

JOEL STEVEN MILLER

Distinguished Professor of Chemistry, University of Utah

Education

Wayne State University,	Detroit, MI	B.S. in Chemistry, 1967
University of California, Los Angeles	Los Angeles, CA	PhD Chemistry, 1971
Stanford University (Postdoctoral)	Palo Alto, CA	Chemistry, 1971-1972

Appointments

2001-present	Distinguished Professor of Chemistry, Univ. of Utah
2013-present	Adjunct Professor of Physics, Univ. of Utah
1994-present	Adjunct Professor of Materials Science and Engineering, Univ. of Utah
2017 – 2017	Visiting Professorship, Osaka University, Osaka, Japan
2014 – 2015	Lady Davis Visiting Professorship, Hebrew University, Jerusalem, Israel
2011 – 2011	Schulich Visiting Professorship, Technion, Haifa, Israel
2011 – 2012	Visiting Professor, Noyori Materials Science Laboratory
2005 – 2005	Professeur Invité, Institut de Sci. et d'Ingénierie Supramoléculaires
2004- 2005	Visiting Professor, University of Barcelona, Barcelona, Spain
1996 – 1996	Wilhelm Manchot Research Professor, Technische Universität Munich
1994 - present	Adjunct Professor of Materials Science, University of Utah
1996 -1996	Visiting Professor, Johannes-Gutenberg University, Germany
1996 -1996	Visiting Professor, Materials Science Dept., Weizmann Inst. of Science
1993- 2001	Professor of Chemistry, University of Utah
1983-1993	Research Supervisor for Solid State Science, Central Research & Dev.
1991-1993	Industrial Fellow, Northwester Univ., Materials Research Center
1991- 1991	Visiting Professor of Chemistry, Univ. of Paris (Orsay)
1988 – 1988	Visiting Professor of Chemistry, Univ. of Pennsylvania

Five Publications (out of >575) Most Relevant of the Proposal

1. J. M. Manriquez, G. T. Yee, R. S. McLean, A. J. Epstein, J. S. Miller, “A Room Temperature Molecular/Organic-Based Magnet”, *Science* 252, 1415-1417 (1991). DOI: [10.1126/science.252.5011.1415](https://doi.org/10.1126/science.252.5011.1415)
2. I. Pokhodnya, M. Bonner, J. S. Miller, “Parylene Protection Coatings for Thin film V[TCNE]_x Room Temperature Magnets”, *Chem. Mater.* 16, 5114-5119 (2004). DOI: [10.1021/cm048872dK](https://doi.org/10.1021/cm048872dK)
3. K. I. Pokhodnya, A. J. Epstein, J. S. Miller, “Thin Film V[TCNE]_x Magnets”, *Adv. Mater.* 12, 410-413 (2000). Front Cover Mar 16, 2000 12(#6) DOI: [10.1002/\(SICI\)1521-4095\(200003\)12:6<410::AID-ADMA410>3.0.CO;2-B](https://doi.org/10.1002/(SICI)1521-4095(200003)12:6<410::AID-ADMA410>3.0.CO;2-B)
4. V. N. Prigodin, N. P. Raju, K. I. Pokhodnya, J. S. Miller, A. J. Epstein, “Spindriven Resistance in Organic-based Magnetic Based Semiconductor V[TCNE]_x”, *Adv. Mater.* 14, 1230-1233 (2002). DOI: [10.1002/1521-4095\(20020903\)14:17<1230::AID_ADMA1230>3.0.CO;2-5](https://doi.org/10.1002/1521-4095(20020903)14:17<1230::AID_ADMA1230>3.0.CO;2-5)
5. K. I. Pokhodnya, V. Burtman, A. J. Epstein, J. W. Raebiger, J. S. Miller, “Control of Coercivity in Organic-based Solid Solution V_xCo_{1-x}[TCNE]₂•zCH₂Cl₂ Room Temperature Magnets, *Adv. Mater.* 15, 1211-1214 (2003). DOI: [10.1002/adma.200304984](https://doi.org/10.1002/adma.200304984)

Five Additional Products

1. W. E. Buschmann, S. C. Paulson, C. M. Wynn, M. Girtu, A. J. Epstein, H. S. White, J. S. Miller, 1 Apr 1998, “Reversed (Negative) Magnetization for Electrochemically Deposited High-

T_c Thin Films of Chromium Hexacyanide Magnets”, *Chem. Mater.* **10**, 1386-1395 (1998). DOI: [10.1021/cm970773v](https://doi.org/10.1021/cm970773v)

