

# Kate A. Ross

*Assistant Professor*

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## Research Interests

Quantum materials, quantum spin liquids, quantum phase transitions, topological spin textures, neutron scattering, crystal growth, ultrasound spectroscopy.

## Current Positions

2015/08 - present  
Department of Physics, Colorado State University  
*Position:* Assistant Professor

## Education

09/2007 - 11/2012 McMaster University, Hamilton, Ontario Canada

Ph.D., Physics; Thesis title: *Neutron Scattering Studies of the Quantum Spin Ice Material  $Yb_2Ti_2O_7$* . Advisor: Bruce Gaulin

09/2002 - 09/2007 University of Waterloo, Waterloo, Ontario Canada

B.Sc., Honours Physics, Co-operative Program; Research: *Specific Heat Measurements of the Magnetic Pyrochlores  $Gd_2Sn_2O_7$  and  $Gd_2Ti_2O_7$* . Advisor: Jan Kycia

## Grants, Awards, and Fellowships

- DOE Early Career award DE-SC0018972 (2018-2023)
- Oxford Instruments 2018 Lee Osheroff Richardson prize (Feb. 2018)
- Kavli Fellow (Feb. 2018)
- American Physical Society 2016 George E. Valley Jr. Prize (awarded March 2017)
- NSF DMR-1611217 “Quantum phases in spin-orbit coupled honeycomb magnets: beyond 4d and 5d transition metal ions” (Sept. 2016 - Sept. 2019)
- Canadian Institute for Advanced Research (CIFAR) Azrieli Global Scholar (June 2016)
- Royal Society of Canada’s Alice Wilson Award (Nov 2014)
- NSERC Post Doctoral Fellowship (awarded Feb 2014)
- 2014 Prize for Outstanding Student Research, Neutron Scattering Society of America (February 2014)
- NSERC CGS-D: Sept. 2009 - Sept. 2011
- NSERC CGS-M: Sept. 2007 – Sept. 2009
- NSERC Industrial USRA: Summer 2006
- Xerox Research Centre Award (for written communication, University of Waterloo): 2004 and 2005
- I.R. Dagg Memorial Scholarship (University of Waterloo): 2005-2006
- Selected to attend the 2008 Lindau Nobel Laureate conference (June 2008), Lindau Germany

## Past Positions

2016/07 - 2018/07

CIFAR Quantum Materials Program

*Position:* CIFAR Azrieli Global Scholar

2014/09 - 2015/08

Department of Chemistry, Colorado State University

*Position:* NSERC Postdoctoral fellow

*Research focus:* Synthesis of new exotic magnetic materials

*Advisor:* James Neilson

2012/09 - 2014/09

Institute for Quantum Matter, Johns Hopkins University and the NIST Center for Neutron Research.

*Position:* Postdoctoral fellow

*Research focus:* Quantum magnets, exotic phases of magnetic materials, neutron scattering as a probe of strongly interacting electronic systems, emergent phenomena

*Advisor:* Collin Broholm

2010/09 - 2012/09

McMaster University, Hamilton, Ontario Canada

*Position:* Instrument Responsible at McMaster Nuclear Reactor (MNR)

*Research focus:* Commissioning the new triple-axis neutron spectrometer at the MNR, preparation for use as a teaching and research tool

*Advisor:* Bruce Gaulin

2007/09 - 2012/09

McMaster University, Hamilton, Ontario Canada

*Position:* Ph.D. Candidate

*Research focus:* Crystal growth, neutron and x-ray scattering, frustrated magnetic materials

*Advisor:* Bruce Gaulin

2006/09 – 2007/04

University of Waterloo, Waterloo, Ontario Canada

*Position:* Undergraduate researcher

*Research focus:* Ultra-low temperature specific heat measurements, frustrated magnetic materials

*Advisor:* Jan Kycia

2004/09 – 2004/12

PICASSO Dark Matter Search Experiment, Queen's University, Kingston, Ontario Canada

*Position:* Undergraduate researcher

*Research focus:* Design and construction of a portable neutron calibration source, machine shop, design drawings, Monte Carlo simulations in C++

*Advisor:* Tony Noble

2004/01 – 2004/04

TRIUMF Weak Interaction Symmetry Test (TWIST), Vancouver, British Columbia Canada

