

# Eric C. O'Quinn, PhD

## Personal

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## Professional

Research Assistant Professor University of Tennessee Knoxville, Tennessee, USA	2023-present
Research Scientist University of Tennessee Knoxville, Tennessee, USA	2023
Postdoctoral Research Associate University of Tennessee Knoxville, Tennessee, USA	2020-2022
Graduate Research Fellow Oak Ridge National Laboratory Oak Ridge, Tennessee, USA	2018-2019

## Education

Ph.D., Nuclear Engineering University of Tennessee Knoxville, Tennessee, USA <i>Dissertation: Characterizing Heterogeneous Disorder in Complex Oxides</i> University of Tennessee, Graduate Research Advisor: Dr. Maik Lang Department of Energy Office of Science Graduate Student Research (SCGSR) Fellowship Advisor: Dr. Matthew Tucker	2015-2019
B.Sc., Physics Louisiana State University Baton Rouge, Louisiana, USA	2007-2011

## Publications (g-index = 18, h-index = 9, from Google Scholar)

25. Evan Williams, Jacob Minnette, **Eric O'Quinn**, Cale Overstreet, William F. Cureton, Ina Schubert, Christina Trautmann, Changyong Park, Maxim Zdorovets, Maik Lang, *Swift Heavy Ion Irradiation Effects in Zirconium and Hafnium Carbides*, under review with *Nucl. Instruments Methods Phys. Res. Sect. B Beam Interact. with Mater. Atoms*.
24. Jacob Minnette, Evan Williams, William Cureton, Alexandre Solomon, **Eric O'Quinn**, Matthew Kurley, Rodney D. Hunt<sup>2</sup> Changyong Park, Ina Schubert, Christina Trautmann, Maik Lang, *Response of ZrC to Swift Heavy Ion Irradiation*, *J. Appl. Phys.* 134 (2023) 185901
23. Gushev, Igor; **O'Quinn, Eric**, Tucker, Matthew; Ewing, Rodney; Overstreet, Cale; Neufeind, Joerg; Everett, Michelle; Zhang, Qiang; Sprouster, David; Olds, Daniel; Baldinozzi, Gianguido; Lang, Maik,

*Systematic study of short- and long-range correlations in RE<sub>3</sub>TaO<sub>7</sub> weberite-type compounds by neutron total scattering and X-ray diffraction, Journal of Materials Chemistry A* 11, 8886–8903 (2023).