2. J. S. Miller, 22 Jul 2009, “Composition and Structure of the V[TCNE]_x (TCNE = tetracyanoethylene) Room-Temperature, Organic-based Magnet - A Personal Perspective”, *Polyhed.* **28**, 1596-1605 (2009). DOI: [10.1016/j.poly.2008.11.030](https://doi.org/10.1016/j.poly.2008.11.030)

3. J.-H. Her, P. W. Stephens, K. I. Pokhodnya, M. Bonner, J. S. Miller, “Cross-linked Layered Structure of Magnetically Ordered Fe(TCNE)₂•zCH₂Cl₂ (TCNE = Tetracyanoethylene; T_c = 100 K)”, *Angew. Chem. Internat. Edit.* **46**, 1521-1524 (2007). DOI: [10.1002/anie.200604164](https://doi.org/10.1002/anie.200604164)

4. K. H. Stone, P. W. Stephens, A. C. McConnell, E. Shurdha, K. I. Pokhodnya, J. S. Miller, “Mn(TCNE)_{1.5}(I₃)_{0.5} - a 3-D Network-Structured Organic-based Magnet and Comparison to a 2D Analog”, *Adv. Mater.* **22**, 2514-2519 (2010). DOI: [10.1002/adma.200904238](https://doi.org/10.1002/adma.200904238)

5. H. Liu, C. Zhang, H. Malissa, M. Groesbeck, M. Kavand, R. McLaughlin, S. Jamali, J. Hao, D. Sun, R. A. Davidson, L. Wojcik, J. S. Miller, C. Boehme, Z. V. Vardeny, "Organic-based Magnon Spintronics," *Nat. Mater.* **XX**, 0000-0000 (2018) in press

Synergetic Activities (selected)

Advisory Board, *Advanced Materials*, 1990 – Present;

Advisory Board, *Chemistry - A European Journal*, 2000- Present;

Conference Chairship, “Frontiers of Molecular Magnetism”, PacificChem 2015;

Conference Chairship, *25th International Conf. on Coordination and Bioinorganic Chem.*, 2015;

Conference Chairship, *4th International Conf. on Magnetic Materials and Applications*, 2015;

National Research Committee, *New Materials Synthesis and Crystal Growth Committee*, 2007-8

Guest Editor, The Electrochemical Society, Fall 2002 (Vol. 11, Issue 3)

Guest Editor, Materials Research Society, Nov., 2000 (Vol. 25, Issue 11)

Guest Editor, Chemical Society Reviews, June 2011 (Vol. 40, Issue 6)

Program Review Committee, North Dakota State Univ. Spintronics, Fargo, ND, 2006

Patents (out of 6)

Low Temperature Chemical Vapor Deposition of Thin Film Magnets

J. S. Miller, K. I. Pokhodnya,

US Patent #6,660,375 (2003) (assigned to University of Utah Research Foundation).

Honors and Awards

2016- *Molecular Science Forum Lecturer*, Institute of Chemistry, Chinese Academy of Science

2014 - Fellow, Lady David, Hebrew University, Jerusalem

2008- Oliver Kahn Lecture, 11th Internat. Conf. *Molecule-Based Magnets*, Firenze, IT

2007- Recipient of the *McGroddy Prize for Chemistry of New Materials*, Am. Phys. Soc.

2006- ISI Highly Cited Materials Scientist by Thomson Scientific;

2004- Recipient of the Governor's Medal for Science and Technology, 2004, State of Utah

2003- Recipient of the Utah Award (Central Utah & SLC Sections of the Am. Chem. Soc.)

2003- Lecturer for Gerhard Schmidt, Weizmann Institute of Science

2000- Japan Society for the Promotion of Science Fellow

2000- Recipient of the Am. Chem. Soc. Award for *Chemistry of Materials*

1996- Recipient of the Wayne State University Distinguished Alumni Award

1996- Professorship, Wilhelm Manchot Research

Christoph Boehme

Department of Physics and Astronomy

University of Utah, Salt Lake City, UT 84122-0830

Phone: 801-581-6896; Fax: 801-581-4801; Email: boehme@physics.utah.edu

Professional Preparation

Ruprecht-Karls-Universität Heidelberg, Germany

Physics Diplom, 2000

North Carolina State University, NC

Physics M.Sc., 2000

Philipps Universität Marburg, Germany

Physics Ph.D. (Dr. rer. nat.), 2003

Appointments

Professor, Department of Physics and Astronomy, University of Utah (2013 – present)

Associate Chair, Department of Physics and Astronomy, University of Utah, (2010 - 2015)

Associate Professor of Physics, University of Utah, Utah (2010 - 2013)