*Position:* Undergraduate researcher

*Research focus:* Monte Carlo simulations in C++

*Advisor:* Art Olin

## Professional Activities

- Communications Secretary, Neutron Scattering Society of America (Feb 2017 - Feb 2021)
- Member of Oak Ridge National Laboratory's SNS/HFIR User Group Executive Committee (SHUG-EC) (*Vice-Chair* Jan 2016 - Dec 2016, *Chair* Jan 2017 - Dec 2017, *Past-Chair* Jan 2018 - Dec 2018)
- Member of the Organizing and Program Committees for the 2018 Highly Frustrated Magnetism conference held in Davis California, July 2018
- Member of the Program Committee for the 2016 Highly Frustrated Magnetism conference held in Taipei, Sept. 2016
- Member of the Scientific Review Committee (SRC) for Oak Ridge National Laboratory's neutron scattering user program. (2015 - present)
- Focus Topic Organizer for the APS March Meeting (GMAG unit) (Fall 2015 & Fall 2017)
- Member of the TRIUMF MMS-EEC (scientific review committee for the muSR user program) (Jan. 2016 - June 2018)
- Co-organizer for the Front Range Magnetism Symposium (FRAMS) at Colorado State University (Sept. 2015)
- Referee for peer-reviewed journals: Science, Nature, PRL, PRB, Inorganic Chemistry

## Publications (updated June 19, 2019)

- 1) Harikrishnan S. Nair, Tim DeLazzer, Tim Reeder, Antony Sikorski, Gavin Hester, and Kate A. Ross. *Crystal Growth of Quantum Magnets in the Rare-Earth Pyrosilicate Family  $R_2Si_2O_7$  ( $R = Yb, Er$ ) Using the Optical Floating Zone Method*. Crystals 9(4), 196 (2019)

- 2) J. Gaudet, E. M. Smith, J. Dudemaine, J. Beare, C. R. C. Buhariwalla, N. P. Butch, M. B. Stone, A. I. Kolesnikov, Guangyong Xu, D. R. Yahne, K. A. Ross, C. A. Marjerrison, J. D. Garrett, G. M. Luke, A. D. Bianchi, and B. D. Gaulin. *Quantum spin ice dynamics in the dipole-octupole pyrochlore magnet  $Ce_2Zr_2O_7$* . Phys. Rev. Lett **122** 187201 [**Editor's suggestion**] (2019)
- 3) Gavin Hester, H. S. Nair, T. Reeder, D. R. Yahne, T. N. DeLazzer, L. Berges, D. Ziat, J. A. Quilliam, J. R. Neilson, A. A. Aczel, G. Sala, and K. A. Ross. *A Novel Strongly Spin-Orbit Coupled Quantum Dimer Magnet:  $Yb_2Si_2O_7$* . arXiv:1810.13096 [cond-mat.str-el] (2018) [**in press Physical Review Letters**]
- 4) J G Rau, L S Wu, A F May, A E Taylor, I-Lin Liu, J Higgins, N P Butch, K A Ross, H S Nair, M D Lumsden. *Behavior of the breathing pyrochlore lattice  $Ba_3Yb_2Zn_5O_{11}$  in applied magnetic field*. Journal of Physics: Condensed Matter, **30**, 45 (2018)
- 5) Liurukara D. Sanjeewa, Kate A. Ross, Colin L. Sarkis, Harikrishnan S. Nair, Colin D. McMillen, and Joseph W. Kolis. *Single Crystals of Cubic Rare-Earth Pyrochlore Germanates:  $RE_2Ge_2O_7$  ( $RE = Yb$  and  $Lu$ ) Grown by a High-Temperature Hydrothermal Technique*. Inorg. Chem., **57** (20), pp. 12456–12460 (2018)
- 6) S. K. Takahashi, A. Arsenault, C. Mauws, A. M. Hallas, C. Sarkis, K. A. Ross, C. R. Wiebe, M. Tachibana, G. M. Luke, and T. Imai. *Low-frequency spin dynamics in the XY quantum spin ice  $Yb_2Pt_2O_7$* . Phys. Rev. B **98**, 104425 (2018)
- 7) H.S. Nair, J.M. Brown, E. Coldren, G. Hester, M.P. Gelfand, A. Podlesnyak, Q. Huang, K.A. Ross. *Short range order in the quantum XXZ honeycomb lattice material  $BaCo_2(PO_4)_2$* . Phys. Rev. B **97**, 134409 (2018)
- 8) M.J. Tarne, M.M. Bordelon, S. Calder, J.R. Neilson, K.A. Ross. *Tuning the antiferromagnetic helical pitch length and nanoscale domain size in  $Fe_3PO_4O_3$  by magnetic dilution*. Phys. Rev. B **96**, 214431 (2017)
- 9) B. A. Frandsen, K. A. Ross, J. W. Krizan, G. J. Nilsen, A. R. Wildes, R. J. Cava, R. J. Birgeneau, S. J. L. Billinge. *Real-space investigation of short-range magnetic correlations in fluoride pyrochlores  $NaCaCo_2F_7$  and  $NaSrCo_2F_7$  with magnetic pair distribution function analysis*. Phys. Rev. Materials **1**, 074412 [**Editor's suggestion**] (2017)
- 10) A. J. Neer, J. Milam-Guerrero, J. E. So, B. C. Melot, K. A. Ross, Z. Hulvey, C. M. Brown, A. A. Sokol, and D. O. Scanlon. *Ising-like antiferromagnetism on the octahedral sublattice of a*

