, Switzerland, "Beyond dc transport: electronic and optical measurements on single-molecule junctions"

12/09 *Colloquium*, University of Maryland Center for Nanophysics and Advanced Materials, "Atomic- and molecular-scale devices: Beyond DC electronic transport"

11/09 *Condensed matter seminar*, Michigan State University Dept. of Physics and Astronomy, "Atomic- and molecular-scale devices: Beyond DC electronic transport"

10/09 *Invited talk*, 2009 Hangzhou Workshop on Quantum Matter, Zhejiang University, China, "Correlations in single-molecule transistors and other nanoscale junctions"

09/09 *Colloquium*, Rice University Dept. of Physics, "Atomic- and molecular-scale devices: Beyond DC electronic transport"

09/09 *Invited talk*, International CECAM workshop on Quantum Transport at the Molecular Scale, Bremen, Germany, "Simultaneous measurements of Raman response and electronic conduction in single molecules"

05/09 *Invited talk*, National Nanotechnology Initiative Nanotechnology Enabled Sensing Workshop 2009, Arlington, VA, "Simultaneous electronic transport and Raman spectroscopy in single-molecule devices"

04/09 *Invited talk*, Carleton College, "Nanostructures for fun and (intellectual) profit"

03/09 *Invited talk*, American Physical Society March Meeting, Pittsburgh, "Simultaneous electronic transport and Raman spectroscopy in single-molecule devices"

03/09 *Invited colloquium*, Center for Nanoscale Materials, Argonne National Lab, "Nanostructures to examine transport, dissipation, and correlations"

12/08 *NSEC seminar*, Columbia University, "Single-molecule transistors: Tools for physics and physical chemistry"

10/08 *ECE colloquium*, Princeton University, "Single-molecule transistors: Tools for physics and physical chemistry"

09/08 *Invited colloquium*, University of Arizona, "Single-molecule transistors: Tools for physics and physical chemistry"

09/08 *Research presentation*, David and Lucille Packard Foundation annual fellows meeting, "Electronic and optical measurements of single molecules"

08/08 *Invited talk*, International Symposium on Organic Transistors and Functional Interfaces, Tsukuba, Japan, "Interfacial charge transfer and contact effects in nanoscale poly(3-hexylthiophene) transistors"

07/08 *Invited talk*, Young Engineering Scientists Symposium, French embassy, Washington, DC, "Nanometer scale devices as tools for examining physics and physical chemistry"

06/08 *Short invited talk,* ESPMI-08, Princeton, NJ, "Simultaneous measurements of single-molecule Raman and conduction response"

04/08 *Invited colloquium,* University of Houston IEEE Magnetics Society/Center for Nanomagnetic Systems, "Nanoscale electronic probes of magnetic materials"

04/08 *Physics colloquium*, Texas A&M University, "Single-molecule junctions: electronic and optical properties"

04/08 *Panel discussion,* Rice VISEN center Workshop on Probabilistic and Resilient Architectures for Nanoscale Computing, "Emerging Application Opportunities and Technology Challenges"

03/08 *Invited talk,* TX-UK Collaborative, Rice University, "Nanostructures for single-molecule chemical sensing"

02/08 *Seminar*, Lockheed Martin Corporation, Orlando, FL, "LANCER: Plasmonic IR detectors"

12/07 *Seminar*, NIST, "Nanostructures: new tools for physics, physical chemistry, and materials science"

11/07 *Materials science colloquium*, Carnegie Mellon University, "Nanostructures: new tools for physics, physical chemistry, and materials science"

10/07 *Invited talk*, Electrochemical Society national meeting, Washington, DC, "Contact effects in polymer field-effect transistors"

09/07 *Physics colloquium,* University of Houston, "Single-molecule transistors: new tools for physics and physical chemistry"

09/07 *Poster*, David and Lucille Packard Foundation annual fellows meeting, "Electrically-driven phase transition in magnetite nanostructures"

08/07 *Invited talk*, Workshop on Quantum Coherence in Nanoscale Devices, Max Planck Institute, Dresden, "Anomalous gate dependence of Kondo conduction in single-molecule transistors"

07/07 *Invited talk*, ACS/MRS Workshop on Organic Electronics, Seattle, WA, "Contact effects in polymer field-effect transistors"

05/07 *Contributed talk,* 2007 International Conference on Strongly Correlated Electronic Systems, Houston, "Anomalous gate dependence of Kondo conduction in single-molecule transistors"

04/07 *Poster + short talk*, NSF Grantees conference, Reno, NV, "NER: Atomic-scale magnetoresistive sensors"

04/07 *Invited talk*, AVS Symposium on Nanoscale Electronics, Carnegie Mellon University, "Single-molecule transistors: new tools for physics and physical chemistry"