Assistant Professor of Physics, University of Utah, Utah (2006 - 2010)

Postdoctoral Researcher, Hahn-Meitner-Institut Berlin, Berlin, Germany (2002 – 2005)

Research Assistant, Hahn-Meitner-Institut Berlin, Berlin, Germany (2000 – 2002)

Research Assistant, North Carolina State University, Raleigh, North Carolina (1998 – 2000)

Selected recent publications (* = corresponding author)

- H. Liu, C. Zhang, H. Malissa, M. Groesbeck, M. Kavand, R. McLaughlin, S. Jamali, J. Hao, D. Sun, R. A. Davidson, L. Wojcik, J. S. Miller, C. Boehme, Z. Valy Vardeny, **Organic-based Magnon Spintronics**, accepted for publication in *Nature Materials* **17**, (2018).
- S Jamali, G. Joshi, H. Malissa, J. M. Lupton, C. Boehme, **Monolithic OLED-microwire devices for ultrastrong magnetic resonant excitation**, *Nano Lett.* **17**, 8, 4648 (2017).
<http://dx.doi.org/10.1021/acs.nanolett.7b01135>
- D. Sun, K. J. van Schooten, H. Malissa, M. Kavand, C. Zhang, C. Boehme, and Z. V. Vardeny, **Inverse Spin Hall Effect from pulsed Spin Current in Organic Semiconductors with Tunable Spin-Orbit Coupling**, *Nature Materials* **15** (5) (2016). <http://dx.doi.org/10.1038/nmat4618>
- D. P. Waters, G. Joshi, M. Kavand, M. E. Limes, H. Malissa, P. L. Burn, J. M. Lupton, C. Boehme, **The spin-Dicke effect in OLED magnetoresistance**, *Nature Physics* **11** (11), 910 (2015). <http://dx.doi.org/10.1038/nphys3453>
- K. J. van Schooten, D. L. Baird, M. E. Limes, J. M. Lupton, C. Boehme, **Probing long-range carrier-pair spin-spin interactions in a conjugated polymer by detuning of electrically detected spin beating**, *Nature. Commun.* **6**, 6688 (2015).
<http://dx.doi.org/10.1038/ncomms7688>
- H. Malissa, M. Kavand, D. P. Waters, K. J. van Schooten, P. L. Burn, Z. V. Vardeny, B. Saam, J. M. Lupton, **C. Boehme, Room-temperature coupling between electrical current and nuclear spins in OLEDs**, *Science* **345**, 1487 (2014). <http://dx.doi.org/10.1126/science.1255624>
- C. Boehme, J.M. Lupton, **Challenges for organic spintronics**, *Nature Nanotech.* **8** (9), 612 (2013). <http://dx.doi.org/10.1038/nnano.2013.177>

Honors, Awards and Scholarships

- 2016 Silver Medal for Physics and Materials Science of the International EPR Society
- 2010 CAREER Award of the National Science Foundation
- 2004 HMI Communicator Award for the best scientific presentation to a non-scientific audience
- 2004 IHK Nordhessen Science Award
- 2003 Dissertation Award Adlershof
- 1997 Fulbright Scholarship
- 1994 Scholarship of the Hans-Böckler-Foundation

Synergistic Activities

1) 2009 – present: Member of the Organizing Committee of the of the EPR Symposium of the Rocky Mountain Conference on Magnetic Resonance; 2011 – present: Member of the Program Committee of the Spins in Organic Semiconductors (SPINOS) conference, Proposal Reviewer for major funding agencies, Manuscript referee for various journals and books; Focus session organizer at APS March Meeting; 07/2010 – 10/2013 Member of the EMR Facility User Committee of the National High Magnetic Field, Laboratory, Tallahassee, FL; 07/2011 – 08/2012 Chair of the EPR Symposium of the Rocky Mountain Conference on Magnetic Resonance; 07/2010 – 2011 Co-Chair of the EPR Symposium of the Rocky Mountain Conference on Magnetic Resonance.

2) Given and coauthored presentations, Patents

47 invited, keynote, and plenary talks at international conferences, 51 invited talks at colloquia, seminars and other events, 107 contributed talks at conferences and 37 posters. 2 granted and 2 pending **patent applications**.

3) Public outreach

regular press coverage, including radio, television and print media, of significant publications; an overview of public relations work and of non-scientific media press coverage can be found at: <http://www.physics.utah.edu/~boehme/>

4) Teaching

The PI has taught 20 courses with six different course numbers at the University of Utah. The PI has frequently received excellent teaching evaluations with composite scores reaching 6/6 points.

