

# CHRISTINA M. ROST

Assistant Professor

Virginia Polytechnic Institute and State University, Blacksburg, VA

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## Employment History

08/2023 - present     Assistant Professor of Materials Science & Engineering, Virginia Tech  
08/2019 – 08/2023     Assistant Professor of Physics, James Madison University  
07/2017 – 10/2018     Interim X-ray Diffraction Specialist, Nanoscale Materials Characterization Facility, University of Virginia  
08/2016 – 08/2019     Postdoctoral Research Associate, University of Virginia  
                                  Advisor: Prof. Patrick Hopkins

## Education

2016     Ph.D., Materials Science & Engineering, North Carolina State University  
                  Advisor: Prof. Jon-Paul Maria  
                  Dissertation Title: “Entropy-Stabilized Oxides: Explorations of a Novel Class of Multicomponent Materials.”  
2012     M.S., Physics, Indiana University of Pennsylvania  
                  Advisor: Prof. Gregory Kenning  
                  Thesis Title: “Development of the Dual-DC SQUID Magnetometer and Aging in Non-Equilibrium Dynamics.”  
2009     B.S., Physics, Indiana University of Pennsylvania

## I. Awards & Honors

2024     Secretary-Elect, American Ceramic Society Electronics Division  
2023     JMU Provost Award for Excellence in Research & Scholarship  
2017     UVA Postdoctoral Teaching Fellow  
2015     Electronic Materials & Applications (EMA) Best Student Presentation, 1<sup>st</sup> Place  
2011     Creating Opportunities for Applying Mathematics Awardee  
2009     Daniel G. Reiber Memorial Scholar in Physics  
2008     Sigma Pi Sigma Physics Honor Society Inductee  
2004     Girl Scouts of the USA Silver Awardee

## II. Peer-Reviewed Publications (Total citations to date: 4,472. h-index: 22.)

*Underlined> are advised students, \*corresponding author, +invited contribution/special collection.*

### a. Top five cited papers from highest to lowest (based on Google Scholar):

**C.M. Rost**, E. Sachet, T. Borman, A. Moballegh, E. Dickey, D. Hou, J. Jones, S. Curtarolo\*, J-P. Maria\*, Entropy-stabilized oxides, *Nature Communications*, Vol. 6, Sept. 2015, 8485. *Citations: 2222.*

T.J. Harrington, J. Gild, P. Sarkar, C. Toher, **C.M. Rost**, O. Dippo, C. McElfresh, K. Kaufmann, E. Marin, L. Borowski, P.E. Hopkins, J. Luo, S. Curtarolo, D.W. Brenner, K. Vecchio\*, Phase stability and mechanical properties of novel high entropy transition metal carbides, *Acta Materialia*, Vol. 166, Mar. 2019, pp. 271-280. *Citations: 559.*

J.L. Braun, **C.M. Rost**, M. Lim, A. Giri, D.H. Olson, G. Kotsonis, G. Stan, D.W. Brenner, J-P. Maria, P.E. Hopkins\*, Charge-induced disorder controls the thermal conductivity of entropy-stabilized oxides, *Advanced Materials*, Vol. 30, Dec. 2018, 1805504. *Citations: 401.*

**C.M. Rost\***, Zs. Rak, D.W. Brenner, J-P. Maria, Local Structure of the  $Mg_xNi_xCo_xCu_xZn_xO$  ( $x=0.2$ ) Entropy-Stabilized Oxide: An EXAFS Study, *Journal of the American Ceramic Society*, Vol. 100, Issue 6, April 2017, pp. 2732-2738. *Citations: 220.*

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Zs. Rak, **C.M. Rost**, M. Lim, P. Sarker, C. Toher, S. Curtarolo, J-P. Maria, D.W. Brenner\*, Charge compensation and electrostatic transferability in three entropy-stabilized oxides: Results from density functional theory calculations, *Journal of Applied Physics*, Vol. 120, Issue 9, Sept. 2016, 095105. Citations: 128.

