

Curriculum Vitae

I. Personal Information

I.A. Rodriguez, Efrain E. , Ph.D.
Department of Chemistry and Biochemistry
University of Maryland
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I.B. Academic Appointments at UMD

Professor, Department of Chemistry and Biochemistry	2022 - present
Associate Professor, Department of Chemistry and Biochemistry	2018 - 2022
Assistant Professor, Department of Chemistry and Biochemistry	2012 - 2018
Affiliate Professor, Department of Materials Science and Engineering	2013 - present
Affiliate Professor, Department of Physics	2015 - 2018
Core Faculty Member, Maryland Quantum Materials Center	2019 - present
Faculty Member, Chemical Physics Program	2013 - present
Faculty Member, UMD NanoCenter	2014 - present

I.C. Administrative Appointments at UMD

Graduate Program Director for Chemistry,	2018 - 2021
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I.D. Other Employment

National Research Council Post-Doctoral Fellow NIST Center for Neutron Research, National Institute of Standards and Technology Gaithersburg, MD	2009-2012
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Graduate Research Assistant Los Alamos National Laboratories (LANL) Los Alamos, NM	2005-2008
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Post-baccalaureate Researcher Manuel Lujan Neutron Scattering Center, LANL Los Alamos, NM	2003-2004
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I.E. Educational Background

PhD. Materials Science, Department of Materials University of California, Santa Barbara, CA	2009
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B.S. Materials Science, Department of Materials Science and Engineering Massachusetts Institute of Technology, Cambridge, MA	2003
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I.F. Leadership Positions in Professional Societies

American Institute of Physics, Board of Directors
Neutron Scattering Society of America, Executive Committee
Society for the Advancement of Chicanos/Hispanics and Native Americans in Science,
member and faculty adviser
U.S. National Committee for Crystallography (USNC/Cr), Chair of Nominations and Public
Relations Subcommittees

II. Research, Scholarly, Creative and/or Professional Activities

II.A. Books

II.A.1. Books Edited

Fundamentals of Quantum Materials: A Practical Guide to Synthesis and Exploration

J. Paglione, N. Butch, and **E. E. Rodriguez**

World Scientific, New Jersey, 2020

ISBN: 978-981-121-937-5

II.B. Chapters

II.B.1. Books

“Chapter 6: Hydrothermal Synthesis and Crystal Growth”

Wilfong, B., Zhou, X. and **Rodriguez, E. E.**

Fundamentals of Quantum Materials: A Practical Guide to Synthesis and Exploration

World Scientific, New Jersey, **2021**

ISBN: 978-981-121-937-5

II.B.2. Encyclopedia

Rodriguez, E. E.* “Iron-based Superconductors”

Encyclopedia of Inorganic and Bioinorganic Chemistry, **2019**.

II.C. Refereed Journals

II.C.1. Refereed Journal Articles

h-index = 30, i10-index = 63, citations: 2885 (from Google Scholar)

* indicates corresponding author and driver of published work

90. Leonard, M. B; Bruni, E.; Hall, M.; Li, T.; **Rodriguez, E. E.**; Durke, E. “Experimental Study of the Adsorption and Decomposition of Sarin on Dry Copper(II) Oxide”, *The Journal of Physical Chemistry Letters* **2022**, *13* (50), 11663-11668. [[DOI: 10.1021/acs.jpcclett.2c0318](https://doi.org/10.1021/acs.jpcclett.2c0318)]

89. Li, T.; A., L.; McEntee, M.; Tsyshevsky, R.; Leonard, M.; Durke, E.; Karwacki, C.; Kuklja, M.; Zachariah, M.; **Rodriguez, E. E.***, “Aliovalent-Doping Effects on the Surface Activity of Mesoporous CeO₂ towards Nerve Agent Simulant DMMP Decomposition” *The Journal of Physical Chemistry C*, **2022**, *126* (42) 17923-17934. [[DOI: 10.1021/acs.jpcc.2c04853](https://doi.org/10.1021/acs.jpcc.2c04853)]

88. Leonard, M.; Li, T.; Kramer, M.; McDonnell, S. M.; Vedernikov, A. N.; **Rodriguez, E. E.***, “Synthesis of Ordered Mesoporous Cerium Doped Titanium Oxide for Toxic Chemical Filtration”, *Journal of Hazardous Materials*, **2022**, *438*, 129536. [[DOI:10.1016/j.jhazmat.2022.129536](https://doi.org/10.1016/j.jhazmat.2022.129536)]

