Michael Alan McGuire

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Materials Science and Technology Division, Oak Ridge National Laboratory Phone: 865-574-5496

Research Interests

Magnetic, thermoelectric, and superconducting materials; cleavable materials; solid state chemistry and crystal growth of complex and new inorganic compounds; magnetic, thermal, and transport properties; crystallography and structure-property relationships.

Education

2001 – 2006	**Cornell University**	**Ph.D. Physics**
1999 – 2001	**University of Mississippi**	**M.S. Physics**
1995 – 1999	**University of Mississippi**	**B.S. Physics**

Research Experience

2007 – present **Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN**
Senior R&D Staff and Eugene P. Wigner Fellow, Correlated Electron Materials Group

2006 – 2007 **Department of Chemistry, Princeton University, Princeton, NJ**
Postdoctoral Research Associate

2002 – 2006 **Department of Chemistry and Chemical Biology, Cornell University, Ithaca, NY**
Graduate Research Assistant
▪ Dissertation: "*Exploring Thallium Compounds, Chevrel Phases, and Other Chalcogenides as Thermoelectric Materials*"

2000 – 2001 **Department of Physics and Astronomy, University of Mississippi, Oxford, MS**
Graduate Research Assistant
▪ Thesis: "*Resonant Ultrasound Spectroscopy Studies of Clathrate Thermoelectrics*"

Fellowships, Memberships, and Awards

Fellow of the American Association for the Advancement of Science, 2020
Fellow of the American Physical Society, 2017

Member **AAAS, American Physical Society, American Crystallographic Association, American Chemical Society**

Highly Cited Researcher, Clarivate Analytics, 2021
R&D 100 Award, 2021 (UCC: Ultraconductive Copper-CNT Composite)
Significant Event Award (Switching in vdW crystals), Oak Ridge National Laboratory, 2020
Highly Cited Researcher, Clarivate Analytics, 2019
Highly Cited Researcher, Clarivate Analytics, 2018
Excellence in Technology Transfer Award, Federal Laboratory Consortium, 2018; Southeast Region, 2017
R&D 100 Award, 2017 (Additively Printed High Performance Magnets)
Highly Cited Researcher, Thompson Reuters, 2014
Significant Event Award (Critical Materials Institute), Oak Ridge National Laboratory, 2013
Gordon Battelle Prize, Oak Ridge National Laboratory, 2011
Directors Award for Outstanding Team Accomplishment, Oak Ridge National Laboratory, 2009
Scientific Research Team Award, Oak Ridge National Laboratory, 2009
Significant Event Award (iron-based superconductors), Oak Ridge National Laboratory, 2008
Eugene P. Wigner Fellowship, Oak Ridge National Laboratory, 2007-2009
Cornell University Fellowship, Cornell University, 2001-2002
Graduate Student Achievement Award, University of Mississippi, 2001
Taylor Medal, University of Mississippi, 1999

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h-index = 61 WOS/Publons, 73 Google Scholar; ORCID

Full Publication List:

(308) X. Li, S.-H. Do, J. Yan, M.A. McGuire, G.E. Granroth, S. Mu, T. Berlijn, V.R. Cooper, A.D. Christianson, L. Lindsay, "Phonons and phase symmetries in bulk $CrCl_3$ from scattering measurements and theory" *Acta Materialia* 241, 118390 (2022). DOI: 10.1016/j.actamat.2022.118390

(307) Z. Y. Li, X. Y. Li, J. M. He, M. A. McGuire, A. A. Aczel, J. A. Alonso, M. T. Fernandez-Diaz, J.-S. Zhou, Exotic physical properties in metallic perovskite LaRuO3: Strong evidence for Hund metal, **PHYSICAL REVIEW B** 106, L081104 (2022). DOI: 10.1103/PhysRevB.106.L081104

(306) S.-H. Do, J.A.M. Paddison, G. Sala, T.J. Williams, K. Kaneko, K. Kuwahara, A.F. May, J. Yan, M.A. McGuire, M.B. Stone, M.D. Lumsden, A.D. Christianson, "Gaps in topological magnon spectra: Intrinsic versus extrinsic effects" **PHYSICAL REVIEW B** 106, L060408 (2022). DOI: 10.1103/PhysRevB.106.L060408