01/07 *Condensed matter seminar*, University of Washington, "Single-molecule transistors: new tools for physics and physical chemistry"

01/07 *Invited talk*, American Association of Physics Teachers national meeting, Seattle, "Nanoelectronics"

11/06 *Invited talk,* Canadian Institute for Advanced Research Nanoelectronics conference, Banff, Canada, "Single-molecule transistors: tools for physics and physical chemistry"

10/06 *Condensed matter seminar*, Texas A&M University, "Time-dependent conductance fluctuations: new results"

09/06 *Poster*, David and Lucille Packard Foundation annual fellows meeting, "Electronic conduction and coherence in nanostructures with molecules"

08/06 *Research presentation,* Air Force Office of Sponsored Research Nanotechnology Workshop, Carnegie Mellon University, "SPRING and nanoscience research at Rice University"

08/06 *Invited talk*, SPIE annual meeting, San Diego, "Contact effects in polymer field-effect transistors"

05/06 *Research presentation*, Lockheed Martin Corporation, Washington, DC, "Nanotechnology at Rice University"

04/06 *Condensed matter seminar*, Oak Ridge National Laboratory, "Surprises in the Kondo physics of single-molecule transistors"

04/06 *Physics colloquium*, West Virginia University, "Single-molecule transistors: new tools for physics and physical chemistry"

03/06 *Chemistry seminar*, University of Houston, "Transport in molecular devices"

03/06 *Invited talk*, American Chemical Society meeting, Atlanta, "Single-molecule transistors: new tools for physical chemistry and physics"

01/06 *Colloquium*, James Madison University, "Single-molecule transistors: new tools for physics and physical chemistry"

01/06 *Condensed matter seminar*, Virginia Tech, "Surprises in the Kondo physics of single-molecule transistors"

12/05 *Invited talk,* XII Latin American Congress of Surface Science and its Applications, Angra dos Reis, Brazil, "Single-molecule transistors: new tools for physics and chemistry"

10/05 *Condensed matter seminar*, University of Wisconsin, "Surprises in the Kondo physics of single-molecule transistors"

10/05 *Physics Colloquium*, University of Utah, "Surprises in the Kondo physics of single-molecule transistors"

09/05 *Electrical and Computer Engineering seminar*, Texas A&M, "Injection in polymer field-effect transistors"

9/05 *Invited talk,* Bat Sheva Seminar on Electron Transport in Molecular Junctions (international workshop), Weizmann Institute, Israel

3/05 *Invited talk*, American Physical Society March Meeting, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

2/05 *Condensed matter seminar*, MIT, "Kondo physics and inelastic processes in single-molecule transistors"

2/05 *Physics Colloquium,* Rice University, "Single-molecule transistors: new tools for physics and chemistry"

2/05 *Physics Colloquium*, Sam Houston State University, "Quantum effects in nanoscale electronics"

1/05 *Invited talk,* 4th Annual Nanotechnology Venture Forum, Rice University, "Rice Nanofabrication Facility and Nanoscience Research at Rice University"

1/05 *Condensed matter seminar*, Northwestern University, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

1/05 *Condensed matter seminar*, University of Chicago, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

12/04 *Condensed matter seminar*, University of Maryland, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

11/04 *Solid state colloquium*, Harvard University, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

10/04 *Condensed matter seminar*, University of Pennsylvania, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

10/04 *Condensed matter seminar*, Penn State University, "Single-molecule transistors: transport, Kondo physics, and inelastic processes"

9/04 *Research presentation*, David and Lucille Packard Foundation annual fellows meeting, "Single-molecule transistors: Understanding electronic conduction at the nanometer scale"

8/04 *Research presentation*, Air Force Office of Sponsored Research Nanotechnology Workshop, "SPRING and nanoscience research at Rice University"

6/04 *Poster,* US/UK Frontiers of Science Symposium, Cambridge, UK, "Single-molecule transistors: Understanding electronic conduction at the nanometer scale"

6/04 *Condensed matter seminar*, Georgia Institute of Technology, "Electronic coherence in normal and ferromagnetic metals"

1/04 *DOE Workshop presentation*, Long Island, NY, "Field-effect devices: semiconducting polymers and single-molecule transistors".

1/04 *Condensed matter seminar*, Texas A&M University, "Field-effect devices: semiconducting polymers and single-molecule transistors".

11/03 *Condensed matter seminar*, Rice University, "Molecular-scale conduction: few-atom junctions and single-molecule transistors".

11/03 *Condensed matter seminar*, Columbia University (joint with Princeton and Rutgers), "Coherence in solids: Kondo physics in single-molecule transistors, and coherence measurements in metal nanostructures".