87. Diethrich, T. J.; Gnewuch, S.; Dold, K.; Taddei, K.; **Rodriguez, E. E.***, “Tuning Magnetic Symmetry and Properties in the Olivine Series $\text{Li}_{1-x}\text{Fe}_x\text{Mn}_{1-x}\text{PO}_4$ through Selective Delithiation”, *Chemistry of Materials*, **2022**, *34*, 5039-5053. [DOI: [10.1021/acs.chemmater.2c00372](https://doi.org/10.1021/acs.chemmater.2c00372)]
86. Campbell, D. J.; Wilfong, B.; Zic, M. P.; Levy, G.; Na, M. X.; Pedersen, T. M.; Gorovikov, S.; Zavalij, P. Y.; Zhdanovich, S.; Damascelli, A.; **Rodriguez, E. E.**; Paglione, J., “Physical properties and electronic structure of single-crystal KCo_2As_2 .” *Physical Review Materials*, **2022**, *6*, 045003. [DOI: [10.1103/PhysRevMaterials.6.045003](https://doi.org/10.1103/PhysRevMaterials.6.045003)]
85. Li, T.; Tsyshevsky, R.; McEntee, M.; Durke, E. M.; Karwacki, C.; **Rodriguez, E. E.**, Kuklja, M. M., “Detection of Sarin Reactivity on Titania Nanomaterials: Understanding Fundamentals” *ACS Applied Nano Materials*, **2022**, *5*, 6659–6670. [DOI: doi.org/10.1021/acsnm.2c00693]
84. A. McDannald, M. Frontzek, A. T. Savici, M. Doucet, **E. E. Rodriguez**, K. Meuse, J. Opsahl-Ong, D. Samarov, I. Takeuchi, A. G. Kusne, and W. Ratcliff, “On-the-fly autonomous control of neutron diffraction via physics-informed bayesian active learning,” *Applied Physics Reviews*, **2022**, *9*, 021408 [DOI:[10.1063/5.0082956](https://doi.org/10.1063/5.0082956)].
83. Li, T.; Jayathilake, R.; Balisetty, L.; Zhang, Y.; Wilfong, B.; Diethrich, T.; **Rodriguez, E. E.***, Crystal field-induced lattice expansion upon reversible oxygen uptake/release in $\text{YbMn}_x\text{Fe}_{2-x}\text{O}_4$ ”, *Materials Advances*, **2022**, *3*(2), 1087-110. [DOI:[10.1039/D1MA00822F](https://doi.org/10.1039/D1MA00822F)]
82. Li, T.; **Rodriguez, E. E.***, “Mesoporous perovskite titanates via hydrothermal conversion”, *Chemical Communications*, **2022**, *58*, 783-786. [DOI: [10.1039/D1CC05343D](https://doi.org/10.1039/D1CC05343D)]
81. Lane, H. **Rodriguez, E. E.**; Walker, H.C.; Niedermayer, Ch.; Stuhr, U.; Bewley, R.I.; Voneshen, D.J.; Green, M.A.; Rodriguez-Rivera, J.A.; Fouquet, P.; Cheong, S.-W.; Attfield, J. P.; Ewings, R. A.; Stock, C., “Metastable antiphase boundary ordering in CaFe_2O_4 ”, *Physical Review B*, **2021**, *104*(1), 104404 . [DOI: [10.1103/PhysRevB.104.104404](https://doi.org/10.1103/PhysRevB.104.104404)]
80. Li, T.; Tsyshevsky, R.; Algrim, L.; McEntee, M.; Durke, E. M.; Eichhorn, B.; Zachariah, M. R.; Kuklja, M. M.; **Rodriguez, E. E.***, “Understanding Dimethyl Methylphosphonate Adsorption and Decomposition on Mesoporous CeO_2 ”, *ACS Applied Materials & Interfaces* **2021**, *13*(45), 54597-54609 [DOI: [10.1021/acsmi.1c16668](https://doi.org/10.1021/acsmi.1c16668)].
79. Zheng, H.; Wilfong, B.; Hickox-Young, D.; Rondinelli, J.; Zavalij, P. Y.; **Rodriguez, E. E.*** “A Polar Ferromagnetic Metal by Intercalation of Metal-amine Complexes,” *Chemistry of Materials*, **2021**, *33*, 4936-4947. [DOI: [10.1021/acs.chemmater.1c00540](https://doi.org/10.1021/acs.chemmater.1c00540)]
78. Diethrich, T. J.; Gnewuch, S.; Zavalij, P.Y.; **Rodriguez, E. E.*** “Orbital contribution to paramagnetism and non-innocent thiophosphate anions in layered $\text{Li}_2\text{MP}_2\text{S}_6$ where $M = \text{Fe, Co}$,” *Inorganic Chemistry*, **2021**, *60*, 10280-10290. [DOI: [10.1021/acs.inorgchem.1c00710](https://doi.org/10.1021/acs.inorgchem.1c00710)]
77. Gillard, C.; Zhou, X.; Avdeev, M.; **Rodriguez, E. E.**; Sharma, Neeraj “On the electrochemical phase evolution of cobalt selenide in alkali ion batteries,” *Inorganic Chemistry*, **2021**, *60*, 7150-7160. [DOI: [10.1021/acs.inorgchem.1c00226](https://doi.org/10.1021/acs.inorgchem.1c00226)]

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74. Guiton, B. S.; Stefik, M.; Augustyn, V.; Banerjee, S.; Bardeen, C. J.; Bartlett, B. M.; Li, J.; López-Mejías, V.; MacGillivray, L. R.; Morris, A.; **Rodriguez, E. E.**; Samia, A.C. S.; Sun, H.; Sutter P.; Talham D. R., "Frontiers in hybrid and interfacial materials chemistry research," *Materials Research Bulletin*, **2020**, 45, 951-964. [[DOI: 10.1557/mrs.2020.271](https://doi.org/10.1557/mrs.2020.271)]
73. Gnewuch, S.; **Rodriguez, E. E.**, "Distinguishing the intrinsic antiferromagnetism in polycrystalline LiCoPO_4 and LiMnPO_4 Olivines." *Inorganic Chemistry*, **2020**, 59, 5883-5895. [[DOI: 10.1021/acs.inorgchem.9b03545](https://doi.org/10.1021/acs.inorgchem.9b03545)]
72. Cooley, J. A.; Bocarsly, J. D.; Schueller, E. C.; Levin, E. E.; **Rodriguez, E. E.**; Huq, A.; Lapidus, S. H.; Wilson, S. D.; Seshadri, R. "Evolution of noncollinear magnetism in magnetocaloric MnPtGa ", *Physical Review Materials*, **2020**, 4, 044405. [[DOI: 10.1103/PhysRevMaterials.4.044405](https://doi.org/10.1103/PhysRevMaterials.4.044405)]
71. Zhou, X.; Wang, L.; Fan, X.; Wilfong, B.; Liou, S.-C.; Wang, Y.; Zheng, H.; Feng, Z.; Wang, C.; **Rodriguez, E. E.**, "Isotope Effect between H_2O and D_2O in Hydrothermal Synthesis", *Chemistry of Materials*, **2020**, 32, 765. [[DOI: 10.1021/acs.chemmater.9b04121](https://doi.org/10.1021/acs.chemmater.9b04121)]
70. Wilfong, B.; Zhou, X.; Zheng, H.; Babra, N.; Brown, C.; Lynn, J. W.; Taddei, K.; Paglione, J.; **Rodriguez, E. E.**, "Long-range magnetic order in hydroxide-layer-doped $(\text{Li}_{1-x-y}\text{Fe}_x\text{Mn}_y\text{OD})\text{FeSe}$ ", *Physical Review Materials*, **2020**, 4, 034803. [[DOI: 10.1103/PhysRevMaterials.4.034803](https://doi.org/10.1103/PhysRevMaterials.4.034803)]
69. DePablo, J. J.; Jackson, N. E.; Webb, M.; Chen, L.-Q.; Moore, J.; **Rodriguez, E. E.** et al. "New frontiers for the materials genome initiative", *NPJ Computational Materials*, **2019**, 5, 41. [[DOI: 10.1038/s41524-019-0173-4](https://doi.org/10.1038/s41524-019-0173-4)]
68. Tosado, J.; Chen, W.C.; Gnewuch, S.; Hasaan, T.; Dax, T.; **Rodriguez, E. E.**, "Small-angle neutron polarimetry apparatus (SANPA): Development at the NIST Center for Neutron Research ", *Review of Scientific Instruments*, **2019**, 90, 063303. [[DOI: 10.1063/1.5091110](https://doi.org/10.1063/1.5091110)]
67. Tosado, J.; Chen, W.C.; **Rodriguez, E. E.**, "A strategy for handling aberration in Spherical Neutron Polarimetry ", *Journal of Physics: Conference Series*, **2019**, 1316, 012015. [[DOI: 10.1088/1742-6596/1316/1/012015](https://doi.org/10.1088/1742-6596/1316/1/012015)]
66. Virtue, A.; Zhou, X.; Wilfong, B.; Lynn, J. W.; Taddei, K.; Zavalij, P.; Wang, L.; **Rodriguez, E. E.**, "Magnetic order effects on the electronic structure of KMMnS_2