(305) M. Checa, I. Ilanov, S.M. Neumayer, M.A. Susner, M.A. McGuire, P. Maksymovych, L. Collins, "Correlative piezoresponse in micro-Raman imaging of CuInP2S6-In4/3P2S6 flakes unravels phase-specific phononic fingerprint via unsupervised learning" **APPLIED PHYSICS LETTERS** 121, 062901 (2022). DOI: 10.1063/5.0101395

(304) Q. Zhang, Y. Zhang, M. Matsuda, V.O. Garlea, J. Yan, M.A. McGuire, D.A. Tennant, S. Okamoto, "Hidden Local Symmetry Breaking in a Kagome-Lattice Magnetic Weyl Semimetal" **JOURNAL OF THE AMERICAN CHEMICAL SOCIETY** 144, 14339 (2022). DOI: 10.1021/jacs.2c05665

(303) A.Y. Borisevich, R.K. Vasudevan, K.P. Kelley, S.M. Neumayer, M.A. Susner, M.A. McGuire, A.N. Morozovska, E.A. Eliseev, P. Ganesh, A. O'Hara, B.R Tuttle, S.T. Pantelides, N. Balke, P. Maksymovych, "Role of Defects and Structure Evolution across Ferroelectric Phase Transitions Studied by Quantitative Aberration-Corrected STEM" **MICROSCOPY AND MICROANALYSIS** 28, 2360 (2022). DOI:10.1017/S1431927622009060

(302) B.C. Sales, W.R. Meier, D.S. Parker, L. Yin, J. Yan, A.F. May, S. Calder, A.A. Aczel, Q. Zhang, H. Li, T. Yilmaz, E. Vescovo, H. Maio, D.H. Moseley, R.P. Hermann, M.A. McGuire, "Chemical Control of Magnetism in the Kagome Metal $CoSn_{1-x}In_x$: Magnetic Order from Nonmagnetic Substitutions" **CHEMISTRY OF MATERIALS** 34, 7069 (2022). DOI: 10.1021/acs.chemmater.2c01634.

(301) T. Zhang, T. Yilmaz, E. Vescovo, H.X. Li, R.G. Moore, H.N. Lee, H. Miao, S. Murakami, M.A. McGuire "Endless Dirac nodal lines in kagome-metal $Ni_3In_2S_2$" **NPJ COMPUTATIONAL MATERIALS** 8, 155 (2022). DOI: 10.1038/s41524-022-00838-z

(300) M.S. Kesler, M.A. McGuire, B. Conner, O. Rios, B. Murphy, W. Carter, H.B. Henderson, G.M. Ludtka, R.A. Kisner "A rapid heating and high magnetic field thermal analysis technique" **JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY** 147, 7449 (2022). DOI: 10.1007/s10973-021-11010-y

(299) S. Gao, M.A. McGuire, Y. Liu, D.L. Abernathy, C. dela Cruz, M. Frontzek, M.B. Stone, A.D. Christianson "Spiral Spin Liquid on a Honeycomb Lattice" **PHYSICAL REVIEW LETTERS** 128, 227201 (2022). DOI: 10.1103/PhysRevLett.128.227201

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(297) M.A. McGuire, Y.-Y. Pai, M. Brahlek, S. Okamoto, R.G. Moore, "Electronic and topological properties of the van der Waals layered superconductor PtTe" **PHYSICAL REVIEW B** 105, 184514 (2022). DOI: 10.1103/PhysRevB.105.184514

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(287) M.A. McGuire, Q. Zhang, H. Miao, W. Luo, M. Yoon, Y. Liu, T. Yilmaz, E. Vescovo, "Antiferromagnetic Order and Linear Magnetoresistance in Fe-Substituted Shandite $Co_3In_2S_2$" **CHEMISTRY OF MATERIALS** 33, 9741 (2021). DOI: 10.1021/acs.chemmater.1c03596

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(283) Z. Lin, B. Huang, K. Hwangbo, Q. Jiang, Q. Zhang, Z. Liu, Z. Fei, H. Lv, A. Millis, M.A. McGuire, D. Xiao, J-H. Chu, X. Xu, "Magnetism and its structural coupling effects in 2D Ising Ferromagnetic insulator VI_3" **NANO LETTERS** 21, 9180 (2021). DOI: 10.1021/acs.nanolett.1c03027