### b. Manuscripts currently under review or revision:

- 1) J.T. Sivak\*, S.S.I. Almishal, M.K. Caucci, Y. Tan, D. Srikanth, M. Furst, L-Q. Chen, **C.M. Rost**, J-P. Maria, S.B. Sinnott\*. “Discovering High-Entropy Oxides with a Machine-Learning Interatomic Potential.” (Under Review). <https://arxiv.org/pdf/2408.06322>
- 2) Y. Son\*, S. Udovenko, S.V.G. Ayyagari, J.P. Barber, K. Nakamura, **C.M. Rost**, N. Alem, S. Trolier-McKinstry. “Polarization Stability and Its Influence on Electrocaloric Effects of High Entropy Perovskite Oxide Films.” (Under Review).
- 3) S.K. Jhajharia\*, T.S. Verma, G. Bejger, S. Krishnamurty, K. Selvarajd, **C.M. Rost**, R.L. Mahajana\*. “Layered Niobate/Coal Graphene Superlattice: Maneuvering In-situ Generated Mott-Schottky junctions and oxygen vacancies for High-Current-Density Hydrogen Evolution.” (Under Revision).
- 4) M.K. Caucci, J.T. Sivak, S.S.I. Almishal, B. Yang, **C.M. Rost**, I. Dabo, J-P. Maria, S.B. Sinnott\*. “Performance of Exchange-Correlation Approximations to Density-Functional Theory for Rare-earth Oxides.” (Under Review).
- 5) S.S.I. Almishal\*, L. Miao, Y. Tan, G.N. Kotsonis, J.T. Sivak, N. Alem, L-Q. Chen, V.H. Crespi, I. Dabo, **C.M. Rost**, S.B. Sinnott, J-P. Maria\*. “Order Evolution from a High-Entropy Matrix: Understanding and Predicting Paths to Low Temperature Equilibrium.” (Under Review). <https://arxiv.org/pdf/2404.15708>

### Publications since joining Virginia Tech:

- 6) G.E. Niculescu, G.R. Bejger, J.P. Barber, J.T. Wright, S.S.I. Almishal, M. Webb, S.V.G. Ayyagari, J-P. Maria, N. Alem, **C.M. Rost\***. “Local Structure Maturation in High Entropy Oxide (Mg,Co,Ni,Cu,Zn)<sub>1-x</sub>(Cr,Mn)<sub>x</sub>O Thin Films.” *Journal of the American Ceramic Society*, September 2024, *Accepted, In Press*. <https://arxiv.org/pdf/2406.13550>
- 7) S.S.I. Almishal\*, J.T. Sivak\*, G.N. Kotsonis, Y. Tan, M. Furst, D. Srikanth, V.H. Crespi, V. Gopalan, J.T. Heron, L-Q. Chen, **C.M. Rost\***, S.B. Sinnott, J-P. Maria. “Untangling Individual Cation Roles in Rock Salt High-Entropy Oxides.” *Acta Materialia*, August 2024, *Accepted, In Press*. <https://arxiv.org/pdf/2405.07918>
- 8) L. Min, J.P. Barber, Y. Wang, S.V.G. Ayyagari, G.E. Niculescu, E. Krysko, G.R. Bejger, L.Miao, S.H. Lee, Q. Zhang, N. Alem, **C. M. Rost\***, Z. Mao\*; High Entropy Protected Sharp Magnetic Transitions in Highly Disordered Spinel Ferrites. *Journal of the American Chemical Society*, August 2024, 10.1021/jacs.4c04765.
- 9) +G.N. Kotsonis, S.S.I. Almishal\*, L. Miao, M.K. Caucci, G.R. Bejger, Sai Venkata Gayathri Ayyagari, T.W. Valentine, B.E. Yang, S.B. Sinnott, **C.M. Rost**, N. Alem, J-P. Maria; Fluorite-structured high-entropy oxide sputtered thin films from bixbyite target. *Appl. Phys. Lett.*, Vol. 124, April 2024, 171901.

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- 10) +M. Webb, M. Gerhart, S. Baksa, S. Gelin, A. Ansbros, P.B. Meisenheimer, T. Chiang, J-P. Maria, I. Dabo, **C.M. Rost**, J.T. Heron\*; High temperature stability of entropy-stabilized oxide (MgCoNiCuZn)<sub>0.2</sub>O in air. *Appl. Phys. Lett.*, Vol. 124, April 2024, 151904.
- 11) E. Krysko, L. Min, Y. Wang, N. Zhang, J.P. Barber, G.E. Niculescu, J.T. Wright, F. Li, K. Burrage, M. Matsuda, R. A. Robinson, Q. Zhang, R. Katzbaer, R. Schaak, M. Terrones, **C.M. Rost\*** and Z. Mao\*, Studies on the Structure and the Magnetic Properties of High-Entropy Spinel Oxide (Mg,Mn,Fe,Co,Ni)Al<sub>2</sub>O<sub>4</sub>, *APL Materials*, Vol. 11, October 2023, 101123.