(M=Cu,Li) with the ThCr₂Si₂-type structure", *Physical Review Materials*, **2019**, 3, 044411. [[DOI: 10.1103/PhysRevMaterials.3.044411](https://doi.org/10.1103/PhysRevMaterials.3.044411)]

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64. Trainer, C.; Yim, C. M.; Heil, C.; Giustino, F; Croitori, D.; Tsurkan, V.; Loidl, A.; **Rodriguez, E. E.**; Stock, C.; Wahl, P., "Manipulating surface magnetic order in iron telluride", *Science Advances*, **2019**, 5, eaav3478. [[DOI: 10.1126/sciadv.aav3478](https://doi.org/10.1126/sciadv.aav3478)]

63. Gnewuch, S.; **Rodriguez, E. E.*** "The fourth ferroic order: Current status on ferrotoroidic materials", *Journal of Solid State Chemistry*, **2019**, 271, 175. [[DOI: 10.1016/j.jssc.2018.12.035](https://doi.org/10.1016/j.jssc.2018.12.035)]

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60. Songvilay, M.; **Rodriguez, E. E.**; Lindsay, R.; Green, M. A.; Walker, H. C.; Rodriguez-Rivera, J. A.; Stock, C., Anharmonic Magnon Excitations in Noncollinear and Charge-Ordered RbFe²⁺Fe³⁺F₆, *Physical Review Letters*, **2018** [[DOI: 10.1103/PhysRevLett.121.087201](https://doi.org/10.1103/PhysRevLett.121.087201)]

59. Zhou, X.; Wilfong, B.; Liou, S.-C., Hodovanets, H.; Brown C. M. and **Rodriguez, E.E***, "Proton and ammonia intercalation into layered iron chalcogenides", *Chemical Communications*, **2018**, Special Issue on Emerging Investigators 2018. [[DOI: 10.1039/C8CC02436G](https://doi.org/10.1039/C8CC02436G)]

58. Jayathilake, R.; Levitas, B.; **Rodriguez, E. E.***, "In situ diffraction studies on reversible oxygen uptake and release in AFe₂O_{4+ δ} (A = Lu, Yb, Y, In)", *Journal of Materials Chemistry A*, **2018**, 6, 4801-4810. [[DOI:10.1039/C7TA09823E](https://doi.org/10.1039/C7TA09823E)]

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56. Vera Stimpson, L. J.; **Rodriguez, E. E.**; Brown, C. M.; Stenning, G. B. B; Jura, M.; Arnold, D. C. "Magnetic ordering in a frustrated bow-tie lattice", *Journal of Materials Chemistry C*, **2018**, 6, 4541, [[DOI: 10.1039/C7TC05187E](https://doi.org/10.1039/C7TC05187E)]