(282) J. Lapano, Y.-Y. Pai, A. Mazza, J. Zhang, T. Isaacs-Smith, P. Gemperline, L Zhang, H.N. Lee, H. Miao, G. Eres, M. Yoon, R. Comes, T.Z. Ward, B.J. Lawrie, M.A. McGuire, R.G. Moore, C.T. Nelson, A.F. May, M. Brahlek, "Self-regulated growth of candidate topological superconducting parkerite by molecular beam epitaxy" **APL MATERIALS** 9, 101110 (2021). DOI: 10.1063/5.0064746

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(280) B.C. Sales, W.R. Meier, A.F. May, J. Xing, J.-Q. Yan, S. Gao, Y.H. Liu, M.B. Stone, A.D. Christianson, Q. Zhang, M.A. McGuire, "Tuning the flat bands of the kagome metal CoSn with Fe, In, or In doping" **PHYSICAL REVIEW MATERIALS** 5, 044202 (2021). DOI: 10.1103/PhysRevMaterials.5.044202

(279) Y. Liu, L.-L. Wang, Q. Zheng, Z. Huang, X. Wang, M. Chi, Y. Wu, B.C. Chakoumakos, M.A. McGuire, B.C. Sales, W. Wu, J. Yan "Site Mixing for Engineering Magnetic Topological Insulators" **PHYSICAL REVIEW X** 11, 021033 (2021). DOI: 10.1103/PhysRevX.11.021033

(278) W.R. Meier, B.C. Chakoumakos, S. Okamoto, M.A. McGuire, R.P. Hermann, G.D. Samolyuk, S. Gao, Q. Zhang, M.B. Stone, A.D. Christianson, B.C. Sales "A Catastrophic Charge Density Wave in $BaFe_2Al_9$" **CHEMISTRY OF MATERIALS** 33, 2855 (2021). DOI: 10.1021/acs.chemmater.1c00005

(277) S.M. Neumayer, M.A. Susner, M.A. McGuire, S.T. Pantelides, S. Kalnaus, P. Maksymovych, N. Balke, "Lowering of TC in Van Der Waals Layered Materials Under In-Plane Strain" **IEEE TRANSACTIONS ON ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL** 68, 253 (2021). DOI: 10.1109/TUFFC.2020.3007290

(276) S.K. Karna, D. Tristant, J.K. Hebert, G. Cao, R. Chapai, W.A. Phelan, Q. Zhang, Y. Wu, C. Dhital, Y. Li, H.B. Cao, W. Tian, C.R. Dela Cruz, A.A. Aczel, O. Zaharko, A. Khasanov, M.A. McGuire, A. Roy, W. Xie, D.A. Browne, I. Vekhter, V. Meunier, W.A. Shelton, P.W. Adams, P.T. Springer, D.P. Young, R. Jin, J.F. DiTusa, "Helical magnetic order and Fermi surface nesting in non-centrosymmetric ScFeGe" **PHYSICAL REVIEW B** 103, 014443 (2021). DOI: 10.1103/PhysRevB.103.014443

(275) J. Cenker, B. Huang, N. Suri, P. Thijssen, A. Miller, T. Song, T. Taniguchi, K. Watanabe, M.A. McGuire, D. Xiao, X. Xu, "Direct observation of two-dimensional magnons in atomically thin CrI_3" **NATURE PHYSICS** 17, 20 (2021). DOI: 10.1038/s41567-020-0999-1

(274) N.J. Ghimire, R.L. Dally, L. Poudel, D.C. Jones, D. Michael, N.T. Magar, M. Bleuel, M.A. McGuire, J.S Jiang, J.F. Mitchell, J.W. Lynn, I.I. Mazin, "Competing magnetic phases and fluctuation-driven scalar spin chirality in the kagome metal YMn_6Sn_6" **SCIENCE ADVANCES** 6, eabe2680 (2020). DOI: 10.1126/sciadv.abe2680

(273) X.B. Liu, M.S. Kesler, M.F. Besser, M.J. Kramer, M.A. McGuire, I.C. Nlebedim, "Effect of processing hydrogen pressure on magnetic properties of HDDR Nd-Fe-B magnet" **IEEE TRANSACTIONS ON MAGNETICS** 57, 1 (2021). DOI: 10.1109/TMAG.2020.3022739