11/03 *Condensed matter seminar*, Bell Laboratories, "Molecular-scale conduction: few-atom junctions and single-molecule transistors".

9/03 *Condensed matter seminar*, Laboratory for Physical Sciences, Univ. of Maryland, "Molecular-scale conduction: few-atom junctions and single-molecule transistors".

9/03 *Condensed matter seminar*, NIST Gaithersburg, "Molecular-scale conduction: few-atom junctions and single-molecule transistors".

9/03 *Condensed matter seminar*, Naval Research Lab, "Molecular-scale conduction: few-atom junctions and single-molecule transistors".

8/03 *Invited talk* at 1st annual meeting of Texas Strategic Partnership for Research in Nanotechnology (SPRING), "Transport in nanostructures: physics and potential applications".

4/03 *Panel discussion* at Houston chapter meeting of ASM, on "Nanotechnology in materials science"

2/03 *Condensed matter seminar* at Stanford University Department of Physics, "Nonmetallicity in electrochemically fabricated atomic scale metal junctions"

11/02 *Invited talk* at International Workshop on Electron Interference and Decoherence in Nanostructures, Dresden, "Geometry-dependent dephasing in narrow metal wires".

10/02 *Invited talk*, Texas Nanotechnology Colloquium series sponsored by Applied Nanotechnology, "Molecular electronics: a view from the trenches".

9/02 *Physics department seminar* at Trinity University Department of Physics, "Quantum coherence and nanoscale wires: using small tools to answer big questions".

11/01 *Condensed matter seminar* at University of Texas Department of Physics, "Quantum coherence in sub-10 nm metal wires".

10/01 *Condensed matter seminar* at University of Florida Department of Physics, "Quantum coherence in sub-10 nm metal wires".

3/01 *APS March Meeting*, "Geometry-dependent dephasing in narrow metal wires", in symposium on "Dephasing and Dynamical Effects in Metals at Low Temperatures".

11/00 *MRS symposium* on Nonlithographic and Lithographic Methods for Nanofabrication-From Ultralarge-Scale Integration to Photonics to Molecular Electronics, "Quantum coherence in sub-10 nm metal wires".

4/00 *Divisional Seminar* at Bell Laboratories, Lucent Technologies, "Transport in molecular scale metal wires".

3/00 *Colloquium* at Rensselaer Polytechnic Institute Department of Physics, Applied Physics, and Astronomy, "Localization in molecular-scale metal wires".

Condensed matter seminar at Stanford University Laboratory for Advanced Materials, "Localization in molecular-scale metal wires".

Condensed matter seminar at California Institute of Technology Department of Applied Physics, "Localization in molecular-scale metal wires".

Colloquium at Amherst College Department of Physics, "Mesoscopic physics: using tiny tools to answer big questions".

2/00 *Colloquium* at University of Cincinnati Department of Physics, "Localization in molecular-scale metal wires".

Colloquium at Rice University Department of Physics and Astronomy, "Localization in molecular-scale metal wires".

1/00 *Condensed matter seminar* at University of Illinois at Urbana-Champaign Department of Physics, "Localization in molecular-scale metal wires".

10/99 *Condensed matter seminar* at Johns Hopkins University Department of Physics and Astronomy, "Fabrication and measurement of extremely narrow wires."

3/98 *APS March Meeting*, "Temperature dependent TLS collective behavior in glasses", in symposium on "Glasses: collective behavior and vibrational dynamics".

2/98 *Condensed Matter Seminar*, Bell Laboratories, Lucent Technologies, "Temperature dependent TLS collective behavior in glasses".

Condensed Matter Seminar, Princeton University Department of Physics, "Temperature dependent TLS collective behavior in glasses".

CONTRIBUTED PRESENTATIONS

3/22 *APS March Meeting*, Chicago, "Magnon shot noise in a longitudinal spin Seebeck device"

3/20 *APS March Meeting*, virtual, "Tunneling spectroscopy of c-axis epitaxial cuprate junctions"

3/14 *APS March Meeting*, Denver, "*In situ* Diffraction studies of H_xVO_2 and D_xVO_2"

3/11 *APS March Meeting*, Dallas, "Magnetic field dependence of the nonequilibrium metal-insulator transition in magnetite nanostructures"

3/08 *APS March Meeting*, New Orleans, "Electrically-driven phase transition in magnetite nanostructures"

3/07 *APS March Meeting*, Denver, "Strong magnetic scattering from TiO_x adhesion layers"

6/06 *Contributed talk*, TMS 2006 Electronic Materials Conference, "Surface chemistry modifications to contact resistances in organic field-effect transistors"

3/06 *APS March Meeting*, Baltimore, "Kondo resonances and anomalous gate dependence of electronic conduction in single-molecule transistors"

8/05 *Contributed talk,* 24th International Low Temperature Physics Conference (LT24), Orlando, FL.