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54. Stock, C.; **Rodriguez, E. E.**; Lee, N.; Demmel, F.; Fouquet, P.; Laver, M.; Niedermayer, Ch.; Su, Y.; Nemkosvski, K; Green, M.A.; Rodriguez-Rivera, J. A.; Kim, J.W.; Zhang, L.; Cheong, S.-W., "Orphan spins in the $S = 5/2$ antiferromagnet CaFe_2O_4 ", *Physical Review Letters*, **2017**, *119*, 257204. [[DOI:10.1103/PhysRevLett.119.257204](https://doi.org/10.1103/PhysRevLett.119.257204)]
53. Zhou, X.; Eckberg, C.; Wilfong, B.; Liou, S.-C.; **Vivanco, H. K.**; Paglione, J.; **Rodriguez, E. E.***, "Superconductivity and magnetism in iron sulfides intercalated by metal hydroxides", *Chemical Sciences*, **2017**, *8*, 3781. [[DOI:10.1039/C6SC05268A](https://doi.org/10.1039/C6SC05268A)]
52. Larson, A.; Wilfong, B.; Moetakef, P.; Brown, C. M.; Zavalij, P.; **Rodriguez, E. E.***, "Metal-insulator transition tuned by magnetic field in $\text{Bi}_{1.7}\text{V}_8\text{O}_{16}$ hollandite", *Journal of Materials Chemistry C*, **2017**, *5*, 4967. [[DOI: 10.1039/C7TC00487G](https://doi.org/10.1039/C7TC00487G)]
51. Zhou, X.; **Rodriguez, E. E.***, "Tetrahedral transition metal chalcogenides as functional inorganic materials", *Chemistry of Materials*, **2017**, *29*, 5737. [[DOI:10.1021/acs.chemmater.7b01561](https://doi.org/10.1021/acs.chemmater.7b01561)] **Paper part of the Up-and-Coming series.**
50. Zhou, X.; Wilfong, B.; **Vivanco, H. K.**; Paglione, J.; Brown, C. M.; **Rodriguez, E. E.***, "Layered metastable cobalt chalcogenides from topochemical deintercalation", *Journal of the American Chemical Society*, **2016**, *138*, 16432. [[DOI: 10.1021/jacs.6b10229](https://doi.org/10.1021/jacs.6b10229)]
49. Zhou, X.; Zhou, W.; Udovic, T. J.; Yildirim, T.; Rush, J. J.; **Rodriguez, E. E.**; Wu, H.*, "Development of potential organic-molecule-based hydrogen storage materials: Converting C-N bond-breaking thermolysis of guanidine to N-H bond-breaking dehydrogenation", *International Journal of Hydrogen Energy*, **2016**, *41*, 18542. [[DOI: 10.1016/j.ijhydene.2016.08.129](https://doi.org/10.1016/j.ijhydene.2016.08.129)]
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47. Wu, H.*; Zhou, X.; **Rodriguez, E. E.**; Zhou, W.; Udovic, T. J.; Yildirim, T.; Rush, J. J., "A new family of metal borohydride guanidinate complexes: Synthesis, structures and hydrogen-storage properties", *Journal of Solid State Chemistry*, **2016**, *242*, 186. [[DOI: 10.1016/j.jssc.2016.07.013](https://doi.org/10.1016/j.jssc.2016.07.013)]
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45. **Vivanco, H. K.** and **Rodriguez, E. E.***, "The intercalation chemistry of layered iron chalcogenide superconductors", *Journal of Solid State Chemistry*, **2016**, *242*, 3. [[DOI: 10.1016/j.jssc.2016.04.008](https://doi.org/10.1016/j.jssc.2016.04.008)]
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42. **Rodriguez, E. E.***; Cao, H.; Haiges, R.; Melot, B. C.* “Single crystal magnetic structure and susceptibility of CoSe_2O_5 ”, *Journal of Solid State Chemistry*, **2016**, 236, 39. [DOI: [10.1016/j.jssc.2015.09.006](https://doi.org/10.1016/j.jssc.2015.09.006)]
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39. Stock, C*; Rodriguez-Rivera, J. A.; Schmalzl, K.; **Rodriguez, E. E.**; Stunault, A.; Petrovic, C. “Single to multiquasiparticle excitations in the itinerant helical magnet CeRhIn_5 ”, *Physical Review Letters*, **2015**, 114, 247005. [DOI: [10.1103/PhysRevLett.114.247005](https://doi.org/10.1103/PhysRevLett.114.247005)]
38. Taylor, D. D.; Schreiber, N. J.; Brown, C. M.; Arevalo-Lopez, A.; **Rodriguez, E. E.*** “Stabilization of cubic $\text{Sr}_2\text{FeMoO}_6$ through topochemical reduction”, *Chemical Communications*, **2015**, 51, 12201. [DOI: [10.1039/C5CC04145G](https://doi.org/10.1039/C5CC04145G)]
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36. Larson, A. M.; Moetakef, P.; Gaskell, K. J.; Brown, C.; King, G.; **Rodriguez, E. E.***; “Inducing ferrimagnetism in insulating hollandite $\text{Ba}_{1.2}\text{Mn}_8\text{O}_{16}$ ”, *Chemistry of Materials*, **2015**, 27, 515. [DOI: [10.1021/cm503801j](https://doi.org/10.1021/cm503801j)]
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II.D. Conferences, Workshops, and Talks

II.D.1. Keynotes

Richard D. Green Science and Mathematics Award and Lecture
California State University at Long Beach 2020, Long Beach, CA

Plenary talk "*Hard Matter Science of Synthesis: Where are We Headed?*"
Neutron Scattering User Group Meeting, ORNL 2019, Oak Ridge, TN

Etter Award talk "*Hydrogen Bonding and Symmetry Relationships in Quantum Materials*"
Annual Meeting of the American Crystallographic Association 2019, Covington, KY

II.D.2. Invited Talks

"Breaking Symmetry to Induce Novel Properties in Layered Metal Chalcogenides"
Seminar, Technische Universität München 2022, Munich, Germany
Seminar, University of Münster 2022, Münster, Germany
Seminar, ETH 2022, Zurich, Switzerland
Seminar, University of Zurich 2022, Zurich, Switzerland
Seminar, Paul Scherrer Institute 2022, Villigen, Switzerland
Seminar, George Mason University 2022, Fairfax, VA
Seminar, University of Maryland Baltimore County 2022, Baltimore, MD
Seminar, Northwestern University 2021, Evanston, IL

Solid state reactions on the beamline, what we gain by peering into the "black box"
Pittsburgh Diffraction Society Conference 2022, Lemont, IL

"Functional Inorganic Materials at the University of Maryland"
Breaking Barriers through Chemistry 2021, virtual meeting
Inaugural conference to promote chemical research between Mexico, U.S. and Europe.

"Understanding oxygen storage materials synthesis and properties by combined neutron and x-ray diffraction"
Materials Synthesis Science and Opportunities Aided by in-situ Scattering
Oak Ridge National Laboratory Neutron Scattering Workshop 2020, virtual meeting

"Designing New Quantum Materials through Intercalation Chemistry"
Dept. of Materials Science and Engineering seminar 2020, virtual meeting
University of Florida, Gainesville

"Past and future workshops on magnetic structure determination"
Annual Meeting of the American Crystallographic Association 2020, virtual meeting

"Hydrogen Bonding in Quantum Materials"
NSF Center for Sustainable Nanotechnology 2020, virtual meeting

"Hydrogen Bonding in Layered Superconductors and Magnetic Materials"
Denver X-ray Meeting 2020, virtual meeting

"Electronic transport in Fe and Co chalcogenides prepared from intercalation chemistry"
American Chemical Society National Meeting 2019, San Diego, CA