- cobalt-containing garnet and the potential for quantum criticality*. Phys. Rev. B **95**, 144419 (2017)
- 11) K.A. Ross, J.M. Brown, R.J. Cava, J.W. Krizan, S. E. Nagler, J.A. Rodriguez-Rivera, and M. B. Stone. *Single-ion properties of the  $S = 1/2$  XY antiferromagnetic pyrochlores,  $NaA'Co_2F_7$  ( $A' = Ca^{2+}, Sr^{2+}$ )*. Phys. Rev. B **95**, 144414 [Editor's suggestion] (2017)
- 12) J.-J. Wen, S. M. Koohpayeh, K. A. Ross, B. A. Trump, T. M. McQueen, K. Kimura, S. Nakatsuji, Y. Qiu, D. M. Pajerowski, J. R. D. Copley, and C. L. Broholm. *Disordered Route to the Coulomb Quantum Spin Liquid: Random Transverse Fields on Spin Ice in  $Pr_2Zr_2O_7$* . Phys. Rev. Lett. **118**, 107206 (2017)
- 13) Edwin Kermarrec, Jonathan Gaudet, Katharina Fritsch, Rustem Khasanov, Zurab Guguchia, Clemens Ritter, Kate Ross, Hanna Dabkowska, and Bruce Gaulin. *Ground state selection under pressure in the quantum pyrochlore magnet  $Yb_2Ti_2O_7$* . Nature Communications **8**, 14810 (2017)
- 14) K. Fritsch, K.A. Ross, G.E. Granroth, G. Ehlers, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin. *Quasi-two-dimensional spin correlations in the triangular lattice bilayer spin glass  $LuCoGaO_4$* . Phys. Rev. B **96**, 094414 (2017)
- 15) J.H. Roudebush, K.A. Ross, and R.J. Cava. *Iridium containing honeycomb Delafossites by topotactic cation exchange*. Dalton Trans., **45**, 8783-8789 (2016)
- 16) J. Gaudet, K. A. Ross, E. Kermarrec, N. P. Butch, G. Ehlers, H. A. Dabkowska, and B. D. Gaulin. *Gapless quantum excitations from an ice-like splayed ferromagnetic ground state in stoichiometric  $Yb_2Ti_2O_7$* . Phys. Rev. B **93**, 064406 [Editor's suggestion] (2016)
- 17) K. A. Ross, J. W. Krizan, J. A. Rodriguez-Rivera, R. J. Cava, and C. L. Broholm. *Static and dynamic XY-like short-range order in a frustrated magnet with exchange disorder*. Phys. Rev. B **93**, 014433 (2016)
- 18) L. Pan, N. J. Laurita, K. A. Ross, B. D. Gaulin & N. P. Armitage. *A measure of monopole inertia in the quantum spin ice  $Yb_2Ti_2O_7$* . Nature Physics (2015)
- 19) J. Gaudet, D. D. Maharaj, G. Sala, E. Kermarrec, K. A. Ross, H. A. Dabkowska, A. I. Kolesnikov, G. E. Granroth, and B. D. Gaulin. *Neutron spectroscopic study of crystalline electric field excitations in stoichiometric and lightly stuffed  $Yb_2Ti_2O_7$* . Phys. Rev. B **92**, 134420 (2015)