(272) L.D. Sanjeewa, Y. Liu, J. Xing, R.S. Fishman, M.T.K. Kolambage, M.A. McGuire, C.D. McMillen, J.W. Kolis, A.S. Sefat "Stacking Faults and Short-Range Magnetic Correlations in Single Crystal $Y_5Ru_2O_{12}$: A Structure with $Ru^{+4.5}$ One-Dimensional Chains" **PHYSICA STATUS SOLIDI B,** 2000197 (2020). DOI: 10.1002/pssb.202000197

(271) B. Huang, M.A. McGuire, A.F. May, D. Xiao, P. Jarillo-Herrero, X. Xu, "Emergent phenomena and proximity effects in two-dimensional magnets and heterostructures" **NATURE MATERIALS** 19, 1276 (2020). DOI: 10.1038/s41563-020-0791-8

(270) M.A. McGuire, "Cleavable magnetic materials from van der Waals layered transition metal halides and chalcogenides" **JOURNAL OF APPLIED PHYSICS** 128, 110901 (2020). DOI: 10.1063/5.0023729

(269) S.R. Singamaneni, L.M. Martinez, J. Niklas, O.G. Poluektov, R. Yadav, M. Pizzochero, O.V. Yazyev, M.A. McGuire, "Light induced electron spin resonance properties of van der Waals CrX_3 (X = Cl, I) crystals" **APPLIED PHYSICS LETTERS** 117, 082406 (2020). DOI: 10.1063/5.0010888

(268) S.M. Neumayer, L. Tao, A. O'Hara, M.A. Susner, M.A. McGuire, P. Maksymovych, S.T. Pantelides, N. Balke, "The Concept of Negative Capacitance in Ionically Conductive Van der Waals Ferroelectrics" **ADVANCED ENERGY MATERIALS** 10, 2001726 (2020). DOI: 10.1002/aenm.202001726

(267) W.R. Meier, M.-H. Du, S. Okamoto, N. Mohanta, A.F. May, M.A. McGuire, C.A. Bridges, G.D. Samolyuk, B.C. Sales, "Flat bands in CoSn-type compounds" **PHYSICAL REVIEW B** 102, 075148 (2020). DOI: 10.1103/PhysRevB.102.075148

(266) A.F. May, J.-Q. Yan, M.A. McGuire "A practical guide for crystal growth of van der Waals layered materials" **JOURNAL OF APPLIED PHYSICS** 128, 051101 (2020). DOI: 10.1063/5.0015971

(265) A.F. May, M.-H. Du, V.R. Cooper, M.A. McGuire, "Tuning magnetic order in the van der Waals metal Fe_5GeTe_2 by cobalt substitution" **PHYSICAL REVIEW MATERIALS** 4, 074008 (2020). DOI: 10.1103/PhysRevMaterials.4.074008

(264) S. Neumayer, J. Brehm, L. Tao, A. O'Hara, P. Ganesh, S. Jesse, M. Susner, M.A. McGuire, S. Pantelides, P. Maksymovych, N. Balke, "Local Strain and Polarization Mapping in Ferrielectric Materials" **ACS APPLIED MATERIALS & INTERFACES** 12, 38546 (2020). DOI: 10.1021/acsami.0c09246

(263) R.K. Vasudevan, S.M. Neumayer, M.A. Susner, M.A. McGuire, S.T. Pantelides, P.Maksymovych, D.N. Leonard, N. Balke, A.Y. Borisevich "Domains and Topological Defects in Layered Ferrielectric Materials: Implications for Nanoelectronics" **ACS APPLIED NANO MATERIALS** 3, 8161 (2020). DOI: 10.1021/acsanm.0c01577

(262) A. Dziaugys, K. Kelley, J.A. Brehm, L. Tao, A. Puretzky, T. Feng, A. O'Hara, S. Neumayer, M. Chysnavichyus, E.A. Eliseev, J. Banys, Y. Vysochanskii, F. Ye, B.C.Chakoumakos, M.A. Susner, M.A. McGuire,

S.V. Kalinin, P. Ganesh, N. Balke, S.T. Panelides, A.N. Morozovska, P. Maksymovych "Piezoelectric domain walls in van der Waals antiferroelectric CuInP2Se6" **NATURE COMMUNICATIONS** 11, 3623 (2020). DOI: 10.1038/s41467-020-17137-0