- “Getting over the Tenure Activation Barrier”*
American Chemical Society National Meeting 2019, Orlando, FL
- “Functional Inorganic Materials at the University of Maryland”*
Seoul National University 2018, Seoul, South Korea
- “The Fourth Ferroic: Ferrotoroidicity and Spherical Neutron Polarimetry”*
American Crystallography Association National Meeting 2018, Toronto, Canada
- “In situ Powder Diffraction of Metal Oxides under Chemical Looping Conditions”*
Deutches Elektronen-Synchrotron (DESY) Workshop 2018, Hamburg, Germany
Pittsburgh Diffraction Society Annual Conference 2017, Indiana, PA
- “Advanced Powder Diffraction of Oxygen Storage Materials”*
Winter School on “Frontiers in Materials Science”
Jawaharlal Nehru Centre for Advanced Scientific Research 2017, Bangalore, India
- “Tetrahedral Transition Metal Chalcogenides as Functional Inorganic Materials”*
Muhlenberg College, Chemistry Department 2019, Allentown, PA
University of Missouri, Dept. of Physics and Astronomy 2019, Columbia, MO
Columbia University, Materials Research & Science Center 2018, NYC, NY
Technische Universität Darmstadt 2018, Darmstadt, Germany
Johns Hopkins University, Dept. of Chemistry 2018, Baltimore, MD
University California Berkeley, Dept. of Chemistry 2017, Berkeley, CA
Rutgers University, LSM/IAMD inter-departmental seminars 2017, Piscataway, NJ
- “Beam Line Science for Materials Discovery and Design”*
Physics Next Workshop: Materials Design and Discovery 2017, Long Island, NY
- “Tetrahedral Transition Metal Chalcogenides as Functional Inorganic Materials”*
Georgia Institute of Technology, Dept. of Chem. & Biochemistry 2017, Atlanta, GA
Florida State University, Dept. of Chemistry 2017, Tallahassee, FL
Northwestern University, MRSEC 2017, Chicago, IL
Wayne State University, Dept. of Chemistry 2017, Detroit, MI
University of Michigan, Dept. of Materials Science & Engineering 2017, Ann Arbor, MI
University of Houston, Dept. of Chemistry 2017, Houston, TX
University of Texas Dallas, Dept. of Chemistry 2017, Dallas, TX
Texas A&M University, Dept. of Chemistry 2017, College Stn, TX
Colorado State University, Dept. of Chemistry 2017, Ft. Collins, CO
University of Central Florida, Dept. of Chemistry 2017, Orlando, FL
University of California Davis, Dept. of Chemistry 2016, Davis, CA
University of Southern California, Dept. of Chemistry 2016, Los Angeles, CA
University of Connecticut, Dept. of Chemistry 2016, Wilmington, DE
Duquesne University, Dept. of Chemistry 2016, Pittsburgh, PA
- “Magnetism, Superconductivity, and Hund’s Rule in Metallic Oxides and Chalcogenides”*
Symposium in Honor of Prof. Anthony K. Cheetham 2016, Cambridge, U.K.
- “Superconductors of Tomorrow. Where do we go from iron-based materials?”*
Gordon Research Conference on Solid State Chemistry 2016, New London, NH

“Superconductivity and Magnetism in Layered Metal Chalcogenides”
Center for Computational Materials Sciences 2016 Fall Meeting 2016, Stony Brook, NY
Center for Nanophysics and Advanced Materials (UMD) 2016, CP, MD
Oak Ridge National Laboratory, Neutron Sciences Division 2016, Oak Ridge, TN

“Complex Magnetism and Metal-Insulator Transition in Microporous Metal Oxides”
International Materials Research Congress 2016, Cancun, Mexico

“Transition Metal Oxides for Chemical Looping Reactions”
Chemical and Biomolecular Engineering (UMD) 2016, College Park, MD

“Magnetic Structure and Dynamics in Iron-based Superconductors”
NIST Center for Neutron Research Summer School 2015, Gaithersburg, MD

“Exploring New Magnetic Phenomena in Hund’s Metals”
North American Conference on Solid State Chemistry 2015, Tallahassee, FL

“Hollandite Oxides as a Route to Magnetic Insulators”
Chemical Society of Canada National Conference 2015, Ottawa, Canada

“Magnetic and bonding trends in djefisherite-type $Ba_6M_{25}S_{27}$ and mackinawite FeS ”
American Chemical Society National Meeting 2014, San Francisco, CA

“Mixed-Valence Microporous Oxides for Magnetic Properties”
American Conference on Neutron Scattering 2014, Knoxville, TN

“Magnetic ordering and metal-insulator transitions in hollandite-type oxides”
American Crystallography Association National Meeting 2015, Philadelphia, PA

“Local Structural Effects on the Magnetism of Doped $Ba_xMn_8O_{16}$ Hollandites”
“The Crystal Chemistry of Technetium Oxides and Halides”
American Crystallography Association National Meeting 2014, Albuquerque, NM

“Magnetism and Superconductivity in Tetrahedral Iron Chalcogenides”
University of Delaware, Dept. of Chemistry 2015, Wilmington, DE
“Chemical, Structural, and Magnetic Trends in Iron-based Superconductors”
Drexel University, Dept. of Materials Science and Eng. 2013, Philadelphia, PA

“Exploring the Structural, Magnetic, and Chemical Degrees of Freedom in Transition Metal Compounds”
Kyoto University, Dept. of Energy and Hydrocarbon Chemistry 2013, Kyoto, Japan

“Chemical, Structural, and Magnetic Trends in Iron Chalcogenides”
University of Edinburgh, School of Physics and Astronomy 2013, Edinburgh, UK
University of Glasgow, School of Chemistry 2013, Glasgow, UK
University of Kent, School of Physical Sciences 2013, Kent, UK

“Interstitial Iron Effects on Magnetic Excitations in $Fe_{1+x}Te$ ”
American Physical Society March Meetings 2012, Boston, MA

	<i>"Local structure effects in magnetoresistance materials"</i> American Crystallography Association National Meeting	2010, Chicago, IL
II.D.3.	Symposia	
	Symposium on <i>Crystallography of Quantum Materials</i> American Crystallography Association National Meeting	2019, Covington, KY
	Symposium on <i>Structure-Property Correlations in Functional Materials</i> American Chemical Society National Meeting	2019, Orlando, FL
	American Conference on Neutron Scattering Co-chair of scientific program (est. 400 attendees)	2018, College Park, MD
	Symposium on <i>Emergent Phenomena in the Solid State</i> American Chemical Society National Meeting	2017, San Francisco, CA
	Symposium on <i>Magnetochemistry in Molecules and Extended Solids</i> American Chemical Society National Meeting	2015, Boston, MA
	Symposium on <i>Materials Discovery and Crystal Growth</i> American Crystallography Association National Meeting	2015, Philadelphia, PA
	<i>"Neutron Day"</i> Full day symposium on collaborations between UMCP and NIST	2015, College Park, MD
	Symposium on <i>Materials Characterization with Neutrons</i> XXII International Materials Research Congress	2013, Cancun, Mexico
II.D.4.	Workshops	
	<i>"Interaction of X-rays and Neutrons with Matter"</i> National School on X-ray and Neutron Scattering	2022 virtual 2021 virtual 2019 Oak Ridge, TN
	<i>Fundamentals of Quantum Materials</i> , co-organizer 6-day workshop and school on Synthesis of Quantum Materials	2022, College Park, MD 2020, College Park, MD 2019, College Park, MD 2018, College Park, MD 2017, College Park, MD
	<i>School on Representational Analysis and Magnetic Structures</i> , co-organizer 4-day school on solving magnetic structures with neutron data	2021, College Park, MD 2018, College Park, MD 2015, College Park, MD
	<i>Workshop: Role of the new Second Target State on Materials Discovery</i> ORNL, discussion leader and co-author of final report	2019, Oak Ridge, TN