- 20) K. A. Ross, M.M. Bordelon, G. Terho, J. R. Neilson. *Nanosized helical magnetic domains in strongly frustrated  $Fe_3PO_4O_3$* . Phys. Rev. B **92**, 134419 [Editor's suggestion] (2015)
- 21) L. Pan, S.K. Kim, A. Ghosh, C.M. Morris, K.A. Ross, E. Kermarrec, B. D. Gaulin, and S.M. Koohpayeh, O. Tchernyshyov, N. P. Armitage. *Low-energy electrodynamics of novel spin excitations in the quantum spin ice  $Yb_2Ti_2O_7$* . Nature Communications **5**, 4970 (2014)
- 22) E.M. Seibel, J.H. Roudebush, M.N. Ali, K.A. Ross, R.J. Cava. *Structure and Magnetic Properties of the Spin-1/2-Based Honeycomb  $NaNi_2BiO_{6-\delta}$  and Its Hydrate  $NaNi_2BiO_{6-\delta} \cdot 1.7H_2O$* . Inorganic Chemistry **53** (20), 10989-10995 (2014)
- 23) K.A. Ross, L. Harriger, Z. Yamani, W. J. L. Buyers, J. D. Garrett, A. A. Menovsky, J. A. Mydosh, C. L. Broholm. *Strict limit on in-plane ordered magnetic dipole moment in  $URu_2Si_2$* . Phys. Rev. B, **89**, 155122 (2014)
- 24) K. A. Ross, Y. Qiu, J. R. D. Copley, H. A. Dabkowska, B. D. Gaulin. *Order by Disorder Spin Wave Gap in the XY Pyrochlore Magnet  $Er_2Ti_2O_7$* . Phys. Rev. Lett. **112**, 057201 (2014)
- 25) H. J. Silverstein, K. Fritsch, F. Flicker, A.M. Hallas, J.S. Gardner, Y. Qiu, G. Ehlers, A.T. Savici, Z. Yamani, K.A. Ross, B.D. Gaulin, M.J.P. Gingras, J.A.M. Paddison, K. Foyevtsova, R. Valenti, F. Hawthorne, C.R. Wiebe, H.D. Zhou. *Liquid-like correlations in single crystalline  $Y_2Mo_2O_7$ : an unconventional spin glass*. Phys. Rev. B **89**, 054433 (2014)
- 26) R. M. D'Ortenzio, H. A. Dabkowska, S. R. Dunsiger, B. D. Gaulin, M. J. P. Gingras, T. Goko, J. B. Kycia, L. Liu, T. Medina, T. J. Munsie, D. Pomaranski, K. A. Ross, Y. J. Uemura, T. J. Williams, and G. M. Luke. *Unconventional magnetic ground state in  $Yb_2Ti_2O_7$* . Phys. Rev. B **88**, 134428 (2013)
- 27) J. J. Wagman, G. Van Gastel, K. A. Ross, Z. Yamani, Y. Zhao, Y. Qiu, J. R. D. Copley, A. B. Kallin, E. Mazurek, J. P. Carlo, H. A. Dabkowska, and B. D. Gaulin. *Two-dimensional incommensurate and three-dimensional commensurate magnetic order and fluctuations in  $La_{2-x}BaxCuO_4$* . Phys. Rev. B, **88** 014412 (2013)
- 28) D. Pomaranski, L.R. Yaraskavitch, S. Meng, K.A. Ross, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin, J.B. Kycia. *Absence of Pauling's residual entropy in thermally equilibrated  $Dy_2Ti_2O_7$* . Nature Physics, **9**, 353-356 (2013)