7/04 *International Conference on the Physics of Semiconductors (ICPS)*, poster, "Contact resistances in high quality polymer field-effect transistors"
ICPS, poster, "Single-molecule transistors: Understanding electronic conduction at the nanometer scale"

4/04 *MRS Spring Meeting*, "Temperature-dependent contact resistances in high quality polymer field-effect transistors"
MRS Spring Meeting, "The Kondo effect in C_{60} single-molecule transistors"

4/03 *MRS Spring Meeting*, "Nonmetallicity in electrochemically fabricated atomic scale metal junctions"
MRS Spring Meeting, "Transport mechanisms in poly(3-hexylthiophene) transistors"

3/03 *APS March Meeting*, "Nonmetallicity in highly disordered Au point contacts at low temperatures"

2/03 *Nanotech 2003*, "Zero bias anomalies in electrochemically fabricated atomic-scale metal junctions"

3/02 *APS March Meeting*, "Transport in poly(3-hexylthiophene) transistors at high carrier densities: a progress report".

10/00 *APS Texas Section Meeting*, "Quantum coherence in sub-10 nm wires".

3/00 *APS March Meeting,* "Localization in molecular-scale metal wires".

11/99 *MRS Fall Meeting*, "Fabrication and measurement of molecular-scale wires".

3/99 *APS Centennial Meeting*, "Fabrication of nanoscale metallic wires", "Conduction of nanoscale metallic wires".

3/97 *APS March Meeting*, "Nonequilibrium acoustic response of glasses at ultra-low temperatures".

3/96 *APS March Meeting*, "Dielectric response of two-level systems to strain at low temperatures".

STUDENT/POSTDOC PRESENTATIONS

3/22 *APS March Meeting*, "Transport and shot noise measurements in $YbRh_2Si_2$ nano wires" (Liyang Chen presenting virtually)

3/22 *APS March Meeting*, "Mesoscale Fabrication of the Thin-filmed Strange Metal $Sr_3Ru_2O_7$" (Dale Lowder presenting)

3/22 *APS March Meeting*, "Light-matter interaction between few-layer MoS2 and electrically driven plasmonic tunnel junctions" (Jiawei Yang presenting virtually)

3/22 *APS March Meeting*, "Crossover from above-threshold to below-threshold plasmonic electroluminescent emission at the atomic scale" (Yunxuan Zhu presenting virtually)

3/22 *APS March Meeting*, "Observation of the spin Seebeck effect in a paramagnetic insulator VO_2" (Renjie Luo presenting virtually)

3/21 *APS March Meeting*, "Nonequilibrium Noise Measurement of a spin current induced by the spin Seebeck effect" (Xuanhan Zhao presenting)

3/21 *APS March Meeting*, "Hot-carrier induced giant above-threshold light emission enhancement in plasmonic tunnel junctions" (Yunxuan Zhu presenting)

3/21 *APS March Meeting*, "$YbRh_2Si_2$ nanodevices: fabrication and measurements" (Liyang Chen presenting)

3/21 *APS March Meeting*, "Controlling the hot carrier tunneling direction in nanogaps" (Mahdiyeh Abbasi presenting)

3/19 *APS March Meeting*, "Resistance fluctuation of V_2O_3 films near the metal-insulator transition" (Liyang Chen presenting)

3/19 *APS March Meeting*, "Nonequilibrium noise measurements using hBN tunnel barriers" (Xuanhan Zhao presenting)

3/19 *APS March Meeting*, "Pair tunneling in $La_{2-x}Sr_xCuO_4$ junctions above T_c" (Panpan Zhou presenting)

3/19 *APS March Meeting*, "Current Noise in InAs/GaInSb Corbino structures" (Loah Stevens presenting)

3/19 *APS March Meeting*, "Nanostructured gold thermocouple for photodetection" (Mahdiyeh Abbasi presenting)

3/19 *APS March Meeting*, "Photothermoelectric detection of gold oxide non-thermal decomposition and related studies" (Xifan Wang presenting)

3/19 *APS March Meeting*, "Photothermoelectric effects at and near individual grain boundaries in gold" (Charlotte Evans presenting)

3/19 *APS March Meeting*, "Probing energy transport in atomic and nanoscale junctions" (Dr. Longji Cui presenting)

3/18 *APS March Meeting*, "Detecting Photothermoelectric Voltages from Surface Plasmon Polariton Excitation in Gold Nanoscale Devices" (Charlotte I. Evans presenting)