Workshop: Solid State and Materials Chemistry Hybrids and Interfaces
NSF, discussion leader and co-author of final report 2019 Alexandria, VA

Workshop: Quantum Materials Young Investigators
ORNL, invited speaker and participant 2019, Oak Ridge, TN

Workshop: Advancing and Accelerating Materials Innovation
NSF, discussion leader and co-author of final report 2017, Ballston, VA

Basic Research Needs Report on Synthesis Science for Energy Related Technologies
DOE, Office of Sciences, participant and co-author of report 2016, Rockville, MD

Workshop: The Materials Genome Initiative in Ceramics, Geosciences, & Solid-State Chem.
NSF, participant and co-author on final report. 2013, Ballston, VA

II.E. Sponsored Research and Programs – Administered by the Office of Research Administration (ORA)

II.E.1. Grants

External single-PI grants (all dollar amounts listed are total costs)

National Science Foundation, Division of Materials Research, DMR-2113682
“Non-centrosymmetric Quantum Materials through Metal-amine Complexes”
\$375,000.00
05/01/2021 to 04/30/2024
Principal Investigator of grant

Department of Energy, Basic Energy Sciences, DESC-0016434
“Exploring Two-dimensional Magnetism in van der Waals Materials”
\$730,000.00
08/01/2022 to 7/31/2025
Principal Investigator of grant

with Polarized Neutron Scattering”
\$653,000.00
08/01/2019 to 7/31/2022
Principal Investigator of grant

Department of Energy, Basic Energy Sciences, DESC-0016434
“Discovering Toroidal Materials with Spherical Neutron Polarimetry”
\$653,000.00
08/01/2019 to 7/31/2022
Principal Investigator of grant

Department of Energy, Basic Energy Sciences, DESC-0016434
“The Next Ferroic Order: Synthesis and Neutron Scattering of Ferrotoroidic Materials”
\$538,854.00
08/01/2016 to 7/31/2019
Principal Investigator of grant

National Science Foundation, Division of Materials Research, DMR-1455118
“CAREER: Designing Hund’s Metals from Transition Metal Sulfides”
\$625,000.00
4/01/2015 to 3/31/2020
Principal Investigator of grant

External multi-PI grants

Department of Defense, Defense Threat Reduction Agency, HDTRA1-19-1-0001
“Bifunctional Materials for CWA Defeat: Integrating Catalysts in High-Capacity Mesoporous Metal Oxide Absorbents”
\$1,323,508.00
10/04/2018 to 10/03/2023
Rodriguez’s portion \$631,986 total
PI Efrain E. Rodriguez and co-PIs: Maija Kukla (UMD Engineering, NSF), Monica McEntee and Erin Durke (U. S. Army ECBC), and Michael Zachariah (Univ. California Riverside)

Department of Commerce, 70NANB15H261
“UMD / NIST Center for the Application of Neutron Scattering”
\$8,584,141
09/01/2017 to 08/31/2022
Rodriguez’s portion approximately \$42,500 per year
PI Robert Briber (MSE) and co-PIs: Johnpierre Paglione (Physics), Efrain E. Rodriguez (Chem & Biochem), and Ichiro Takeuchi (MSE) and

Department of Commerce, 70NANB15H261
“UMD / NCNR Joint Program for the Adv. of Neutron Scattering”
\$2,599,585.00
09/01/2015 to 08/31/2020
Rodriguez’s portion approximately \$300,000 total
PI Robert Briber (MSE) and co-PIs: Johnpierre Paglione (Physics), Efrain E. Rodriguez (Chem & Biochem), and Ichiro Takeuchi (MSE) and

Air Force Office of Science Research, FA-95501410332
“Exploration and Development of Advanced Superconducting Materials”
\$1,200,000
08/01/2014 to 09/14/2019
Rodriguez’s portion \$50,000 per year
PI Johnpierre Paglione (Physics) and co-PIs: Richard L. Greene (Physics), Efrain E. Rodriguez (Chem & Biochem), and Ichiro Takeuchi (MSE)

Defense University Research Instrumentation Program
“Instrumentation for the Materials Genome Approach to the Search for Superconductivity”
\$600,000
2016
Funds for capital equipment of purchase of a Magnetic Measurement Property System
PI Johnpierre Paglione (Physics) and co-PIs: Richard L. Greene (Physics), Efrain E. Rodriguez (Chem & Biochem), and Ichiro Takeuchi (MSE)

II.E.2. Other

“Leading the Structural Sciences through New Single Crystal X-ray Instrumentation”
Maryland Instrumentation Fund 2021

\$793,093

coPIs: Peter Y. Zavalij (Chem and Biochem) and E. E. Rodriguez (Chem & Biochem)

II.F. Research Fellowships, Prizes and Awards

Alexander von Humboldt Fellowship for Experienced Researchers	2022
Margaret C. Etter Early Career Award in Crystallography	2019
National Science Foundation CAREER Award	2015
Research and Scholarship Award from the University of Maryland Graduate School	2013
National Research Council Post-doctoral Fellowship Award	2009