- 29) K. Fritsch, K.A. Ross, Y. Qiu, J.R.D. Copley, T. Guidi, R.I. Bewley, H.A. Dabkowska, B.D. Gaulin. *Antiferromagnetic spin ice correlations at  $(1/2, 1/2, 1/2)$  in the ground state of the pyrochlore magnet  $Tb_2Ti_2O_7$* . Phys. Rev. B **87** (9), 094410 (2013)
- 30) W. H. Toews, S.S. Zhang, K.A. Ross, H.A. Dabkowska, B.D. Gaulin and R.W. Hill. *Thermal conductivity of  $Ho_2Ti_2O_7$  along the  $[111]$  direction*. Phys. Rev. Lett., **110**, 217209, (2013)
- 31) N.R. Hayre, K.A. Ross, R. Applegate, T. Lin, R.R.P. Singh, B.D. Gaulin and M.J.P. Gingras. *Thermodynamic properties of  $Yb_2Ti_2O_7$  pyrochlore as a function of temperature and magnetic field: Validation of a quantum spin ice exchange Hamiltonian*, Phys. Rev. B, **87**, 184453, (2013)
- 32) K.A. Ross, T Proffen, H.A. Dabkowska, J.A. Quilliam, L.R. Yaraskavitch, J.B. Kycia, B.D. Gaulin. *Lightly stuffed pyrochlore structure of single-crystalline  $Yb_2Ti_2O_7$  grown by the optical floating zone technique*. Phys. Rev. B **86** (17), 174424 (2012)
- 33) H.M Revell, L.R. Yaraskavitch, J.D. Mason, K.A. Ross, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin, P. Henelius, J.B. Kycia. *Evidence of impurity and boundary effects on magnetic monopole dynamics in spin ice*. Nature Physics **9** (1), 34-37 (2012)
- 34) L. Savary, K.A. Ross, B.D. Gaulin, J.P.C. Ruff, L. Balents. *Order by Quantum Disorder in  $Er_2Ti_2O_7$* . Phys. Rev. Lett. **109** (16), 167201 (2012)
- 35) L.R. Yaraskavitch, H.M. Revell, S. Meng, K.A. Ross, H.M.L. Noad, H.A. Dabkowska, B.D. Gaulin, and J.B. Kycia. *Spin dynamics in the frozen state of the dipolar spin ice material  $Dy_2Ti_2O_7$* . Phys. Rev. B **85**, 020410(R) (2012)
- 36) Z. Islam, J.P.C. Ruff, K.A. Ross, H. Nojiri, and B.D. Gaulin. *Time-resolved one-dimensional detection of x-ray scattering in pulsed magnetic fields*. Rev. Sci. Instrum. **83**, 013113 (2012)
- 37) K.A. Ross, L. Savary, B. D. Gaulin, and L. Balents. *Quantum Excitations in Quantum Spin Ice*. Phys. Rev. X **1**, 021002 (2011).
- 38) K.A. Ross, L.R. Yaraskavitch, M. Laver, J.S. Gardner, J. A. Quilliam, S. Meng, J.B. Kycia, D. K. Singh, H.A. Dabkowska, and B.D. Gaulin. *Dimensional Evolution of Spin Correlations in the Magnetic Pyrochlore  $Yb_2Ti_2O_7$* . Phys. Rev. B., **84**, 174442 (2011).