5) Memberships

American Physical Society, International EPR Society, International Society of Magnetic Resonance, Deutsche Physikalische Gesellschaft, Phi-Kappa-Phi, Materials Research Society, and the Fulbright Alumni Association, Germany

6) **Advisors:** W. Fuhs (U. Marburg, Ph.D.), K. Lips (Hahn-Meitner-Institut Berlin, Ph.D.), G. Lucovsky (North Carolina State U., M.Sc.), A. Pucci (U. Heidelberg, undergraduate adviser).

7) **Thesis/Postdoctoral Supervision:** Past student supervision: 17 graduate students among whom 7 graduated with PhD degree, 7 undergraduate students; Current student supervision: 8 graduate students (all aimed at PhD), postgraduate supervision: 5 past and 2 current postdoctoral researchers.

ZEEV VALENTINE VARDENY

Distinguished Professor of Physics, University of Utah

Director, John Dixon Laser Institute

Professional Preparation

The Technion, Physics, B.Sc. Cum Laude, 1969

The Technion, Physics of Condensed Matter, PhD, 1979

Brown University, Electrical Engineering, Postdoctoral Associate, 1979-1981

Appointments

2002-present	Distinguished Professor of Physics, University of Utah
2005-present	Director; John Dixon Laser Institute, University of Utah
2011-present	Adjunct Professor of Electrical Engineering and MS&E Departments
2004-2005	Lady Davis Distinguished Professor, Technion, and again in 2009
1997-2003	Chair, Physics Department, University of Utah
1987-2002	Professor of Physics, Physics Department, University of Utah
1984-1987	Associate Professor, Physics Department, Technion
1982-1984	Senior Lecturer, Physics Department, Technion
1981-1982	Assistant Professor, Electrical Engineering, Brown University

Five Products (out of 610 publications) Most Relevant to the Proposal

1. Z. H. Xiong, D. Wu, Z. V. Vardeny, and J. Shi, 26 February 2004, "Giant magnetoresistance in organic spin-valves", *Nature* **427** (6977), 821-824; <http://dx.doi.org/10.1038/nature02325>.
2. T. D. Nguyen, G. Hukic-Markosian, F. Wang, L. Wojcik, X-G. Li, E. Ehrenfreund, and Z. V. Vardeny, 14 February 2010, "Isotope effect in organic magneto-transport; the role of hyperfine interaction". *Nature Materials* **9** (4), 345-350; <http://dx.doi.org/10.1038/nmat2633>.
3. T. D. Nguyen, E. Ehrenfreund, and Z. V. Vardeny, 13 July 2012, "Spin-polarized organic light emitting diode based on a novel bipolar spin-valve", *Science* **337** (6091), 204-209; <http://dx.doi.org/10.1126/science.1223444>.
4. C. Zhang, D. Sun, C-X. Sheng, Y. Zhai, K. Mielczarek, A. Zakhidov, and Z. V. Vardeny, 16 March 2015, "Magnetic field effects in hybrid perovskite devices", *Nature Physics* **11**, 427-434 (2015). <http://dx.doi.org/10.1038/nphys3277>.
5. D. Sun, K. J. van Schooten, H. Malissa, M. Kavand, C. Zhang, C. Boehme, and Z. V. Vardeny, 18 April 2016, "Inverse spin Hall effect from pulsed spin current in organic semiconductors with tunable spin-orbit coupling", *Nature Materials* **15** (8), 863-869; <http://dx.doi.org/10.1038/nmat4618>

Five Additional Products

1. R. Österbacka, C. P. An, X. M. Jiang and Z. V. Vardeny, 4 February 2000, "Two-dimensional electronic excitations in self-assembled conjugated polymer nanocrystals", *Science* **287** (5454), 839-842; <http://dx.doi.org/10.1126/science.287.5454.839>.

2. T. Matsui, A. Agrawal, A. Nahata, and Z. V. Vardeny, 29 March 2007, "Transmission resonances through quasicrystal arrays of subwavelength apertures", *Nature* **446** (7135), 517-520; <http://dx.doi.org/10.1038/nature05620>.
3. A. Tulek, R. C. Polson, and Z. V. Vardeny, 24 January 2010, "Threshold excitation studies of random lasers in π -conjugated polymers", *Nature Physics* **6** (4), 303-310; <http://dx.doi.org/10.1038/nphys1509>.
4. Z. V. Vardeny, A. Nahata and A. Agrawal, 27 February 2013, "Optics of photonics quasicrystals", *Nature Photonics* **7** (3), 177-187; <http://dx.doi.org/10.1038/nphoton.2012.343>.
5. C.-X. Sheng, S. Singh, A. Gambetta, T. Drori, M. Tong, S. Tretiak, and Z. V. Vardeny, 13 September 2013, "Ultrafast intersystem-crossing in platinum containing π -conjugated polymers with tunable spin-orbit coupling", *Scientific Reports* **3** (2653), 2653-2659; <http://dx.doi.org/10.1038/srep02653>.

