
Juan Rafael Chamorro

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EMPLOYMENT AND EDUCATION

Carnegie Mellon University , Pittsburgh, PA USA	
Assistant Professor , Department of Materials Science & Engineering	Fall 2024–present
Courtesy appointments, Departments of Physics and Chemistry	
University of California, Santa Barbara , Santa Barbara, CA USA	
Postdoctoral Fellow , Materials Department & MRL	2021–2024
Advisors: Prof. Ram Seshadri and Prof. Stephen D. Wilson	
The Johns Hopkins University , Baltimore, MD USA	
Ph.D., Chemistry	2017–2021
Advisor: Prof. Tyrel M. McQueen	
B.A., Chemistry	2013–2017

FUNDING, AWARDS, AND HONORS

National Science Foundation, MPS-Ascend Faculty Catalyst Award, 2025–2027
Kaufman Foundation, New Investigator Grant, 2025
National Science Foundation, MPS-Ascend Postdoctoral Fellowship, 2021–2023
The Johns Hopkins University, Gompf Family Fellowship, 2019
National Science Foundation, Graduate Research Fellowship, Honorable Mention, 2018
Ludo Frevel Crystallography Scholarship, 2018
The Johns Hopkins University, Greer Undergraduate Research Fellowship, 2016

COURSES TAUGHT

Electronic Properties of Materials (27-432), Spring 2026
Upper-level undergraduate course covering metals, electronic band theory, semiconductors, and dielectrics.

Magnetism in Materials (27-545/745), Fall 2025, Fall 2026
Cross-listed upper-level undergraduate and graduate course covering magnetic phenomena and their applications in functional materials.

Structure, Properties, and Performance Relationships in Magnetic Materials (27-445), Fall 2024
Upper-level undergraduate course covering fundamentals of magnetism and applications including magnetic data storage, magneto-optics, magnetocalorics, multiferroics, and superconductors.

INVITED TALKS AND CONFERENCE PRESENTATIONS

INVITED

Rice RCQM Winter School on Quantum Materials Synthesis (pedagogical lecture, scheduled), Houston, TX	2026
Kyoto University (invited seminar, scheduled), Kyoto, Japan	2026
University of California, Santa Barbara, Quantum Foundry/MRL Seminar (scheduled), Santa Barbara, CA	2026
Solid State Chemistry Gordon Research Conference (invited short talk), New London, NH	2026

Global Workshop on Quantum Materials Synthesis (invited talk), Rice Global Paris Campus, Paris, France	2026
Pennsylvania State University, MRSEC Seminar, State College, PA	2025
Duquesne University, Department of Chemistry and Biochemistry Seminar, Pittsburgh, PA	2025

CONTRIBUTED

SCES2026 (poster, scheduled), Toyama, Japan	2026
Materials Genome Initiative PI Meeting (poster), Washington, DC	2026
APS March Meeting, Anaheim, CA	2025

PUBLICATIONS

Updated August 2026. With DOI links where available.

IN PRESS OR SUBMITTED

E. Steinebronn, S. Islam, A. Chatterjee, B. Neupane, A. Grutter, C. Jensen, J. A. Borchers, T. Charlton, W. J. Yáñez-Parreño, J. R. Chamorro, T. Berry, S. Ghosh, K. Yang, K. A. Nivedith, K. A. Mkhoyan, T. M. McQueen, Y. Wang, C. Liu, and N. Samarth, Efficiently gate-tunable ferromagnetism in ferromagnetic semiconductor-Dirac semimetal p-n heterojunctions, submitted (2026).