3/18 *APS March Meeting*, "Shot noise in $La_{2-x}Sr_xCuO_4$ tunnel junctions" (Panpan Zhou presenting)

3/18 *APS March Meeting*, "Current Noise in InAs/GaInSb Quantum Well Interfaces" (Loah Stevens presenting)

3/18 *APS March Meeting*, "Altered Photothermoelectric Effects in Au nanowires via Surface Modification" (Xifan Wang presenting)

3/17 *APS March Meeting*, "Current noise in the edge states of InAs/GaSb quantum well interfaces" (Loah Stevens presenting)

3/17 *APS March Meeting*, "Shot noise detection in hBN-based tunnel junctions" (Panpan Zhou presenting)

3/17 *APS March Meeting*, "Remote heating in Au bowtie constrictions by propagating plasmons" (Charlotte Evans presenting)

3/17 *APS March Meeting*, "Nanogap-enhanced Raman spectroscopy of monolayer MoS_2" (Xifan Wang presenting)

3/17 *APS March Meeting*, "Transport studies and potential fluctuations in mesoscopic-scale $SmTiO_3/SrTiO_3/SmTiO_3$ quantum wells" (Will Hardy presenting)

3/16 *APS March Meeting*, “Shot noise measurement in a strongly correlated material” (Panpan Zhou presenting)

3/16 *APS March Meeting*, “Propagating plasmon excitation of molecular junctions for spectroscopy” (Charlotte Evans presenting)

3/16 *APS March Meeting*, “Optically induced changes to the tunneling properties of molecular junctions” (Pavlo Zolotavin presenting)

3/16 *APS March Meeting*, “Surface Enhance Infrared Absorption in nanogap structures” (Yajing Li presenting)

3/16 *APS March Meeting*, “Bias-dependent enhancement of the Fano factor in atomic-scale Au junctions” (Loah Stevens presenting)

3/16 *APS March Meeting*, “Thickness- and magnetic-field-driven suppression of antiferromagnetism in V5S8 single crystals” (Will Hardy presenting)

7/15 *Telluride Workshop on Quantum Transport in Nanoscale Molecular Systems*, “Voltage tuning of vibrational mode energies and optically induced changes to the tunneling properties of molecular junctions” (Pavlo Zolotavin presenting)

3/15 *APS March Meeting*, “Dissipation and heating in C_{60} molecular junctions” (Pavlo Zolotavin presenting)

3/15 *APS March Meeting*, “Nanostructure investigations of nonlinear differential conductance in $NdNiO_3$ thin films” (Will Hardy presenting)

3/15 *APS March Meeting*, “SERS detection of vibrational Stark effect using PCBM-based molecular junctions” (Yajing Li presenting)

3/15 *APS March Meeting*, “Variable temperature shot noise measurements in mechanically controlled gold break junctions” (Ruoyu Chen presenting)

3/15 *APS March Meeting*, “Low temperature high bias enhanced noise in atomic-scale Au junctions” (Loah Stevens presenting)

3/15 *APS March Meeting*, “Low temperature electric transport properties of hydrogen-doped VO_2” (Heng Ji presenting)

1/15 *Tsinghua University*, seminar, “Voltage tuning of vibrations of C60 molecular junctions” (Yajing Li presenting)

3/14 *APS March Meeting*, “Kondo effect in ferromagnetic atomic scale junctions” (Pavlo Zolotavin presenting)

3/14 *APS March Meeting*, “Atomic hydrogen doping in single-crystal vanadium dioxide” (Heng Ji presenting)

3/14 *APS March Meeting*, “Layered magnetic dichalcogenide in the nanoscale thickness regime” (Will Hardy presenting)

3/14 *APS March Meeting*, “Electrostatic gating and single-molecule Raman spectroscopy” (Yajing Li presenting)

3/14 *APS March Meeting*, “Variation of the shot noise within an ensemble of atomic-scale metal junctions” (Ruoyu Chen presenting)

3/14 *APS March Meeting*, “Germanium-Based Plasmonic Nanojunctions” (Kenneth Evans presenting)

3/13 *APS March Meeting*, “High bias shot noise measurement and electronic heating in STM style gold junctions at room temperature” (Ruoyu Chen presenting)

3/13 *APS March Meeting*, “Photoconductance measurements of patterned nanocrystal films on gold nanojunctions” (Kenneth Evans presenting)

3/13 *APS March Meeting*, “Surface-enhanced Raman detection of a vibrational Stark effect in C_{60}-containing molecular junctions” (Yajing Li presenting)