### Publications from James Madison University:

- 12) G.N. Kotsonis, S.S.I. Almishal, F. Marques dos Santos Vieira, V.H. Crespi, I. Dabo, **C.M. Rost**, J-P. Maria\*, High-Entropy Oxides: Harnessing Crystalline Disorder for Emergent Functionality, *Journal of the American Ceramics Society*, Vol. 106, March 2023, 5587-5611.
- 13) +**C.M. Rost\***, D.L. Schmuckler, C. Bumgardner, D.R. Diercks, S. Bin Hoque, G. Kotsonis, J-P. Maria, G. Brennecka, P.E. Hopkins, Thermal and mechanical properties of the Mg<sub>0.2</sub>Ni<sub>0.2</sub>Co<sub>0.2</sub>Cu<sub>0.2</sub>Zn<sub>0.2</sub>O entropy stabilized oxide across the multi-phase to single-phase transition, *Applied Physics Letters Materials*, Vol. 10, Dec. 2022, 121108.
- 14) E.A. Scott, M.K. Singh, J.P. Barber, **C.M. Rost**, S. Ivanov, J. Watt, D. Pete, P. Sharma, T-M. Lu, C.T. Harris, Sensing performance of sub-100-nm vanadium oxide films for room temperature thermal detection applications, *Applied Physics Letters*, Vol. 121, Oct. 2022, 203505.
- 15) +M. Brahlek, M. Gazda, V. Keppens, A.R. Mazza, S.J. McCormack, A. Mielewczyk-Gryn, B. Musico, K. Page, **C.M. Rost**, S.B. Sinnott, C. Toher, T.Z. Ward, A. Yamamoto, What is in a name: Defining “high entropy” oxides, *APL Materials*, Vol. 10, Oct. 2022, 1100902.
- 16) L. Min, M. Sretenovic, T.W. Valentine, T. Heitmann, R. Zu, V. Gopalan, **C.M. Rost**, X. Ke, Z. Mao, A topological kagome magnet in high entropy form, *Communications Physics*, Vol. 5, Mar. 2022, pp. 1-7.
- 17) C. Toher, C. Oses, M. Esters, D. Hicks, G.N. Kotsonis, **C.M. Rost**, D.W. Brenner, J-P. Maria, S. Curtarolo, High-entropy ceramics: propelling applications through disorder, *MRS Bulletin*, Vol. 47, Feb. 2022, pp. 194-202.
- 18) K.F. Quiambao-Tomko, R.R. White, J.A. Tomko, **C.M. Rost**, L. Backman, E.J. Opila, P.E. Hopkins, Thermomechanical and thermochemical failure mechanisms of titanium subjected to high-heat fluxes using a laser-based thermoreflectance technique, *Journal of Applied Physics*, Vol. 131, Feb. 2022, 055104.
- 19) +A.R. Mazza, X. Gao, D.J. Rossi, B.L. Musico, T.W. Valentine, Z. Kennedy, J. Zhang, J. Lapano, V. Keppens, R.G. Moore, M. Brahlek, **C.M. Rost**, T.Z. Ward, Searching for superconductivity in high entropy oxide Ruddlesden-Popper cuprate films, *Journal of Vacuum Science and Technology A*, Vol. 40, Jan. 2022, 013404.
- 20) G.N. Kotsonis, P.B. Meisenheimer, L. Miao, J. Roth, B. Wang, P. Shafer, R. Engel-Herbert, N. Alem, J.T. Heron, **C.M. Rost**, J-P. Maria, Property and cation valence engineering in entropy-stabilized oxide thin films, *Physical Review Materials*, Vol. 4, Oct. 2020, 100401.

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### Publications from Ph.D. and Postdoctoral Research:

- 21) **C.M. Rost**, T. Borman, M.D. Hossian, M. Lim, K.F. Quiambao-Tomko, J.A. Tomko, D.W. Brenner, J-P. Maria, P.E. Hopkins\*, Electron and phonon thermal conductivity in high entropy carbides with variable carbon content, *Acta Materialia*, Vol. 196, Sep. 2020, pp. 231-239.
- 22) E.A. Scott, K. Hattar, J.L. Braun, **C.M. Rost**, J.T. Gaskins, T. Bai, Y. Wang, C. Ganski, M. Goorsky, P.E. Hopkins\*, Orders of magnitude reduction in the thermal conductivity of polycrystalline diamond through carbon, nitrogen, and oxygen ion implantation, *Carbon*, Vol. 157, Feb. 2020, pp. 97-105.
- 23) M.E. DeCoster, X. Chen, K. Zhang, **C.M. Rost**, E.R. Hoglund, J.M. Howe, T.E. Beechem, H. Baumgart, P.E. Hopkins\*, Thermal Conductivity and Phonon Scattering Processes of ALD Grown PbTe–PbSe Thermoelectric Thin Films, *Advanced Functional Materials*, Vol. 29, Nov. 2019, 1904073.
- 24) E. Radue, E.L. Runnerstrom, K.P. Kelley, **C.M. Rost**, B.F. Donovan, E.D. Grimley, J.M. LeBeau, J-P. Maria, P.E. Hopkins\*, Charge confinement and thermal transport processes in modulation-doped epitaxial crystals lacking lattice interfaces, *Physical Review Materials*, Vol. 3, Mar. 2019, 032201.
- 25) T.J. Harrington, J. Gild, P. Sarkar, C. Toher, **C.M. Rost**, O. Dippo, C. McElfresh, K. Kaufmann, E. Marin, L. Borowski, P.E. Hopkins, J. Luo, S. Curtarolo, D.W. Brenner, K. Vecchio\*, Phase stability and mechanical properties of novel high entropy transition metal carbides, *Acta Materialia*, Vol. 166, Mar. 2019, pp. 271-280.
- 26) M. Lim, Zs. Rak, J.L. Braun, **C.M. Rost**, G.N. Kotsonis, P.E. Hopkins, J-P. Maria, D.W. Brenner\*, Influence of mass and charge disorder on the phonon thermal conductivity of entropy stabilized oxides determined by molecular dynamics simulations, *Journal of Applied Physics*, Vol 125, Feb. 2019, 055105.
- 27) J.L. Braun, **C.M. Rost**, M. Lim, A. Giri, D.H. Olson, G. Kotsonis, G. Stan, D.W. Brenner, J-P. Maria, P.E. Hopkins\*, Charge-induced disorder controls the thermal conductivity of entropy-stabilized oxides, *Advanced Materials*, Vol. 30, Dec. 2018, 1805504.
- 28) E. Scott, S.W. Smith, M.D. Henry, **C.M. Rost**, A. Giri, J.T. Gaskins, S.S. Fields, S.T. Jaszewski, J.F. Ihlefeld, P.E. Hopkins\*, Thermal resistance and heat capacity in hafnium zirconium oxide ( $\text{Hf}_{1-x}\text{Zr}_x\text{O}_2$ ) dielectrics and ferroelectric thin films, *Applied Physics Letters*, Vol. 113, Nov. 2018, 192901.
- 29) G.G. Kenning\*, D.M. Tennant, **C.M. Rost**, F. Garrote de Silva, B.J. Walters, Q. Zhai, D.C. Harrison, E.D. Dahlberg, R.L. Orbach, End of aging as a probe for finite size effects near the spin glass transition temperature, *Physical Review B*, Vol. 98, Sep. 2018, 104436.
- 30) E. Scott, K. Hattar, **C.M. Rost**, M. Fazli, J.T. Gaskins, K. Esfarjani, C. Ganski, C. Li, T. Bai, Y. Wang, M. Goorsky, P.E. Hopkins\*, Phonon scattering effects from point and extended defects on thermal conductivity studied via ion irradiation of crystals with self-impurities, *Physical Review Materials*, Vol. 2, Sep. 2018, 095001.
- 31) G. Kotsonis, **C.M. Rost**, D.T. Harris, J-P. Maria\*, Epitaxial entropy-stabilized oxides: growth of chemically diverse phases via kinetic bombardment, *MRS Communications*, Vol. 8, Sep. 2018, pp. 1371-1377.
- 32) D.H. Olson, **C.M. Rost**, J.T. Gaskins, C.J. Szejewski, J.L. Braun, P.E. Hopkins\*, Size Effects on the Cross-Plane Thermal Conductivity of Transparent Conducting Indium Tin Oxide (ITO) and

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Fluorine Tin Oxide (FTO) Thin Films, *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 9, Aug. 2018, pp. 51-57.

- 33) E.A. Paisley, M.T. Brumbach, C.T. Shelton, A.A. Allerman, S. Atcitty, **C.M. Rost**, J.A. Ohlhausen, B.L. Doyle, Z. Sitar, J-P. Maria, J.F. Ihlefeld\*, Nitride surface chemistry influence on band offsets at epitaxial oxide/GaN interfaces, *Applied Physics Letters*, Vol. 112, Feb. 2018, 092903.
- 34) **C.M. Rost**, J.L. Braun, K. Ferri, L. Backman, A. Giri, E.J. Opila, J-P. Maria, P.E. Hopkins\*, Hafnium nitride films for thermoreflectance transducers at high temperatures: Potential based on heating from laser absorption, *Applied Physics Letters*, Vol. 111, Oct. 2017, 151902.
- 35) A. Giri\*, J.L. Braun, **C.M. Rost**, P.E. Hopkins\*, On the minimum limit to thermal conductivity of multi-atom component crystalline solid solutions based on impurity mass scattering, *Scripta Materialia*, Vol. 138, Sept. 2017, pp. 134-138.
- 36) **C.M. Rost\***, Zs. Rak, D.W. Brenner, J-P. Maria, Local Structure of the  $Mg_xNi_xCo_xCu_xZn_xO$  ( $x=0.2$ ) Entropy-Stabilized Oxide: An EXAFS Study, *Journal of the American Ceramic Society*, Vol. 100, Issue 6, April 2017, pp. 2732-2738.
- 37) S. Faraji, O. Yildiz, **C. Rost**, K. Stano, N. Farahbakhsh, Y. Zhu, P.D. Bradford\*, Radial growth of multi-walled carbon nanotubes in aligned sheets through cyclic carbon deposition and graphitization, *Carbon*, Vol. 111, Jan. 2017, pp. 411-418.
- 38) Zs. Rak, **C.M. Rost**, M. Lim, P. Sarker, C. Toher, S. Curtarolo, J-P. Maria, D.W. Brenner\*, Charge compensation and electrostatic transferability in three entropy-stabilized oxides: Results from density functional theory calculations, *Journal of Applied Physics*, Vol. 120, Issue 9, Sept. 2016, 095105.
- 39) T.E. Beechem\*, A.E. McDonald, E.J. Fuller, A.A. Talin, **C.M. Rost**, J-P. Maria, J.T. Gaskins, P.E. Hopkins, A.A. Allerman, Size dictated thermal conductivity of GaN, *Journal of Applied Physics*, Vol. 120, Issue 9, Sept. 2016, 095104.
- 40) **C.M. Rost**, E. Sacht, T. Borman, A. Moballeggh, E. Dickey, D. Hou, J. Jones, S. Curtarolo\*, J-P. Maria\*, Entropy-stabilized oxides, *Nature Communications*, Vol. 6, Sept. 2015, 8485.
- 41) S. Faraji, K. Stano, **C. Rost**, J-P. Maria, Y. Zhu, P. Bradford\*, Structural annealing of carbon coated aligned multi-walled carbon nanotube sheets, *Carbon*, Vol. 79, Nov. 2014, pp. 113-122.