APPEARED

36. S. J. G. Alvarado, J. R. Chamorro, D. Rout, J. Hielscher, S. Schwarz, C. Benyacko, M. B. Stone, V. O. Garlea, A. R. Jackson, G. Pokharel, R. Gomez, B. R. Ortiz, S. Sarker, L. Kautzsch, L. C. Gallington, R. Seshadri, and S. D. Wilson, Interleaved bond frustration in a triangular lattice antiferromagnet, *Nat. Mater.* **25** (2026) 65–72. [\[doi\]](#)
35. M. A. Wright, A. S. Mulligan, D. Rout, J. G. Hu, J. Liu, R. L. Behrens, J. R. Chamorro, S. D. Wilson, A. K. Cheetham, and R. Seshadri, Strong, yet split hydrogen bonding with ice rules in delafossite (H/D)RhO₂, *Angew. Chem. Int. Ed.* **64** (2025) e15471. [\[doi\]](#)
34. J. R. Chamorro, S. J. G. Alvarado, D. Rout, S. Schwarz, A. Scheie, G. Pokharel, A. I. Kolesnikov, L. Keller, and S. D. Wilson, Hidden frustration in the triangular-lattice antiferromagnet NdCd₃P₃, *Phys. Rev. Mater.* **9** (2025) 104414. [\[doi\]](#)
33. C. J. Lygouras, J. Zhang, J. Gautreau, M. Pula, S. Sharma, S. Gao, T. Berry, T. Halloran, P. Orban, G. Grissonnanche, J. R. Chamorro, T. Mikuri, D. K. Bhoi, M. A. Siegler, K. J. T. Livi, Y. Uwatoko, S. Nakatsuji, B. J. Ramshaw, Y. Li, G. M. Luke, C. L. Broholm, and T. M. McQueen, Type I and type II superconductivity in a quasi-2D Dirac metal, *Mater. Adv.* **6** (2025) 1685–1694. [\[doi\]](#)
32. B. R. Ortiz, W. R. Meier, G. Pokharel, J. R. Chamorro, F. Yang, S. Mozaffari, A. Thaler, S. J. G. Alvarado, H. Zhang, D. S. Parker, G. D. Samolyuk, J. A. M. Paddison, J. Yan, F. Ye, S. Sarker, S. D. Wilson, H. Miao, D. Mandrus, and M. A. McGuire, Stability Frontiers in the AM₆X₆ Kagome Metals: The LnNb₆Sn₆ (Ln:Ce–Lu,Y) Family and Density-Wave Transition in LuNb₆Sn₆, *J. Am. Chem. Soc.* **147** (2025) 5279–5292. [\[doi\]](#)
31. R. Bhandia, D. Barbalas, R. Xiao, J. R. Chamorro, T. Berry, T. M. McQueen, N. Samarth, and N. P. Armitage, Anomalous electronic energy relaxation and soft phonons in the Dirac semimetal Cd₃As₂, *Phys. Rev. B* **110** (2024) 075131. [\[doi\]](#)
30. J. R. Chamorro, J. L. Zuo, E. N. Bassey, A. K. Watkins, G. Zhu, A. Zohar, K. E. Wyckoff, T. L. Kinnibrugh, S. H. Lapidus, S. Stemmer, J. C. Peters, R. J. Clément, S. D. Wilson, and R. Seshadri, Soft-Chemical Synthesis, Structure Evolution, and Insulator-to-Metal Transition in Pyrochlore-like λ-RhO₂, *Chem. Mater.* **36** (2024) 1547–1558. [\[doi\]](#)
29. K. Górnicka, X. Gui, J. R. Chamorro, T. M. McQueen, R. J. Cava, T. Klimczuk, and M. J. Winarski, Superconductivity–Electron Count Relationship in Heusler Phases — the Case of LiPd₂Si, *Chem. Mater.* **36** (2024) 1870–1879. [\[doi\]](#)