Synergetic Activities

Inaugural Editor, *Nature Communications*, 2010-2016;

Editor, *Journal of Synthetic Metals*, 2000- 2012;

Chairman of the International Meeting on "Optical Probes of π -Conjugated Polymers", 1991, 1994, 1997, and 2000; member of the international committee 1991-present;

Secretary General of the ICSM 96 Meeting at Snowbird, Utah 1996;

Chairman of the 2nd International Meeting on Spin in Organic (SPINOS), Salt Lake City, UT, 2009

Honors and Awards

1994- Fellow, American Physical Society

2005- Recipient of **Utah Governor's Medal** for Science and Technology

2008- Recipient of the **APS Frank Isakson Prize** for Optical Effects in Solids

2009-Recipient of the **Rosenblatt Award** for Excellence in Teaching, Research and administration at the University of Utah

Graduate Advisors and Postdoctoral Sponsor

At the Technion: Profs. O. Brafman (deceased) for the PhD; G. Gilat (deceased) for the MSc.

At Brown University: Dist. Professor J. Tauc (deceased) for the postdoctoral period.

Ex-Graduate Students and Postdoc Associates (within the past 72 months)

A. Gambetta (Politecnico de Milan), B. Gautam (Un. of NC), J. Holt (NREL), G. Hukic (Cambridge Un., UK), J. Kennedy (NASA), C. Liu (USTC), M. Navas (Un. of California, Davis), Ndobe (CNRS, Bologna), T. Nguyen (Un. of Georgia), E. Olejnik (Un. of Montreal), B. Pandit (Industry), S. Singh (Industry), D. Sun (Un. of Utah), F. Wang (Industry), C. Zhang (un of Utah), Y. Zhang (Industry).

Total number of graduate student advisees: 52. Total number of postdoctoral associates: 22.

Complete list provided separately.

Dali Sun

Assistant Professor,

Department of Physics, North Carolina State University, Raleigh, NC 27695

Education and Training

BeiHang University, Beijing, Applied Physics, B.S., 2004

Institute of Physics, Chinese Academy of Sciences, Beijing, Physics of Condensed Matter, PhD., 2009

Oak Ridge National Laboratory, Oak Ridge, Tennessee, Postdoctoral Fellow, 2009-2011

University of Utah, Salt Lake City, Utah, Postdoctoral Fellow, 2012-2014

Research and Professional Experience

2017 – Present Assistant Professor, North Carolina State University, Raleigh, NC

2014 – 2016 Research Assistant Professor, University of Utah, Salt Lake City, UT

Five Products Most Relevant to the Proposal:

1. H. Liu, C. Zhang, H. Malissa, M. Groesbeck, M. Kavand, R. McLaughlin, S. Jamali, J. Hao, **D. Sun**, R. A. Davidson, L. Wojcik, J. S. Miller, C. Boehme, & Z. Vally Vardeny. “Organic-based Magnon Spintronics”. *Nature Materials* (2018) accepted, in press.
2. R. McLaughlin*, **D. Sun***, C. Zhang, M. Groesbeck, & Z. Vally Vardeny. “Optical Detection of Transverse Spin-Seebeck effect in Permalloy Film using Sagnac Interferometer Microscopy”. *Physical Review B: Rapid Communications* **95** (18), 180401(R) (2017); <http://dx.doi.org/10.1103/PhysRevB.95.180401>.
3. M. Kavand, C. Zhang, **D. Sun**, H. Malissa, Z. Vally Vardeny, & C. Boehme. “Quantitative inverse spin Hall effect detection via precise control of the driving-field amplitude”. *Physical Review B: Rapid Communications* **95** (16), 161406(R) (2017); <http://dx.doi.org/10.1103/PhysRevB.95.161406>
4. **D. Sun**, C. M. Kareis, K. J. van Schooten, W. Jiang, G. Siegel, W. W. Shum, A. Tiwari, C. Boehme, F. Liu, P. W. Stephens, J. S. Miller, & Z. Vally Vardeny. “Spintronics Detection of Interfacial Magnetic Switching in a Paramagnetic Tris(8-hydroxyquinoline)iron(III) Thin Film”. *Physical Review B* **95** (5), 054423 (2017). <https://dx.doi.org/10.1103/PhysRevB.95.054423>.
5. **D. Sun***, K. J. van Schooten*, H. Malissa, M. Kavand, C. Zhang, C. Boehme, & Z. V. Vardeny. “Inverse Spin Hall Effect in Organic Semiconductors with Tunable Spin-Orbit Coupling”. *Nature Materials* **15** (8), 863-869 (2016); <http://dx.doi.org/10.1038/nmat4618>