### III. Invited Presentations

#### a. Invited Seminars

<u>Institution</u>	<u>Location</u>	<u>Date</u>
1) Virginia Tech Dept. of Materials Science & Engineering	Blacksburg, VA	1/2025
2) James Madison University Dept. of Physics	Harrisonburg, VA	11/2024
3) University of Toledo Dept. of Chemistry & Biochemistry	Toledo, OH	4/2024
4) University of Michigan Dept. of Materials Science & Engineering	Ann Arbor, MI	4/2024
5) Carnegie Mellon University Dept. of Materials Science & Engineering	Pittsburgh, PA	3/2023
6) James Madison University Dept. of Physics	Harrisonburg, VA	12/2022
7) University of Texas – Dallas Dept. of Chemistry & Biochemistry	Dallas, TX	10/2022
8) James Madison University Dept. of Chemistry & Biochemistry	Harrisonburg, VA	10/2022
9) University of British Columbia, Quantum Matter Institute	Online	9/2022
10) Texas A&M Dept. of Materials Science & Engineering	College Station, TX	3/2022



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11) Duke University AFLOW Consortium	Online	12/2021
12) Illinois Institute of Technology Dept. of Physics	Online	03/2021
13) XAFS Global Journal Club	Online	11/2020
14) Iowa State University Dept. of Materials Science & Engineering	Ames, IA	02/2019
15) Indiana University of Pennsylvania Dept. of Physics	Indiana, PA	01/2015

### b. Invited Conference/Workshop Presentations

*\*poster presentation*

<u>Conference/Workshop Title</u>	<u>Location</u>	<u>Date</u>
1) The Metals, Minerals, & Materials Society (TMS) Annual Meeting & Exhibit	Las Vegas, NV	03/2025
2) Electronic Materials and Applications (EMA) Conference	Denver, CO	02/2025
3) 10th International Congresses on Ceramics (ICC10) (declined due to conflict)	Montreal, Canada	07/2024
4) Materials Research Society (MRS) Spring Meeting	Seattle, WA	04/2024
5) International Conference on High Entropy Materials (ICHEM) (declined due to move to VT)	Knoxville, TN	06/2023
6) Electronic Materials & Applications (EMA)	Orlando, FL	01/2023
7) Telluride Workshop on Compositionally Complex Oxides	Telluride, CO	07/2022
8) International Conference & Expo on High Entropy Ceramics & Composites (ICACC)	Online	01/2022
9) Ultra-High Temperature Ceramics: Materials for Extreme Environment Applications IV*	Windsor, UK	09/2017
10) IEEE International Conference on Nanotechnology	Pittsburgh, PA	07/2017
11) Gordon Research Seminar on Solid State Chemistry: Strategies for Materials Discovery: New Functional Materials and Their Applications*	New London, NH	07/2016
12) Annual US-Japan Seminar on Dielectric & Piezoelectric Ceramics*	Matsumoto, Japan	11/2015