28. A. Mitra, R. Xiao, W. Yanez, Y. Ou, J. R. Chamorro, T. M. McQueen, A. J. Gutter, J. A. Borchers, M. R. Fitzsimmons, T. R. Charlton, and N. Samarth, Constraints on proximity-induced ferromagnetism in a Dirac semimetal (Cd_3As_2)/ferromagnetic semiconductor ($\text{Ga}_{1-x}\text{Mn}_x\text{Sb}$) heterostructure, *Phys. Rev. Mater.* **7** (2023) 094201. [\[doi\]](#)
27. J. R. Chamorro, A. R. Jackson, A. K. Watkins, R. Seshadri, and S. D. Wilson, Magnetic order in the $S_{\text{eff}} = 1/2$ triangular-lattice compound NdCd_3P_3 , *Phys. Rev. Mater.* **7** (2023) 094402. [\[doi\]](#)
26. R. Xiao, S. Islam, W. Yanez, Y. Ou, H. Liu, X. Xie, J. R. Chamorro, T. M. McQueen, and N. Samarth, Influence of Magnetic and Electric Fields on Universal Conductance Fluctuations in Thin Films of the Dirac Semimetal Cd_3As_2 , *Nano Lett.* **23** (2023) 5634–5640. [\[doi\]](#)
25. U. Dang, J. O'Hara, H. A. Evans, D. Olds, J. R. Chamorro, D. Hickox-Young, G. Laurita, and R. T. Macaluso, Vacancy-Driven Disorder and Elevated Dielectric Response in the Pyrochlore $\text{Pb}_{1.5}\text{Nb}_2\text{O}_{6.5}$, *Inorg. Chem.* **61** (2022) 18601–18610. [\[doi\]](#)
24. G. Pokharel, B. R. Ortiz, J. R. Chamorro, P. M. Sarte, L. Kautzsch, G. Wu, J. P. C. Ruff, and S. D. Wilson, Highly anisotropic magnetism in the vanadium-based kagome metal TbV_6Sn_6 , *Phys. Rev. Mater.* **6** (2022) 104202. [\[doi\]](#)
23. A. de la Torre, B. Zager, J. R. Chamorro, M. H. Upton, G. Fabbris, D. Haskel, D. Casa, T. M. McQueen, and K. W. Plumb, Electronic ground state of two nonmagnetic pentavalent honeycomb iridates, *Phys. Rev. Mater.* **6** (2022) 084406. [\[doi\]](#)
22. L. A. Pressley, M. Sinha, H. K. Vivanco, J. R. Chamorro, S. Das, R. Ramesh, and T. M. McQueen, Optimization of PbTiO_3 Single Crystals with Flux and Laser Floating Zone Method, *Cryst. Growth Des.* **22** (2022) 5629–5638. [\[doi\]](#)
21. B. Zager, J. R. Chamorro, L. Ge, F. Bahrami, V. Bisogni, J. Pellicciari, J. Li, G. Fabbris, T. M. McQueen, M. Mourigal, and K. W. Plumb, Electronic structure of the frustrated diamond lattice magnet NiRh_2O_4 , *Phys. Rev. B* **106** (2022) 045134. [\[doi\]](#)
20. R. Xiao, J. Zhang, J. R. Chamorro, J. Kim, T. M. McQueen, D. Vanderbilt, M. Kayyalha, Yi Li, and N. Samarth, Integer quantum Hall effect and enhanced g factor in quantum-confined Cd_3As_2 films, *Phys. Rev. B* **106** (2022) L201101. [\[doi\]](#)
19. W. Yanez, Y. Ou, R. Xiao, J. Koo, J. T. Held, S. Ghosh, J. Rable, T. Pillsbury, E. Gonzalez Delgado, K. Yang, J. R. Chamorro, A. J. Gutter, P. Quarterman, A. Richardella, A. Sengupta, T. M. McQueen, J. A. Borchers, K. A. Mkhoyan, B. Yan, and N. Samarth, Spin and charge interconversion in Dirac semimetal thin films, *Phys. Rev. Appl.* **16** (2021) 054031. [\[doi\]](#)
18. A. de la Torre, B. Zager, F. Bahrami, M. DiScala, J. R. Chamorro, M. H. Upton, G. Fabbris, D. Haskel, D. Casa, T. M. McQueen, F. Tafti, and K. W. Plumb, Enhanced hybridization in the electronic ground state of the intercalated honeycomb iridate $\text{Ag}_3\text{LiIr}_2\text{O}_6$, *Phys. Rev. B* **104** (2021) L100416. [\[doi\]](#)
17. V. J. Stewart, J. R. Chamorro, and T. M. McQueen, Integer versus half-integer spin on an approximate honeycomb lattice, *Phys. Rev. Mater.* **5** (2021) 094401. [\[doi\]](#)
16. W. K. Park, J. A. Sittler, L. H. Greene, W. T. Fuhrman, J. R. Chamorro, S. M. Koohpayeh, W. A. Phelan, and T. M. McQueen, Topological nature of the Kondo insulator SmB_6 and its sensitiveness to Sm vacancy, *Phys. Rev. B* **103** (2021) 155125. [\[doi\]](#)
15. Y.-S. Eo, A. Rakoski, S. Sinha, D. Mihaliov, W. T. Fuhrman, S. R. Saha, P. F. S. Rosa, Z. Fisk, C. Hatnean, G. Balakrishnan, J. R. Chamorro, S. M. Koohpayeh, T. M. McQueen, B. Kang, M.-S. Song, B. Cho, M. S. Fuhrer, J. P. Paglione, and C. Kurdak, Bulk transport paths through defects in floating zone and Al flux grown SmB_6 , *Phys. Rev. Mater.* **5** (2021) 055001. [\[doi\]](#)
14. J. R. Chamorro, T. M. McQueen, and T. T. Tran, Chemistry of Quantum Spin Liquids, *Chem. Rev.* **121** (2021) 2898–2934. [\[doi\]](#)