- 39) H. Nojiri, S. Yoshii, M. Yasui, K. Okada, M. Matsuda, J. -S. Jung, T. Kimura, L. Santodonato, G. E. Granroth, K. A. Ross, J. P. Carlo, and B. D. Gaulin. *Neutron Laue Diffraction Study on the Magnetic Phase Diagram of Multiferroic MnWO<sub>4</sub> under Pulsed High Magnetic Fields*. Phys. Rev. Lett., **106**, 237202 (2011).
- 40) J.P. C. Ruff, Z. Islam, J. P. Clancy, K. A. Ross, H. Nojiri, Y. H. Matsuda, H. A. Dabkowska, A. D. Dabkowski, and B. D. Gaulin. *Magnetoelastics of a Spin Liquid: X-Ray Diffraction Studies of Tb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> in Pulsed Magnetic Fields*. Phys. Rev. Lett., **105**, 077203 (2010).
- 41) Granroth G. E., Kolesnikov A. I., Sherline T. E., Clancy J. P., Ross K. A., Ruff J. P. C., Gaulin B. D., Nagler S. E. *SEQUOIA: a newly operating chopper spectrometer at the SNS*. Journal of Physics: Conference Series **251**, 12058 (2010).
- 42) K.A. Ross, J.P.C. Ruff, C.P. Adams, J.S. Gardner, H.A. Dabkowska, Y. Qiu, J.R.D. Copley, and B.D. Gaulin. *Two dimensional kagome correlations and field induced long range order in the ferromagnetic XY pyrochlore Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*. Phys. Rev. Lett., **103**, 227202 (2009).
- 43) Z.Islam, J.P.C. Ruff, H. Nojiri, Y.H. Matsuda, K.A. Ross, B.D. Gaulin, Z. Qu, J.C. Lang. *A portable high field pulsed magnet system for single crystal x-ray scattering studies*. Rev. Sci. Instrum., **80**, 113902 (2009).
- 44) J.A. Quilliam, K. A. Ross, A. G. Del Maestro, M. J. P. Gingras, L. R. Corruccini, and J.B. Kycia. Phys. *Evidence for Gapped Spin-Wave Excitations in the Frustrated Gd<sub>2</sub>Sn<sub>2</sub>O<sub>7</sub> Pyrochlore Antiferromagnet from Low-Temperature Specific Heat Measurements*. Rev. Lett. **99**, 097201 (2007).

## Plenary talks

- “*Spin Orbit Coupled Quantum Magnetism*”: American Physical Society’s Four Corners Section Meeting (Oct. 2017)
- “*Towards Emergent Electrodynamics in a Geometrically Frustrated Magnet*”: American Conference on Neutron Scattering (June 2014) (Outstanding Student Research Prize talk)

## Selection of Invited talks (50 given since 2008)

- “*Spin Orbit Coupled Quantum Magnetism*”, University of Illinois Urbana Champaign (Dec 2018)
- “*Spin Orbit Coupled Quantum Magnetism*”, Northwestern University, Evanston, IL (Feb 2018)
- “*Spin Orbit Coupled Quantum Magnetism*”, Seaborg Institute Lecture, Los Alamos, NM (November 2017)
- “*New Manifestations of Classical Ground State Degeneracy*”, Ohio State University, Columbus, OH (October 2017)
- “*Quantum phenomena in  $S_{eff} = 1/2$  pyrochlores revealed by neutron scattering*”, NCNR summer school, Gaithersburg, MD (June 2017)
- “*Frustration, Quantum Magnetism, Spin Liquids*”, CIFAR Summer School, Vancouver, Canada (April 2017)
- George E. Valley, Jr. Prize Talk: “*Quantum Frustrated Magnetism and its Expression in the Ground State Selection of Pyrochlore Magnets*”, APS March Meeting, New Orleans, LA (March 2017)
- “*Quantum Phenomena in XY Pyrochlores*”, Stanford University, Palo Alto CA (Nov. 2016)
- “*Quantum Phenomena in XY Pyrochlores*”, CIFAR Quantum Materials meeting. Paris, France (Oct. 2016)
- “*Quantum Spin Ice and Other Phenomena in XY Pyrochlores*”, Gordon Research Conference on Correlated Electron Systems (June 2016)
- “*Ice-like Ferromagnetism with Continuum Excitations in Stoichiometric  $Yb_2Ti_2O_7$* ”, Topological Matter Conference, MPI, Dresden Germany (Feb. 2016)
- “*Spin Excitations in Stoichiometric  $Yb_2Ti_2O_7$* ”: KITP, Santa Barbara (July 2015)
- “*The effect of exchange disorder on a pyrochlore antiferromagnet: XY fluctuations and freezing in  $NaCaCo_2F_7$* ”: Gordon Research Conference (GRC), Hong Kong (June 2015)
- “*From Order by Disorder to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: LASSP Seminar, Cornell University, Ithaca NY (May 2015)
- “*Order-by-Disorder versus Spin Freezing in XY Pyrochlore Antiferromagnets*”: Seminar, IFW, Dresden, Germany (April 2015)