### IV. Contributed Presentations

*\*poster presentation*

<u>Conference/Workshop Title</u>	<u>Location</u>	<u>Date</u>
1) Materials Research Society (MRS) Spring Conference	Honolulu, HI	5/2022
2) Electronic Materials & Applications (EMA) Conference	Online	01/2022
3) Materials Research Society (MRS) Spring Conference*	Phoenix, AZ	04/2019
4) International Conference & Expo on Advanced Ceramics & Composites (ICACC)	Daytona, FL	01/2019
5) Electronic & Advanced Materials Conference	Orlando, FL	01/2018
6) Materials Science & Technology (MS&T) Conference (2 talks)	Pittsburgh, PA	10/2017
7) Materials Research Society (MRS) Spring Conference*	Phoenix, AZ	04/2017
8) Electronic Materials & Applications (EMA) Conference	Orlando, FL	01/2017
9) Electronic Materials & Applications (EMA) Conference	Orlando, FL	01/2016
10) International Conference on Electroceramics (ICE)	State College, PA	05/2015
11) Electronic Materials & Applications (EMA) Conference	Orlando, FL	01/2015
12) IUP Scholars Forum*	Indiana, PA	04/2011
13) Women in STEM Research Forum*	Indiana, PA	10/2010

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### **V. Pending and Awarded Research & Educational Funding Proposals (Individual share total: \$1,594,612. Overall total: \$28,499,951. Note: not including pending, GOALI, and MRI in calculations.)**

- 1) “CAREER: Investigating Inversion in High Entropy Oxide Spinels- Unraveling Structural Dynamics for Advanced Materials Design,” National Science Foundation, \$685,343, 5/1/2025-4/30/2030. PI: C.M. Rost (VT). Role: PI. Pending, 2024.
- 2) “Disorder Enabled Functionality in Extremes for Computing Technology and Sensing (DEFECTS),” Department of Energy, \$555,000 of \$10,000,000, 10/1/2024 – 9/30/2028. PI: T.Z. Ward (ORNL) Co-PIs: S. Shannon (NCSU), A. Mazza (LANL), R. Katiyar (UPR), V. Fung (GATech), C.M. Rost (VT), A. Minnich (CalTech). Role: co-PI. Pending, 2024.
- 3) “Research and Education Program for HBCU/MI: Center of Excellence in Integrated Sensing and Cyber with Authentication,” Department of the Army, Army Contracting Command, \$1,000,000 of \$10,000,000, 9/1/2023-8/31/2028. PI: D. Viehland (VT) Co-PIs: C.M. Rost (VT), J. Li (VT), A. Stavrou (VT), L. Nazhandali (VT), J. Heremans (VT), S. Trolrier-McKinstry (PSU), D. Werner (PSU), A. Arguelles (PSU), T. Jackson (PSU), M. Kiani (PSU). Role: co-PI. Awarded, 2023.
- 4) “Collaborative Research: U.S.-Ireland R&D Partnership: Processing-Driven Nucleation Mediated Control for Manufacturing of Phase-Pure Ferroelectric Hafnia,” National Science Foundation, \$143,196.00 of \$478,541, \$125,152.00 transferred to VT, 1/1/2023-12/31/2025, co-PIs: C.M. Rost (JMU/VT), J.F. Ihlefeld (UVA), A. Kumar (Queen’s Univ. Belfast), B. Rodriguez (Univ. College Dublin). Role: co-PI. Awarded, 2022.
- 5) “Major Research Instrumentation: Acquisition of an ultrahigh vacuum closed cryostat scanning probe microscope for nanoscale discoveries on surfaces”, National Science Foundation, \$801,660.00. co-PIs: Ashleigh Baber, Christina Rost, Xiaofeng Hu, Costel Constantin. Role: co-PI. Awarded, 2022.
- 6) “Collaborative Research Grant: Superconductivity in High Entropy Alloys,” 4-VA, \$5,000, 6/1/2022-5/31/2024, co-PIs: Despina Louca (UVA) and Christina Rost (JMU), Role: co-PI, Awarded, 2022.
- 7) “Development of Student Research Experiences within Courses: Pilot Initiative: PHYS 106E- Introduction to Research”, Christina Rost, Gabriel Niculescu, Sean Scully, JMU CSM Research Stimulus Program (RSP), \$4,000, Role: PI. Awarded, 2022.
- 8) Materials Research Science and Engineering Center IRG: “Entropy Stabilized Oxides,” National Science Foundation, \$429,916.00 of \$18,000,000, \$255,672.67 transferred to VT, 9/1/2020-8/31/2026 Lead PI: V. Crespi (PSU), co-PIs: I. Dabo, S. Sinnott, J-P. Maria, S. Trolrier-McKinstry, R. Engel-Herbert, Z. Mao, V. Gopalan, N. Alem, L.Q. Chen (PSU), J. Heron (U. Mich.), C.M. Rost (JMU/VT). Role: co-PI. Awarded, 2020.
- 9) “Collaborative Research Grant: Multifunctional entropy-stabilized thermal barrier coatings,” 4-VA, \$5,000.00, 12/1/2019 – 12/1/2021, PI: Christina Rost, co-PI: Patrick Hopkins (UVA). Role: PI. Awarded, 2019.
- 10) “GOALI: Understanding and controlling heat transport mechanisms in nano-layered materials for energy harvesting thermal barrier coatings in jet engines,” National Science Foundation,

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\$322,639.59, 08/1/2017 – 07/31/2020, PI: Patrick Hopkins, Ann Bolcavage (co-PI: Rolls-Royce).  
Role: Contributed to proposal content. Awarded.