Five Other Publications:

1. P. Odenthal, W. Talmadge, N. Gundlach, R. Wang, C. Zhang, **D. Sun**, Z. G. Yu, Z. Vally Vardeny, & Y. S. Li. “Spin-polarized exciton quantum beating in hybrid organic-inorganic perovskites”. *Nature Physics* (2017), in press. <http://dx.doi.org/10.1038/nphys4145>
2. C. Zhang*, **D. Sun***, C-X. Sheng*, Y. X. Zhai, K. Mielczarek, A. Zakhidov, & Z. V. Vardeny. “Magnetic Field Effect in Hybrid Perovskite Devices”. *Nature Physics*, **11** (5), 427-434 (2015); <http://dx.doi.org/10.1038/nphys3277>

3. **D. Sun***, M. Fang*, X. Xu, L. Jiang, H. Guo, Y. Wang, W. Yang, L. Yin, P. C. Snijders, T. Z. Ward, Z. Gai, X.-G. Zhang, H. N. Lee & J. Shen. "Ferroelectric control of spin polarization in organic spin valves". *Nature Communications*, **5**, 4396 (2014); <http://dx.doi.org/10.1038/ncomms5396>
4. **D. Sun**, E. Ehrenfreund, & Z. Valy Vardeny. "The first decade of Organic Spintronics research". *Chemical Communications* **50** (15), 1781-1793 (2013), *Feature Article*. <http://dx.doi.org/10.1039/C3CC47126H>
5. **D. Sun**, L. F. Yin, C. J. Sun, H. W. Guo, Z. Gai, X. G. Zhang, Z. H. Cheng, & J. Shen, "Giant Magnetoresistance in Organic Spin Valves". *Physical Review Letters* **104** (23), 236602 (2010); <http://dx.doi.org/10.1103/PhysRevLett.104.236602>.

Synergistic Activities

- (i) Member of American Physical Society.
- (ii) University Teaching: NC State University, Department of Physics, PY205, Physics for Engineers and Scientists I.
- (iii) Reviewer for Physical Review Letters, Physical Review B, Nano Letters, Applied Physics Letters, Physical Chemistry Chemical Physics, Scientific Reports, Organic Electronics, Journal of Mathematical and Fundamental Sciences, European Physical Journal - Applied Physics.

Graduate Advisors and Postdoctoral Sponsor

At the Institute of Physics: Prof. Z. H. Cheng & Prof. J. Shen for the PhD.

At the Oak Ridge National Laboratory: Prof. J. Shen for the postdoctoral period.

At University of Utah: Dist. Professor Z. Valy Vardeny for the postdoctoral period.

Ex-Graduate Students and Postdoc Associates (within the past 48 months)

H. Guo (Un. of Louisiana), W. Wang (Fudan University), Anna Caruso (Un. of Utah), Michael Bonskowski (Un. of Minnesota), Dr. Mei Fang (Southwest University), Dr. C. Zhang (Institute of Chemistry)

Present Number of Students and Postdoctoral Associates

At present I advise two graduate students, three undergraduate students.

Wei Zhang

268 Hannah Hall, Oakland University, Rochester, MI 48309; (248) 370-3648;
weizhang@oakland.edu

PROFESSIONAL PREPARATION

- **Argonne National Laboratory**, Materials Science Division, **Postdoc**, 2013-2016
- **University of Washington - Seattle**, Materials Science and Engineering & Nanotechnology, dual-**PhD**, 2013
- **Peking University - Beijing**, Physics, **BS**, 2008

APPOINTMENTS

- **Assistant Professor** of Physics, **Oakland University**, USA, 2016 - present
- **Resident Researcher** of Materials Science Division, **Argonne National Laboratory**, 2016 – present

Research Interests and Accomplishments

- Magnetism, spintronics, condensed matter physics, nanotechnology.
- 50 total authored or co-authored publications; 1 book Chapter; 15 invited presentations; Citations: Google Scholar: > 1200, H-index = 18