- “*From Order by Disorder to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: Colloquium, TU Dresden, Dresden, Germany (April 2015)
- “*Low energy XY spin clusters in a pyrochlore antiferromagnet with weak disorder*”: APS March Meeting, San Antonio, TX (March 2015)
- “*Magnetic Correlations in a Frustrated Ni<sup>3+</sup>-based Spin 1/2 Honeycomb Lattice: Na<sub>(1-x)</sub>Ni<sub>2</sub>SbO<sub>6</sub> \* 1.5 D<sub>2</sub>O*”: Workshop on Novel Quantum Materials and Phases, Okinawa Institute of Science and Technology, Okinawa, Japan (May 2014)
- “*From “Order By Disorder” to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: “Chez Pierre” seminar, MIT, Cambridge MA (April 2014)
- “*From “Order By Disorder” to Emergent Electrodynamics in Geometrically Frustrated Pyrochlore Magnets*”: Condensed Matter Seminar, Caltech, Pasadena CA (February 2014)
- “*Ground states of the effective spin-1/2 XY pyrochlores: “Quantum Spin Ice” and “Order By Disorder”*”: Condensed Matter Seminar, George Mason University, Arlington VA (November 2013)
- “*Pulsed magnet neutron scattering applied to multiferroic MnWO<sub>4</sub>*”: SNS and HFIR User Group Meeting, Oak Ridge TN (August 2013)
- “*Quantum Spin Ice” Physics Determined from High Field Spin Wave Excitations in Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”: Exotic Phases of Frustrated Magnets, Kavli Institute for Theoretical Physics (KITP), Santa Barbara CA (October 2012)
- “*Effective Spin-1/2 Hamiltonians Determined for Er<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> & Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> Through Inelastic Neutron Scattering*”: 4-Corner Condensed Matter Symposium, Perimeter Institute, Waterloo ON (May 2012)
- “*Dimensional Evolution of Spin Correlations in Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”: Geometrically Frustrated Magnets (International Institute of Physics) conference, Natal Brazil (December 2011).
- “*From Two Dimensional Correlations to a Disordered Ground State in the XY Pyrochlore, Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*” APS March Meeting 2011, abstract #A18.00001, Dallas TX (March 2011).
- “*Time of Flight Neutron Diffraction at 30T*”, American Conference on Neutron Scattering, Ottawa ON (June 2010).
- “*Unexpected Frustration, 2D Spin Correlations, and Field-Induced Order in Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>*”, Seminars at Kyoto University and Japan Atomic Energy Agency, Japan (Feb 2010).

## Teaching

2015 - present

Lecturer, Colorado State University (Math Methods, Physical Thermodynamics)

2018/01

Lecturer, Magnetism PRSE Workshop

2017/04

Instructor, CIFAR Summer School

2013/07 & 2017/06

Instructor, NCNR Neutron Scattering Summer School

2007/09 - 2012/09

Teaching Assistant, McMaster University

Undergraduate level: Physics 1B03 (kinematics and dynamics), Physics 2B03

(electronics), Arts and Science 2D06 (physics for an interdisciplinary program), Solid State Physics 4K03

## Outreach

04/2019: Discussion leader for “Women in the Academy” workshop, Colorado State University

04/2019: Alpha Sigma Kappa sorority presentation on academic careers

2017 - 2019: STEM Middle School Girls annual workshop leader (Expanding Your Horizons)

06/2015: Interview for “The Innovators with Laurelle Turner”, KCSU radio station.

06/2014: Participated in a live television interview about neutron scattering on Knoxville’s WBIR news station

2012 - 2014: Tour guide for school group tours of the NIST Center for Neutron Research.

2011/09 - 2012/09: Member of the Organizing committee for the Condensed Matter Journal Club, McMaster University

2011/09 - 2012/09: Mentor for incoming graduate students, McMaster University

2010/09 and 2011/09: Volunteer for the Engineering and Science Olympics, McMaster University

2007/09 - 2012/09: Liquid Nitrogen and Superconductivity Demonstrator for the High School Outreach program, McMaster University

2010/10: Graduate student representative for McMaster University, Canadian Undergraduate Physics Conference (CUPC), Halifax NS, Canada