3/13 *APS March Meeting*, “Surface enhanced Raman spectroscopy in nanojunctions with anomalous polarization dependence” (Joseph Herzog presenting)

3/13 *APS March Meeting*, “Modulation of single-crystal vanadium dioxide film by hydrogen” (Heng Ji presenting)

3/13 *APS March Meeting*, “Investigation of nonlinear differential conductance in $NdNiO_3$ thin films” (Will Hardy presenting)

3/12 *APS March Meeting*, “Study of Raman Stark effect in self-aligned nanojunctions” (Joseph Herzog presenting)

3/12 *APS March Meeting*, “Electrostatic gating and single-molecule Raman spectroscopy” (Yajing Li presenting)

3/12 *APS March Meeting*, “Gigahertz probing of poly(3-hexylthiophene) with a kilohertz detection scheme” (Jeff Worne presenting)

3/12 *APS March Meeting*, “Bias-dependent noise measurements in individual electromigrated nanoscale junctions” (Patrick Wheeler presenting)

3/12 *APS March Meeting*, “Shot noise measurements as a function of bias in STM-style gold junctions” (Ruoyu Chen presenting)

3/12 *APS March Meeting*, “Nanocrystal-based optoelectronic devices” (Kenneth Evans presenting)

3/12 *APS March Meeting*, “Hydrogen stabilization of metallic VO_2 in single-crystal nanobeams” (Jiang Wei presenting)

3/12 *APS March Meeting*, “Gating effect on VO_2 nanowire by ionic liquid” (Heng Ji presenting)

3/11 *APS March Meeting*, “Exploring Transport Effects in Nanoscale Graphene Devices” (Jeffrey Worne presenting)

3/11 *APS March Meeting*, "Nanocrystal optoelectronic devices by plasmon-based optical trapping" (Kenneth Evans presenting)

3/11 *APS March Meeting*, "Fast pulsed measurements of the electric-field-driven metal-insulator transition in magnetite" (Spencer Morris presenting)

3/11 *APS March Meeting*, "Vibrational heating in molecular junctions" (Daniel Ward presenting)

3/11 *APS March Meeting*, "Shot Noise Measurements in Individual Electromigrated Nanoscale Junctions" (Patrick Wheeler presenting)

3/11 *APS March Meeting*, "Bias dependent shot noise measurement in STM style Au junction at room temperature" (Ruoyu Chen presenting)

3/11 *APS March Meeting*, "Gatability of vanadium dioxide single crystal nanobeams and hydrogen doping" (Heng Ji presenting)

3/10 *APS March Meeting*, "Electric field driven transition in magnetite" (Sungbae Lee, presenting, on behalf of A. A. Fursina)

3/10 *APS March Meeting*, "Measurement of electrical field enhancement in plasmonic nanogaps via optical rectification" (D. R. Ward presenting)

3/10 *APS March Meeting*, "Anomalous Transport and Possible Phase Transition in Palladium Nanojunction" (G. D. Scott presenting)

3/10 *APS March Meeting*, "Unifying high- and low-temperature transport in organic semiconductors in large electric fields" (J. H. Worne presenting)

3/10 *APS March Meeting*, "Excess voltage-dependent noise in atomic-scale Au contacts" (P. J. Wheeler presenting)

3/09 *APS March Meeting*, "Kondo effect in the electronic transport of magnetic atomic-size contacts" (M. Reyes Calvo presenting)

3/09 *APS March Meeting*, "Universal Scaling of Nonequilibrium Transport in the Kondo Regime of Single Molecule Devices" (Dr. G. D. Scott presenting)

3/09 *APS March Meeting*, "Universal Scaling of Zero-Bias Conductance Peaks in Single-Molecule Transistors Incorporating Tetra[2,3-thienylene]" (Z. K. Keane presenting)

3/09 *APS March Meeting*, "High frequency measurements of shot noise suppression in atomic-scale metal contacts" (P. J. Wheeler presenting)

3/09 *APS March Meeting*, "Single molecule surface-enhanced Raman spectroscopy in nanogap structures" (D. R. Ward presenting)

3/09 *APS March Meeting*, "Investigation of Electrically Driven Phase Transition in Magnetite Thin Films" (A. Fursina presenting)

3/09 *APS March Meeting*, "Interfacial Charge Transfer in Nanoscale Polymer Transistors" (J. H. Worne presenting)

3/08 *APS March Meeting*, "Sub-100 nm contact effects in poly(3-hexylthiophene) transistors" (J. H. Worne presenting)

3/08 *APS March Meeting*, "Fabrication of high aspect ratio nanogaps" (A. Fursina presenting)

3/08 *APS March Meeting*, "Molecular conductance of oligophenylene-vinylene in metallic break junctions" (P. J. Wheeler presenting)