10 SELECTED PUBLICATIONS

1. **W. Zhang** and K. M. Krishnan, “Epitaxial exchange-bias systems: from fundamentals to future spin-orbitronics”, [Materials Science and Engineering: R: Report 105, 1 \(2016\)](#). (Invited Review)
2. W. Jiang, X. Zhang, G. Yu, **W. Zhang**, X. Wang, M. B. Jungfleisch, J. E. Pearson, X. Cheng, O. Heinonen, K. L. Wang, Y. Zhou, A. Hoffmann, and S. G. E. te Velthuis, “Direct observation of the Skyrmion Hall Effect”, [Nature Physics 13, 162 \(2017\)](#).
3. **W. Zhang**, J. Sklenar, B. Hsu, W. Jiang, M. B. Jungfleisch, J. Xiao, F. Y. Fradin, Y. Liu, J. E. Pearson, J. B. Ketterson, Z. Yang, and A. Hoffmann, “Spin transfer torques in Permalloy on monolayer MoS₂”, [APL Mater. 4, 032302 \(2016\)](#). (Invited Perspective)
4. S. M. Wu, **W. Zhang**, A. KC, P. Borisov, J. E. Pearson, J. S. Jiang, D. Lederman, A. Hoffmann, A. Bhattacharya, “Antiferromagnetic spin Seebeck Effect”, [Phys. Rev. Lett. 116, 097204 \(2016\)](#).
5. M. B. Jungfleisch, **W. Zhang**, J. Sklenar, J. Ding, W. Jiang, H. Chang, F. Y. Fradin, J. E. Pearson, J. B. Ketterson, V. Novosad, M. Wu, A. Hoffmann, “Large spin-wave bullet in a ferrimagnetic insulator driven by spin Hall effect”, [Phys. Rev. Lett. 116, 057601 \(2016\)](#).
6. **W. Zhang**, M. B. Jungfleisch, F. Freimuth, W. Jiang, J. Sklenar, J. E. Pearson, J. B. Ketterson, Y. Mokrousov, and A. Hoffmann, “All electrical manipulation of magnetization dynamics in a ferromagnet by antiferromagnets with anisotropic spin Hall effects”, [Phys. Rev. B 92, 144405 \(2015\)](#).

7. **W. Zhang**, M. Jungfleisch, W. Jiang, J. Sklenar, F. Fradin, J. Pearson, J. Ketterson, and A. Hoffmann, "Spin pumping and inverse spin Hall effects - insights for future spin-orbitronics", *J. Appl. Phys.* **117**, 172610 (2015). (Invited Review)
8. **W. Zhang**, M. Jungfleisch, W. Jiang, Y. Liu, J. Pearson, S. G. E. te Velthuis, A. Hoffmann, F. Freimuth, and Y. Mokrousov, "Reduced spin-Hall effects from magnetic proximity", *Phys. Rev. B* **91**, 115316 (2015).
9. **W. Zhang**, M. Jungfleisch, W. Jiang, J. Pearson, A. Hoffmann, F. Freimuth, and Y. Mokrousov, "Spin Hall effects in metallic antiferromagnets", *Phys. Rev. Lett.* **113**, 196602 (2014). (Google Scholar Citation: > 100)
10. S. Das, **W. Zhang**, M. Demarteau, A. Hoffmann, M. Dubey, and A. Roelofs, "Tunable Transport Gap in Phosphorene", *Nano Letters* **14**, 5733 (2014). (Google Scholar Citation: > 250)

SYNERGISTIC ACTIVITIES

- **Chairs of Conference Symposia:** 2016 Conference on Magnetism and Magnetic Materials (MMM), New Orleans, LA
- **Reviewers** for about 30 peer-reviewed journals, ANL, NSF of Poland, and ARO.

SELECTED AWARDS AND HONORS

- **IEEE Magnetic Society Early Career Award**, 2017. The award citation is: "*contributions to exploring spin-orbit coupling phenomena with antiferromagnets, magnetic insulators, two-dimensional systems, and topologically non-trivial spin textures*".
- **Oakland University Faculty Research Fellowship Award**, 2017.

COLLABORATORS AND CO-EDITORS IN THE LAST 48 MONTHS

David Lederman (UCSC), Frank Freimuth (Forschungszentrum Jülich), Yuriy Mokrousov (Forschungszentrum Jülich), Hendrik Ohldag (SLAC), John Ketterson (Northwestern), Mingzhong Wu (Colorado State), Zheng Yang (UIC), Saptarshi Das (PSU), Wanjun Jiang (Tsinghua), Suzanne te Velthuis (ANL), Yaohua Liu (ORNL), Kang Wang (UCLA), Haidan Wen (ANL), Sam Bader (ANL).