III. **Teaching, Extension, Mentoring, and Advising**

III.A. Courses Taught

<u>Semester</u>	<u>Course</u>	<u>Enrollment</u>
Spring 2015	CHEM401: Inorganic Chemistry	49
Spring 2018	CHEM401: Inorganic Chemistry	54
Spring 2019	CHEM401: Inorganic Chemistry	51
Spring 2016	CHEM602: Advanced Inorganic Chemistry II	7
Spring 2020	CHEM602: Advanced Inorganic Chemistry II	7
Spring 2021	CHEM602: Advanced Inorganic Chemistry II	10
Spring 2023	CHEM608E: Crystallography of the Solid State	15
Fall 2015	CHEM146: General Principles of Chemistry for Majors	42
Fall 2016	CHEM146: General Principles of Chemistry for Majors	50
Fall 2017	CHEM146: General Principles of Chemistry for Majors	37
Fall 2019	CHEM271: General Chemistry and Energetics	81
Fall 2020	*CHEM271: General Chemistry and Energetics	313
Fall 2021	CHEM271: General Chemistry and Energetics	173
Fall 2022	CHEM146: General Principles of Chemistry for Majors	58
Fall 2018	CHEM611: Professional Skills for Graduate Students	19
Fall 2019	CHEM611: Professional Skills for Graduate Students	21
Fall 2020	CHEM611: Professional Skills for Graduate Students	24
Winter 2019	CHEM612: Scientific Presentations for Graduate Students	19
Winter 2020	CHEM612: Scientific Presentations for Graduate Students	20
Winter 2021	CHEM612: Scientific Presentations for Graduate Students	22
Fall 2015	CHEM899D: Inorganic/Organic Seminar	15
Fall 2019	CHEM889: Seminar	10
Spring 2023	CHEM889: Seminar	12

* This course was co-taught virtually with Prof. Christopher Jarzynski due to COVID-restrictions

CHEM399: Introduction to Chemical Research (undergraduate), 7 students

CHEM899: Doctoral Dissertation Research, 10 students

III.B. Advising: Research or Clinical

III.B.1. Undergraduate

- Vince Wendekind (Spring 2020-2022), currently graduate student at University of Maryland CP
- Kaitlyn Dold (Spring 2020- 2022), currently graduate student at University of California Irvine
- Noah Katz (Summer 2019-2022), currently research intern in Tokyo, Japan
- Sarah Joyce (Summer 2019 – Spring 2020)
- Hadas Elazar-Mittelman (Summer 2017-Spring 2018), currently graduate student at Northwestern University
- Navneeth Babra, (Summer 2017-Fall 2017)
- Sarah Bender (Spring 2017-Spring 2018), currently graduate student at University of Illinois-Urbana Champaign
- Ben Levitas (Spring 2015 – Spring 2017), currently graduate student at Boston University
- Hector Vivanco, (Spring 2015-Spring 2017), currently graduate student at Johns Hopkins University
- Natalia Schoch-Lopez, (Spring 2015-Fall 2016), currently research associate at AstraZeneca
- Brenna Hodges (Spring 2014-Fall 2015), Beckman Scholar while at UMD and NSF Graduate Fellow at Yale University
- Nathaniel Schreiber (Fall 2012-Spring 2015), ASPIRE student while at UMD and NSF Graduate Fellow at Cornell University
- Binyamin Katz (Fall 2012-Spring 2014)

III.B.2. Master's advised

Justin Yu, American Chemical Society (Fall 2017-Spring 2019)

Christopher K. H. Borg, Citrine Informatics (Fall 2013-Fall 2015)

III.B.3. Doctoral

Matthew Leonard, PhD in 2023, Dissertation, Currently Post-doctoral research at the Chemical Biological Laboratory in Aberdeen, MD

Timothy Diethrich, PhD in 2022, Dissertation, Currently Research Staff Scientist at Specialty Granules, Frederick, MD

Tianyu Li, PhD in 2022, Dissertation, Currently Post-doctoral research at the University of California Santa Barbara

Brandon Wilfong, PhD in 2020, Dissertation "Magnetism and Superconductivity in Topotactically Modified Transition metal Mhalcogenides." Currently Post-doctoral researcher at Johns Hopkins University, Baltimore, MD

Marcus Carter, PhD in 2019, Dissertation “Polymer Assisted Assembly of Inorganic Materials for Next Generation Batteries.” Currently Post-doctoral researcher at the National Institute of Standards and Technology in Gaithersburg, MD.

Rishvi Jayathilake, PhD in 2019, Dissertation “Oxygen Storage Properties of Ternary Metal Oxide Systems for Chemical Looping Reactions.” Currently Research Scientist at Intel Corp. in Portland, OR.

Austin Virtue, PhD in 2019, Dissertation “Structure and Properties of Alloyed Chalcogenides with the ThCr_2Si_2 -type Structure.”

Xiuquan Zhou, PhD in 2018, Dissertation “Intercalation Chemistry of Tetrahedral Transition Metal Chalcogenides.” Currently Post-doctoral researcher at Argonne National Laboratory, Argonne, IL.

Daniel D. Taylor, PhD in 2017, Dissertation “Structural and Chemical Factors Governing Anion Reactivity in Perovskite Oxides.” Currently Data Scientist at Ford Motor Company, Detroit, MI.

Amber M. Larson, PhD in 2017, Dissertation “Frustrated Magnetism and Electronic Properties of Hollandite Oxide Materials.”

Current PhD students

Stephanie Gnewuch (started Fall 2016)

Huafei Zheng (started Fall 2017)

Lahari Balisetty (started Fall 2018)

Mario Lopez (started Fall 2019)

Hector Cein Mandujano (started Fall 2021)

Stephanie Hong (started Fall 2021)

Akil Mondie (Fall 2021)

PhD defense committee member for following students

Lu Liu (Zachariah group)

Andrew J. Keane (Sita group)

Cathryn Gail Blakely (Sita group)

Jeffrey B. Delisio (Zachariah group)

Aaron Geller (Eichhorn group)

Kaitlyn E. Crawford (Sita group)

Samantha DeCarlo (Eichhorn group)

Ashley Lidie Ruth (Wachsman group, Materials Science and Engineering)

Tyler Drye (Paglione group, Physics)

Maria Teresa Perez-Cardenas (Nie group)

Richard Thompson (Sita group)

Shaoyi Zhang (Nie group)

Kim Lien Thi Huynh (Eichhorn group)

Yang Wang (S.-B. Lee group)

Christopher Eckberg (Paglione Physics)

Marcus Carter (Nie & Rodriguez groups)

Scott Holdren (Zachariah group)

Lauren Stevens (Eichhorn group)

Daniel J. Campbell (Paglione group, Physics)
I-Lin Liu (Paglione group, Physics)
Tao Wu (Zachariah group)
Luning Wang (Eichhorn group)
Wei Wu (D. Liu group, Chemical and Biomolecular Engineering)
Katchen Lachmeyer (Sita group)
Austin Gion (Geology)
Xiaoying Lin (Fourkas group)
Xiyuan Cheng (Y. Wang group)
Junyan Zhang (D. Liu group, Chemical and Biomolecular Engineering)
Miles Rewholdt (Zachariah group, Chemical Physics)
Jiaheng Ruan (Vedernikov group)

III.B.4. Post-doctoral

Dr. Jacob Tosado, PhD from University of Maryland, January 2017 to May 2021,
Currently at Oak Ridge National Laboratory as Research Associate

Dr. Timothy E. Stacey, PhD from University of Wisconsin Madison, July 2013 to May
2014, Currently Data Scientist at RAND Corporation, Washington D.C.