3/08 *APS March Meeting*, "Simultaneous measurements of single-molecule electrical conduction and Raman response" (D. R. Ward presenting)

3/07 *APS March Meeting*, "Electronic transport in Fe_3O_4 nanoparticles" (S. Lee presenting)

3/07 *APS March Meeting*, "Shot noise in single-molecule transistors" (Z. K. Keane presenting)

3/07 *APS March Meeting*, "Time-dependent universal conductance fluctuations in Au nanowires: implications" (A. Trionfi presenting)

3/07 *APS March Meeting*, "Electromigrated nanoscale gaps for surface-enhanced Raman spectroscopy" (D. R. Ward presenting)

3/07 *APS March Meeting*, "Electronic transport of low concentrations of P3HT molecules across nanogap source-drain electrodes" (J. H. Worne presenting)

8/06 *6th Rencontres du Vietnam, Nanophysics: from fundamentals to applications*, Hanoi, "Three-terminal devices to examine single-molecule conductance switching" (Z.K. Keane presenting)

6/06 *TMS 2006 Electronic Materials Conference*, "Single-molecule transistors to characterize bistability in molecular conduction" (Z.K. Keane presenting)

3/06 *APS March Meeting*, "Modifying mesoscopic 1/*f* noise via surface chemistry" (A. Trionfi presenting)

3/06 *APS March Meeting*, "Quantum coherence and time dependent conductance fluctuations in dilute magnetic semiconductors" (S. Lee presenting)

3/06 *APS March Meeting*, "Magnetoresistance of atomic-scale electromigrated nickel nanocontacts" (Z. K. Keane presenting)

3/06 *APS March Meeting*, "Charge injection and band alignment in organic field effect transistors" (B. H. Hamadani presenting)

6/05 *2005 Electronic Materials Conference*, "The Kondo effect and inelastic electron tunneling spectroscopy in transition metal based single-molecule transistors" (L.H. Yu presenting)

6/05 *2005 Electronic Materials Conference*, "Nonlinear charge injection in organic field-effect transistors" (B.H. Hamadani presenting)

3/05 *APS March Meeting*, "Magnetoresistance measurements in nanoconstricted nickel wires" (Z.K. Keane presenting, with L.H. Yu)

3/05 *APS March Meeting*, "Time-dependent universal conductance fluctuations in AuPd, Ag, and Au wires" (A. Tronfi presenting, with S. Lee)

3/05 *APS March Meeting*, "Quantum coherence and local/nonlocal resistance measurements in permalloy wires" (S. Lee presenting, with A. Trionfi)

3/05 *APS March Meeting*, "The Kondo effect in transition metal ion based single-molecule transistors" (L.H. Yu presenting, with Z.K. Keane, J.W. Ciszek, L. Cheng, M.P. Stewart, and J.M. Tour)

3/05 *APS March Meeting*, "Nonlinear charge injection in organic thin-film field effect transistors" (B.H. Hamadani presenting)

3/05 *ACS Meeting*, "Charge injection in organic field-effect transistors" (B.H. Hamadani presenting)

3/04 *APS March Meeting*, "Realization of the Bose-Fermi Kondo Model in a magnetic quantum dot" (S. Kirchner presenting, with L. Zhu, Q. Si)

3/04 *APS March Meeting*, "The Kondo effect in C_{60} single-molecule transistors" (L.H. Yu presenting)

3/04 *APS March Meeting*, "Electron coherence length comparison in mesoscopic AuPd wires" (A. Trionfi presenting, with S. Lee)

3/04 *APS March Meeting*, "Quantum coherence and time dependent conductance fluctuations in ferromagnetic nanowires" (S. Lee presenting, with A. Trionfi)

3/04 *APS March Meeting*, "Temperature dependent contact resistances in organic field effect transistors" (B.H. Hamadani presenting)

3/03 *APS March Meeting*, "Transport measurements on few-molecule devices" (L.H. Yu presenting, with D. Price, J.W. Ciszek, and J.M. Tour)

3/03 *APS March Meeting*, "Electrical decoherence lengths in quasi-1D AuPd nanowires" (A. Trionfi presenting, K.W. West, L.N. Pfeiffer)

3/03 *APS March Meeting*, "Electric transport in magnetic nanowires" (S. Lee presenting, with K.W. West, L.N. Pfeiffer)

3/03 *APS March Meeting*, "Gated nonlinear transport in organic polymer field-effect transistors" (B.H. Hamadani presenting)

3/02 *APS March Meeting*, "Transport in gold nanojunctions" (L.H. Yu presenting)

TEACHING

Formal coursework:

- *Introduction to Solid State Physics (PHYS 412, Spring 2023-4)*
- *Nanostructures and Nanotechnology I (PHYS 533, Fall 2002-5, 2020)*

- *Nanostructures and Nanotechnology II (PHYS 534, Spring 2003-4, 2006-9, 2011-15, Fall 2021)*
- *Statistical and Thermal Physics (PHYS425, Fall, 2001, 2006-8, 2016-19)*
- *Methods of Experimental Physics I (PHYS 537, Fall, 2009)*
- *Honors Mechanics (PHYS 111, Fall 2010-15)*
- *Introduction to Nanoscale Science and Technology (PHYS600, Fall, 2000)*

Doctoral students:

- Dr. Lam H. Yu (PhD 2005, "Transport in Single Molecule Transistors")
- Dr. Behrang H. Hamadani (PhD 2006, "Electronic Charge Injection and Transport in Organic Field-Effect Transistors")
- Dr. Aaron Trionfi (PhD 2006, "Electronic Phase Coherence in Mesoscopic Normal Metal Wires")
- Dr. Sungbae Lee (PhD 2007, "Electron Transport in Ferromagnetic Nanostructures")
- Dr. Zachary Keane (PhD 2009, "Transport Phenomena in Molecular-Scale Devices")
- Dr. Alexandra Fursina (PhD 2010, "Investigation of Electrically Driven Transition in Magnetite, Fe_3O_4, Nanostructures")
- Dr. Daniel Ward (PhD 2010, "Electrical and Optical Characterization of Molecular Nanojunctions")
- Dr. Jeffrey H. Worne (PhD 2012, "Charge Transport and Transfer at the Nanoscale Between Metals and Novel Conjugated Materials")
- Dr. Jun Yao (PhD 2012, co-advised with Prof. James Tour, "Resistive Switching and Memory Effects in Silicon Oxide Based Nanostructures")
- Dr. Patrick J. Wheeler (PhD 2014, "Quantum Shot Noise Characteristics in Atomic Scale
- Junctions at Liquid Nitrogen and Room Temperatures Using Novel Measurement Technique")
- Dr. Heng Ji (PhD 2015, "Hydrogen doping and the metal-insulator phase transition in vanadium dioxide")
- Dr. Kenneth Evans (PhD 2015, "Photoresponse of bowtie nanojunctions")
- Dr. Ruoyu Chen (PhD 2016, "RF shot noise measurements in Au atomic-scale junctions")
- Dr. Yajing Li (PhD 2016, "Surface-enhanced vibrational spectroscopy and electrical characterization on nanojunctions")
- Dr. Will Hardy (PhD 2017, "Nanoscale electronic transport studies of novel strongly correlated materials")
- Dr. Loah A. Stevens (PhD 2019, "Noise processes in atomic-scale junctions and two-dimensional topological insulators")
- Dr. Charlotte I. Evans (PhD 2019, "Bicrystals and Bowties: Photothermoelectric and plasmonic effects of gold nanoscale structures")
- Dr. Panpan Zhou (PhD 2019, "Shot Noise Measurements in Strongly Correlated Materials")
- Dr. Xifan Wang (PhD 2020, "Photothermoelectric Effects in Gold Nanostructures")
- Dr. Mahdiyeh Abbasi (PhD 2021, "Photothermoelectric response and hot carrier tunneling in gold nanowires")
- Dr. Xuanhan Zhao (PhD 2022, "Spin shot noise measurement")
- Dr. Liyang Chen (PhD 2023, "Noise measurement in strongly correlated systems")
- Dr. Yunxuan Zhu (PhD 2023, "Electrically driven plasmonic processes: hot carriers and strong coupling")
- Current: Dale Lowder, Renjie Luo, Shusen Liao, Tanner Legvold, Ken Ssennyimba, Yuxin Wan

Postdoctoral researchers:

- Dr. Gavin Scott (2007-2010), now at Alcatel-Lucent Bell Laboratories.
- Dr. Jiang Wei (2010-2012), now tenured faculty in physics at Tulane University.

- Dr. Joseph Herzog (2011-2013), now tenure-track faculty in engineering at University of Indianapolis
- Dr. Pavlo Zolotavin (2013-2017), now research scientist at Rice University
- Dr. Longji Cui (2018-2020), now tenure-track faculty in mechanical engineering at the University of Colorado
- Dr. Jiawei Yang (2021-2022), now in industry

Undergraduates:

Michael Stanton (2003), Matthew Rigney (2006), Nick King (2007), Jeffrey Russom (2008), Leland Richardson (2011-2), Michael Swift (2013), Ben Huber (2014-5), Yue Liu (2018), Osmond Wen (2018), Ares Lu (2023)