GRADUATE MENTOR: Kannan M. Krishnan (University of Washington - Seattle); **POSTDOC MENTOR:** Axel Hoffmann (Argonne National Lab)

ADVISEES IN THE LAST 5 YEARS: co-advised 3 undergraduate students, 4 graduate students.

Vitae of Principal Investigator

MIKHAIL E. RAIKH

Professor of Physics, University of Utah

Professional Preparation

Polytechnical University, Sankt Petersburg, Russia, Physics, B.Sc. Cum Laude, 1977
A.F. Ioffe Institute, Sankt Petersburg, Condensed Matter Theory, PhD, 1980
A.F. Ioffe Institute, Dr. of Sciences (Habilitation), 1990

Appointments

1994-present	Professor of Physics, Physics Department, University of Utah
1991-1994	Associate Professor, Physics Department, University of Utah
1990-1991	Alexander von Humboldt Fellow, TU Munchen, Germany

Five Products (out of 220 publications) Most Relevant to the Proposal

1. Z. Yue, D.A. Pesin, and M.E. Raikh, 6 July 2015, “*Spin pumping from a ferromagnet into a hopping insulator: the role of resonant absorption of magnons*”, ***Physical Review B* 92**, 045405 (1-6).
2. R.C. Roundy and M.E. Raikh, 23 September 2013, “*Organic magnetoresistance under resonant ac drive*”, ***Physical Review B* 88**, 125206 (1-5).
3. R.C. Roundy and M.E. Raikh, 15 November 2013, “*Tunnel magnetoresistance in organic spin valves in the regime of multistep tunneling*”, ***Physical Review B* 88**, 205205 (1-9).
4. R.C. Roundy, Z.V. Vardeny, and M.E. Raikh, 29 August 2013, “*Organic magnetoresistance near saturation: Mesoscopic effects in small devices*”, ***Physical Review B* 88**, 075207 (1-5).
5. R.C. Roundy and M.E. Raikh, 23 May 2013, “*Slow dynamics of spin pairs in a random hyperfine field: Role of inequivalence of electrons and holes in organic magnetoresistance*”, ***Physical Review B* 87** 195206 (1-15).

Five Additional Products

1. R.C. Roundy and M.E. Raikh, 12 January 2015 “*Spin injection from a ferromagnet into a semiconductor in the case of a rough interface*”, ***Physical Review B* 91**, 045202 (1-9).
2. R.C. Roundy, D. Nemirovsky, V. Kagalovsky, and M.E. Raikh, 4 June 2014 “*Giant Fluctuations of Local Magnetoresistance of Organic Spin Valves and the Non-Hermitian 1D Anderson Model*”, ***Physical Review Letters* 112**, 226601 (1-5).
3. R.C. Roundy and M.E. Raikh, 12 November 2014 “*Spin relaxation of a diffusively moving carrier in a random hyperfine field*”, ***Physical Review B* 91**, 201203(R) (1-5).
4. R.C. Roundy and M.E. Raikh, 12 December 2014 “*Spin transport with dispersive traps: Narrowing of the Hanle curve*”, ***Physical Review B* 90**, 241202(R) (1-5).

5. R. Glenn, M.E. Limes, B. Pankovich, B. Saam, and M.E. Raikh, 15 April 2013 “*Magnetic resonance in slowly modulated longitudinal field: Modified shape of the Rabi oscillations*”, *Physical Review B* **87**, 155128 (1-12).

Synergetic Activities

1. Referee for Phys. Review, Physical. Review. Letters, Applied Physics Letters, Journal of Applied Physics, Journal of Chemical Physics, New Journal of Physics, Nature Photonics
2. Member of BSF Advisory Board (2013)
3. Lecturer at Boulder Summer School (2013)

Honors and Awards

2011 Outstanding Referee for the American Physical Society
2010 Distinguished Mentor Award
2008 Distinguished Research Award
2006 Fellow of the American Physical Society
1992 Outstanding Instructor Award
1990 Alexander von Humboldt Fellowship
1988 Diploma of Academy of Science of USSR for young scientists

Collaborators (within the past 48 months)

Complete list provided separately.

Graduate Advisor

Zh, I. Alferov, A. F. Ioffe Institute, Nobel Prize (2000).

Ex-Graduate Students and Postdoc Associates (within the past 72 months)

R. Glenn (Virginia Tech), R.C. Roundy (Industry), Z. Yue (U. of Karlsruhe), V.V. Mkhitarian (Ames Lab).

Total number of graduate student advisees: 9. Total number of postdoctoral associates: 4.

Complete list provided separately.