11) UVA Postdoctoral Teaching Fellowship, School of Engineering and Applied Science, \$7,500.00,  
8/22/2017-12/20/2017. Awarded.

### VI. Mentorship

#### a. Virginia Tech:

<u>Name</u>	<u>Program</u>	<u>Year(s)</u>
Mr. David Medina	Ph.D. Materials Science and Engineering	Fall 2024-present
Miss Lauren Anderson	B.Sc. Materials Science and Engineering	Fall 2024-present
Mr. William Deary	B.Sc. Materials Science and Engineering	Spring 2024-present
Miss Bethany Crittendon	B.Sc. Materials Science and Engineering	Spring 2024
Miss Sarah Muhlenberg	M.Eng. Materials Science and Engineering	Spring 2024-present
Miss Alix Ehlers	Ph.D. Geology	Spring 2024-present
Mr. John Barber	Ph.D. Materials Science and Engineering	Spring 2024-present
Mr. Gerald Bejger	Ph.D. Materials Science and Engineering	Fall 2023-present

#### b. James Madison University:

<u>Name</u>	<u>Program</u>	<u>Year(s)</u>
Mr. Michael Gerhart	B.Sc. Physics	2022-2023
Mr. Thomas Bertram	B.Sc. Physics	2022-2023
Mr. Gerald Bejger	B.Sc. Physics	2021-2023
Mr. Tyler Thompson	B.Sc. Physics	2022-2023
Mr. John Barber	B.Sc. Physics	2021-2023
Mr. Melvin Chicas-Espinoza	B.Sc. Physics	2021-2023
Mr. Tyler Valentine	B.Sc. Physics	2021-2022
Miss Gabriela Niculescu	H.S. Diploma & B.Sc. Physics (UVA)	2019-2022
Miss Kristen Johnson	B.Sc. Physics	2021-2022
Mr. Daniel Rossi	B.Sc. Physics	2021-2022
Mr. Daniel Mischenko	B.Sc. Physics and Chemistry	2021-2022
Mr. Daniel Schmuckler	B.Sc. Physics	2020-2021
Mr. Zachary Kennedy	B.Sc. Mathematics	2020-2021
Mr. Andrew Giles	B.Sc. Chemistry	2019

#### c. During Ph.D. and Post-doc:

<u>Name</u>	<u>Program</u>
Dr. Mallory DeCoster-Rykal	Ph.D. Mechanical and Aerospace Engineering (UVA)
Dr. Ethan Scott	Ph.D. Mechanical and Aerospace Engineering (UVA)
Dr. Trent Borman	Ph.D. Materials Science and Engineering (PSU)
Dr. Lavina Backman	Ph.D. Materials Science and Engineering (UVA)
Dr. Jeffrey Braun	Ph.D. Mechanical and Aerospace Engineering (UVA)
Dr. Jeroen Deijkers	Ph.D. Materials Science and Engineering (UVA)
Dr. Tyler Harrington	Ph.D. Materials Science and Engineering (UCSD)
Mr. GyungHyun Ryu	M.Sc. Materials Engineering (Changwon National University)
Miss Scarlet Kong	B.Sc. Materials Science (University of New South Wales)
Mr. Victor Bauer	M.Sc. Materials Science (Vienna University of Technology)



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### VII. Teaching

#### a. Virginia Tech:

<u>Course</u>	<u>Number of students</u>	<u>Year(s)</u>
MSE 4614/5614 – Nanomaterials/Advanced Nanomaterials	10	F2023

#### b. James Madison University:

<u>Course</u>	<u>Number of students</u>	<u>Year(s)</u>
PHYS 380 - Thermodynamics and Statistical Mechanics	49	F2020, F2021, F2022
PHYS 381 – Materials Characterization	15	S2021, S2023
PHYS 250 – University Physics II	88	S2020, S2021
PHYS 121 – Physical Nature of Light and Sound	185	F2019, F2020, F2021, F2022
PHYS 106 – Introduction to Research	12	S2023

#### c. University of Virginia:

<u>Course</u>	<u>Number of students</u>	<u>Year(s)</u>
MSE 4592/6592 – X-ray Scattering Technology in MSE	14	F2017