(261) K. Lai, M. McGuire, A. Lupini, L. Skolrood, F. List, B. Ozpineci, S. Ozcan, T. Aytug, "Copper–Carbon Nanotube Composites Enabled by Electrospinning for Advanced Conductors" **ACS APPLIED NANO MATERIALS** 3, 6863 (2020). DOI: 10.1021/acsanm.0c01236

(260) Y. Choi, P.J. Ryan, D. Haskel, J.L. McChesney, G. Fabbris, M.A. McGuire, J.-W. Kim, "Iodine orbital moment and chromium anisotropy contributions to CrI_3 magnetism" **APPLIED PHYSICS LETTERS** 117, 022411 (2020). DOI: 10.1063/5.0012748

(259) J.Q. Yan, Y.H. Liu, D.S. Parker, Y. Wu, A.A. Aczel, M. Matsuda, M.A. McGuire, B.C. Sales "A-type antiferromagnetic order in $MnBi_4Te_7$ and $MnBi_6Te_{10}$ single crystals" **PHYSICAL REVIEW MATERIALS** 4, 054202 (2020). DOI: 10.1103/PhysRevMaterials.4.054202

(258) L.A. Boatner, B.C. Chakoumakos, S.P. Pardhasaradhi, S.N. Dryepondt, A. Shaw, J. Qu, A.E. Marquez Rossy, M.A. McGuire, J.A. Kolopus, E. Lara-Curzio, "Cryo-quenched Fe–Ni–Cr alloy decorative steel single crystals II: Alloy phases, structure, hardness, tensile, tribological, magnetic and electronic properties" **JOURNAL OF ALLOYS AND COMPOUNDS**, 835, 155169 (2020). DOI: 10.1016/j.jallcom.2020.155169

(257) W. Zhao, Z. Fei, T. Song, H.K. Choi, T. Palomaki, B. Sun, P. Malinowski, M.A. McGuire, J.-H. Chu, X. Xu, D.H. Cobden "Magnetic proximity and nonreciprocal current switching in a monolayer WTe_2 helical edge" **NATURE MATERIALS** 19, 503 (2020). DOI: 10.1038/s41563-020-0620-0

(256) D. Zhong, K.L. Seyler, X. Linpeng, N.P. Wilson, T. Taniguchi, K. Watanabe, M.A. McGuire, K.-M.C. Fu, D. Xiao, W. Yao, X. Xu "Layer-resolved magnetic proximity effect in van der Waals heterostructures" **NATURE NANOTECHNOLOGY** 15, 187 (2020). DOI: 10.1038/s41565-019-0629-1

(255) B. Huang, J. Cenker, X. Zhang, E.L. Ray, T. Song, T. Taniguchi, K. Watanabe, M.A. McGuire, D. Xiao, X. Xu. "Tuning inelastic light scattering via symmetry control in the two-dimensional maget CrI_3" **NATURE NANOTECHNOLOGY**, 15, 212 (2020). DOI: 10.1038/s41565-019-0598-4

(254) L.D. Sanjeewa, V.O. Garlea, R.S. Fishman, M.A. McGuire, J. Xing, H. Cao, J.W. Kolis, A.S. Sefat "Observation of a Large Magnetic Anisotropy and a Field-Induced Magnetic State in $SrCo(VO_4)(OH)$: A Structure with a Quasi One-Dimensional Magnetic Chain" **INORGANIC CHEMISTRY** 59, 1029 (2020). DOI: 10.1021/acs.inorgchem.9b02427

(253) J.A. Brehm, S.M. Neumayer, L. Tao, A. O'Hara, M. Chyasnavichus, M.A. Susner, M.A. McGuire, S.V. Kalinin, S. Jesse, P. Ganesh, S.T. Pantelides, P. Maksymovych, N. Balke "Tunable quadruple-well ferroelectric van der Waals crystals" **NATURE MATERIALS** 19, 43 (2020). DOI:10.1038/s41563-019-0532-z

(252) L.D. Sanjeewa, A.S. Sefat, M. Smart, M.A. McGuire, C.D. McMillen, J.W. Kolis, "Synthesis, structure and magnetic properties of $Ba_3M_2Ge_4O_{14}$ (M = Mn and Fe): Quasi-one-dimensional zigzag chain compounds" **JOURNAL OF SOLID STATE CHEMISTRY**, 283, 121090 (2020). DOI: 10.1016/j.jssc.2019.121090

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