Dr. Pouya Moetakef, PhD from University of California Santa Barbara, July 2013 to May
2015, Currently Detector Engineer at NASA Goddard Space Center, Greenbelt, MD

III.B.5. Other Directed Research

Louis Stokes Alliance for Minority Participation (LSAMP) Fellows

Allejandra Chavez, Summer 2020

Corleigh Forrester, Summer 2020

Isai Ramirez Gonzalez, Summer 2020

Hector Vivanco, Spring 2015-Spring 2017

High School Students

Mitchell Moore, Eleanor Roosevelt High School, Currently undergraduate at Texas A&M
University (Summer 2015 – Spring 2016)

Ariane Chandler, McKinley Technology High School, ACS Project SEED (Summer 2014)

III.C. Mentorship

III.C.1. Junior Faculty

Mentoring Committee for Lecturer Amanda Schech 2018-present

III.D. Advising: Other than Directed Research

III.D.1. Undergraduate

Faculty advisor of the *American Chemical Society UMD Student Affiliates*, undergraduate
club for hosting seminars and performing outreach from Fall 2012 to 2018

III.D.2. Doctoral

Faculty advisor to the Dept. of Chemistry and Biochemistry's *Graduate Student Organization* from Fall 2016 to 2019

- III.D.3. Other Advising Activities
Work with current chapter of Society of Chicanos/Hispanics and Native Americans in Science (SACNAS) to re-establish official status on campus and with the national organization.

IV. Service and Outreach

IV.A. Editorships, Editorial Boards, and Reviewing Activities

IV.A.1. Reviewing Activities for Journals and Presses

<i>Journal of American Chemical Society</i>	<i>Chemistry of Materials</i>
<i>Inorganic Chemistry</i>	<i>Journal of Solid State Chemistry</i>
<i>Journal of Materials Chemistry A and C</i>	<i>Nature Communications</i>
<i>Nature Chemistry</i>	<i>Journal of Alloys and Compounds</i>
<i>Chemical Communications</i>	<i>Physical Review Letters</i>
<i>Physical Review B</i>	<i>Physical Review Materials</i>
<i>Journal of Physics: Condensed Matter</i>	

IV.A.2. Reviewing Activities for Agencies and Foundations

On-site reviewer for funding of research programs Argonne National Laboratories	2017 and 2020
Review panelist for National Science Foundation grant proposals Division of Materials Research	2015, 2016, 2019, 2022
Reviewer for Department of Energy, Basic Energy Sciences Science Graduate Student Research Program	2016, 2017, and 2018
Ad-hoc reviewer for NSF DMR grant proposals	
Ad-hoc reviewer for DOE BES grant proposals	

IV.B. Committees, Professional & Campus Service

IV.B.1. Campus Service – Department

Tobin J. Marks Lecture on Chemical Discovery, chair	2019-present
Faculty Task Force Committee	2020
<i>Ad hoc</i> committee for the new Chemistry Building	2016-present
Graduate Admissions Committee	2013-2015, 2018-2020
Chemistry Faculty Search Committee	2019-2020
Facilities, Space, and Resources Committee	2018-2020
Curriculum Committee	2017-2019
Graduate Awards Committee	2018-2019
NSF GAANN Review Committee	2017
Merit Pay and Awards Committee	2016-2017

	Faculty Advisory Committee	2014-2016
IV.B.2.	Campus Service – University	
	President’s Advisory Committee on Conflict of Interest	2022-2025
	Senate Programs, Curricula, and Courses Committee	2018-2020
	Materials Science and Engineering Faculty Search Committee	2019-2020
	Aberration Corrected Electron Microscope Committee	2019-present
	Interview Selection for Banneker-Key University Scholarships	2018, 2019
	Search Committee for Nanocenter Director	2017
<u>IV.C.</u>	<u>External Service and Consulting</u>	
IV.C.1.	Corporate and Other Board Memberships	
	Member of the Board of Directors American Institute of Physics	2020-present
	Executive Committee, Neutron Scattering Society of America	2021-present
	Elected Member, U.S. National Committee for Crystallography (USNC/Cr)	2020-present
	Citrine Informatics Scientific Advisory Board	2017-2018
<u>IV.D.</u>	<u>Media Contributions</u>	
IV.D.1.	Digital Media	
	Recorded a series of segments on high school chemistry topics in our laboratory MacNeil-Lehrer Productions for <i>Discovery Education’s Techbook</i> , an e-textbook.	
<u>IV.E.</u>	<u>Community & Other Service</u>	
	Instructor for U.S. National Chemistry Olympiad, sponsored by the American Chemical Society. June 2020 and 2021	
	Panelist for UMD's SACNAS (Society for Advancement of Chicanos/Hispanics and Native Americans in Science) Chapter with the Tiger Woods Foundation (TGR) to facilitate a conversation around the importance of elevating BIPOC and first-generation voices in the sciences. March 2021	
	Alliance for Diversity in Science and Engineering, Young Researchers Conference. Gave a presentation on diversity and my own research. September 2017	
	Johns Hopkins Center for Talented Youth, Five 45-minute presentations for their Science and Technology Series consisting of demonstrations and lectures. Spring 2017 & 2015.	
	Panelist and participant for bilingual event titled <i>Sábado de Ciencias</i> at nearby Nicholas Orem Middle School, Spring 2015	

Panelist for bilingual workshop *Paving the Way: Event for Latino High School Parents and Students* on campus for students at nearby Northwestern High School, Fall 2014.

Organizer and panelist Workshop *STEM Expo for Parents* sponsored by the Office for Minorities in Science and Engineering, 2014.