### VIII. Professional Activities

#### a. Editorial and Peer-Review

- Guest Editor. Special Issue: “High Entropy Oxides.” High Entropy Alloys and Materials. 2025
- Co-guest editor. “VSI: Beyond Structural High Entropy Alloys: New Advances in High Entropy Materials.” Materials Letters. 2025.
- Guest Editor. Special Topics: “Era of Entropy: Synthesis, Structure, Properties, and Applications of High-Entropy Materials.” Joint Applied Physics Letters/Journal Applied Physics. 2024.
- Reviewer for journals including Science, J. American Ceramics Society, J. Vacuum Science and Technology, Entropy, MRS Advances, J. Materials Chemistry A, Applied Physics Letters, APL Materials, Chemistry of Materials, Journal of Applied Physics, Journal of Materials Research, Nature Communications, J. American Chemical Society, Nature Materials, Nature Electronics, and J. Inorganic Chemistry.

#### b. Conferences and Workshops

- Session Chair, Materials Research Society (MRS) Spring 2024.
- Workshop organizer, MadiSTEM “The Dating Game”. 2022 and 2023.
- Session Chair, International Conference and Expo on Advanced Ceramics and Composites (ICACC) 2022.
- Judge, student presentations and posters, Electronic Materials and Applications (EMA) 2019, 2020, 2022.
- Symposium organizer, Electronic Materials and Applications (EMA) 2022, “2<sup>nd</sup> Annual EMA Failure Pub Quiz”.
- Workshop Organizer, Telluride Science Research Center (TSRC) Workshop entitled, “The Role of Configurational Complexity in Functional High Entropy Oxides.” June 2022.
- Organizer for the 2021 Undergraduate Research Symposium, JMU Physics and Astronomy.
- Session Chair, Electronic Materials and Applications (EMA) Conferences 2016, 2017, 2019, 2020.

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- “Broadening Participation: NSF Proposal Workshop” NSF. Participated in an NSF sponsored workshop focusing on the proposal writing and review process. 2019.
- “New Faculty Academy & Mentoring,” James Madison University. Participated in a year-long workshop focusing on pre-tenured faculty strategies for effectiveness in research, teaching, and service. 2019.
- Judge, Virginia Junior Academy of Science Research Symposium, 2019.

### c. Committees and Panels

- Temkin Fund for Undergraduate Research Committee, VT MSE, 2024-present.
- Undergraduate Curriculum Committee, VT MSE, 2024-present.
- Scholarship Committee, VT MSE, 2024-present.
- Review Panelist, NSF. 2023, 2024.
- External committee member, Alix Ehlers, Geoscience, Virginia Tech. 2024-present.
- Member, Spriggs Phase Equilibria Award Committee, American Ceramic Society, 2021 - present.
- Member, Advanced Photon Source Proposal Review Panel: Spectroscopy, Condensed Matter Physics/ Magnetism, 2021-present.
- Committee member, JMU Physics senior exit exam for Richard Baughman, Tyler Valentine, Jon Tommaro, Daniel Kolecki. Spring 2022.
- Member, College Council, JMU College of Science and Mathematics, 2021-present. *Executive committee/ Secretary 2021-2022.*
- Member, Curriculum, and Instruction Committee, JMU Physics and Astronomy, 2019-2022.
- Committee member, JMU Physics senior exit exam for Matthew Almond and Natasha Gallant. Spring 2021.
- Review panelist, ST8 (Production and Processes Engineering) for the National Science Centre Poland under funding scheme OPUS-21, 2021.
- External committee member, Dr. Jeroen Deijkers, University of Virginia, 2019-2022.

### d. Professional Affiliations

- Member, American Chemical Society
- Member, Virginia Academy of Science
- Member, American Association for the Advancement of Science
- Member, American Physical Society
- Member, American Ceramic Society, Electronics Division Marketing & Media Committee 2019-2023, Spriggs Phase Equilibria Award Committee 2021-present, graduate student mentor 2021-2023.
- Member, Materials Research Society
- Member, Minerals, Metals & Materials Society
- Member, Sigma Pi Sigma, IUP Chapter President 2008-2009
- Adult member, Girl Scouts North Carolina Coastal Pines, Troop Leader 2013-2016

### e. Other Outreach

- “Letters to a Pre-Scientist,” Global Pen Pal Initiative. Matched with a pre-scientist pen pal from an underprivileged background, where we exchanged regular snail-mail letters about scientific questions, goals, and general everyday life.
- “4<sup>th</sup> Annual Truck Touch” Event, Montessori School of Charlottesville. Partnered with Rolls Royce and NSF to create an interactive area where children could learn about simple machines, work with hydrophobic materials, build miniature car engines, and see the inside of a helicopter engine. Worked with 2,000 children ranging in age from toddlers to pre-teens over the course of the 4-hour event.
- “Girl Scouts North Carolina Coastal Pines”, Research Triangle Region, NC. Troop leader for diverse, multi-level troop ranging from Brownies to Cadettes.