13. Z. Ryzynska, J. R. Chamorro, T. M. McQueen, P. Wisniewski, D. Kaczorowski, W. Xie, R. J. Cava, T. Klimczuk, and M. J. Winiarski, RuAl₆ — An Endohedral Aluminide Superconductor, *Chem. Mater.* **32** (2020) 3805–3812. [doi]
12. P. J. Robinson, M. E. Valentine, A. Granmoe, N. Drichko, J. R. Chamorro, P. F. Rosa, T. M. McQueen, and A. N. Alexandrova, Dynamical Bonding Driving Mixed Valency in a Metal Boride, *Angew. Chem. Int. Ed.* **59** (2020) 10996–11002. [doi]
11. J. R. Chamorro, A. Topp, Y. Fang, M. J. Winiarski, C. R. Ast, M. Krivenkov, A. Varykhalov, B. J. Ramshaw, L. M. Schoop, and T. M. McQueen, Dirac Fermions and Possible Weak Antilocalization in LaCuSb₂, *APL Mater.* **7** (2019) 121108. [doi]
10. M. J. Winiarski, T. T. Tran, J. R. Chamorro, and T. M. McQueen, (CsX)Cu₅O₂(PO₄)₂ (X = Cl, Br, I) — a family of Cu²⁺ S = 1/2 compounds with capped-kagome networks composed of OCu₄ units, *Inorg. Chem.* **58** (2019) 4328–4336. [doi]
9. H. Lu, J. R. Chamorro, C. Wan, and T. M. McQueen, Universal Single Ion Physics in Spin-Orbit Coupled d⁵ and d⁴ ions, *Inorg. Chem.* **57** (2018) 14443–14449. [doi]
8. J. R. Chamorro and T. M. McQueen, Progress Toward Solid State Synthesis by Design, *Acc. Chem. Res.* **51** (2018) 2918–2925. [doi]
7. M.-E. Boulanger, F. Laliberté, M. Dion, S. Badoux, N. Doiron-Leyraud, W. A. Phelan, S. M. Koohpayeh, W. T. Fuhrman, J. R. Chamorro, T. M. McQueen, X. Wang, Y. Nakajima, T. Metz, J. Paglione, and L. Taillefer, Field-dependent heat transport in the Kondo insulator SmB₆: phonons scattered by magnetic impurities, *Phys. Rev. B* **97** (2018) 245141. [doi]
6. W. T. Fuhrman, J. R. Chamorro, P. A. Alekseev, J.-M. Mignot, T. Keller, P. Nikolić, T. M. McQueen, and C. L. Broholm, Screened moments and extrinsic in-gap states in samarium hexaboride, *Nat. Commun.* **9** (2018) 1539. [doi]
5. J. R. Chamorro, L. Ge, J. Flynn, M. Subramanian, M. Mourigal, T. M. McQueen, Frustrated spin one on a diamond lattice in NiRh₂O₄, *Phys. Rev. Mater.* **2** (2018) 034404. [doi]
4. P. J. Robinson, G. Liu, S. Ciborowski, C. Martinez-Martinez, J. R. Chamorro, X. Zhang, T. M. McQueen, K. H. Bowen, and A. N. Alexandrova, Mystery of Three Borides: Differential Metal–Boron Bonding Governing Superhard Structures, *Chem. Mater.* **29** (2017) 9892–9896. [doi]
3. T. T. Tran, J. R. Panella, J. R. Chamorro, J. R. Morey, and T. M. McQueen, Designing Indirect-Direct Bandgap Transitions in Double Perovskites, *Mater. Horiz.* **4** (2017) 688–693. [doi]
2. J. Panella, J. R. Chamorro, and T. M. McQueen, Synthesis and Structure of Three New Oxychalcogenides: A₂O₂Bi₂Se₃ (A = Sr, Ba) and Sr₂O₂Sb₂Se₃, *Chem. Mater.* **28** (2016) 890–895. [doi]
1. H. van de Wouw, J. R. Chamorro, M. Quintero, and R. S. Klausen, Opposites Attract: Organic Charge Transfer Salts, *J. Chem. Educ.* **92** (2015) 2134–2139. [doi]

STUDENT MENTORING

DOCTORAL STUDENTS

Julian Marmo	2024–present
Nicholas Shkolnikov	2024–present
Tong Wang	2024–present
Hayden Nuyens	2025–present
Dhiya Srikanth	2026–present

UNDERGRADUATE AND SUMMER RESEARCHERS

Emma Greco	2026–present
T’Ana Moore	2026–present

Megan Yeager	2026–present
Gary Zhang, NSF REU	Summer 2026
Abby Chen	2025–2026
Luis Hierro	2025–2026
David Li	2025–2026
Daniel Yin	2025–2026
Ryan Ngai	Fall 2025
Stanley Holewa, NSF REU	Summer 2025
Cassius Nelson	Spring 2025