22. Min Niu; K. Jayanthi; Hongfei Gao; Alexandre P. Solomon; **Eric C. O'Quinn**; Lei Su; Yuanbin Qin; Maria Eugenia Toimil-Molares; Maik Lang; Alexandra Navrotsky, *Structural and thermodynamic evolution of an amorphous SiOC ceramic after swift heavy ion irradiation* Acta Mater. 242, 118475 (2023).
21. J. Hirtz, **E. C. O'Quinn**, I. M. Gushev, J. C. Neuefeind, M. Lang, Cation Short-Range Ordering of MgAl<sub>2</sub>O<sub>4</sub> and NiAl<sub>2</sub>O<sub>4</sub> Spinel Oxides at High Temperatures via In Situ Neutron Total Scattering. *Inorg. Chem.* (2022), doi:10.1021/acs.inorgchem.2c02766.
20. Donald Z. Chaney, John Hirtz, Evan Williams, Jacob Minnette, William F. Cureton, **Eric C. O'Quinn**, Xiaodong Zhao, Xiaofeng Guo, Takahiro Matsuoka, Michael Koehler, David Sprouster, and Maik Lang, *Grain size dependence of thermally-induced oxidation in ZrC* (2022) *Journal of Materials Science*
19. C. Overstreet, J. Cooper, **E. O'Quinn**, W. Cureton, R. Palomares, J. Leys, G. Deissmann, S. Neumeier, C.-H. Chen, M. Lang, Structural stability of REE-PO<sub>4</sub> (REE = Sm,Tb) under swift heavy ion irradiation. *Nucl. Instruments Methods Phys. Res. Sect. B Beam Interact. with Mater. Atoms.* **527**, 34–39 (2022).
18. D. Drey, **Eric C. O'Quinn**, S. Finkeldei, J. Neuefeind, M. Lang, Local Ordering in Disordered Nd Zr<sub>1</sub>-O<sub>2</sub>-0.5 Pyrochlore as Observed using Neutron Total Scattering, Acta Mater. 225 (2021) 117590.
17. **Eric C. O'Quinn**, Devon L. Drey, Antonio F. Fuentes, Maik K. Lang, *Defining the Structural Stability Field of Disordered Fluorite Oxides. Frontiers in Chemistr* (2021)
16. **Eric C. O'Quinn**, Cameron L. Tracy, William F. Cureton, Ritesh Sachan, Joerg C. Neuefeind, Christina Trautmann, Maik K. Lang, *Multi-scale Investigation of Heterogeneous Swift Heavy Ion Tracks in Stannate Pyrochlore. Journal of Materials Chemistry A* (2021)
15. Alexandre Solomon, Cameron Tracy, **Eric C. O'Quinn**, Maik Lang, and Daniel Severin, *Transformations to Amorphous and X-type Phases in Swift Heavy Ion-Irradiated Ln<sub>2</sub>O<sub>3</sub> and Mn<sub>2</sub>O<sub>3</sub>. Journal of Applied Physics* (2021)
14. Roman Sherrod, **Eric C. O'Quinn**, Igor M. Gushev, Cale Overstreet, Joerg Neuefeind, Maik Lang, *Comparison of Short-Range Order in Irradiated Dysprosium Titanates. Nature Materials Degredation.*, (2021)
13. Mingyang Zhao, **Eric C. O'Quinn**, Nancy Birkner, Yun Xu, Maik Lang, Kyle Brinkman, *Radiation damage and thermal annealing in tunnel structured hollandite materials. Acta Mater.*, (2020)
12. Devon L. Drey, **Eric C. O'Quinn**, Tamilarasan Subramani, Kristina Lilova, Gianguido Baldinozzi, Igor M. Gushev, Antonio F. Fuentes, Joerg Neuefeind, Michelle Everett, David Sprouster, Alexandra Navrotsky, Maik Lang, *Disorder in Ho<sub>2</sub>Ti<sub>2-x</sub>Zr<sub>x</sub>O<sub>7</sub>: Pyrochlore to Defect Fluorite Solid Solution Series. RSC Advances*, (2020)
11. Igor M. Gushev, **Eric C. O'Quinn**, Gianguido Baldinozzi, Jörg Neuefeind, Rodney C. Ewing, and Maik Lang, *Determination of local orthorhombic order of weberite-type Y<sub>3</sub>TaO<sub>7</sub> using neutron total scattering and density functional theory calculation techniques. Acta Materialia*, (2020)

10. M. Lang, **E. C. O'Quinn**, J. Neuefeind, and C. Trautmann, *Characterization of Radiation Effects and Ion Tracks with Spallation Neutron Probes*. *Nucl. Phys. News* **30**, 16 (2020).
9. **E. C. O'Quinn**, K.E. Sickafus, R.C. Ewing, G. Baldinozzi, J.C. Neuefeind, M.G. Tucker, A.F. Fuentes, D. Drey, and M.K. Lang, *Predicting Short-Range Order and Correlated Phenomena in Disordered Crystalline Materials*. *Science Advances*, **6**, 1 (2020).
8. Chung, C.-K.; **O'Quinn, E. C.**; Neuefeind, J. C.; Fuentes, A. F.; Xu, H.; Lang, M.; Navrotsky, A. *Thermodynamic and Structural Evolution of Mechanically Milled and Swift Heavy Ion Irradiated Er<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> Pyrochlore*. *Acta Mater.* **2019**.
7. W.F. Cureton, R.I. Palomares, C.L. Tracy, **E. C. O'Quinn**, J. Walters, M. Zdorovets, R.C. Ewing, M. Lang, *Effects of Irradiation Temperature on the Response of CeO<sub>2</sub>, ThO<sub>2</sub>, and UO<sub>2</sub> to Highly Ionizing Radiation*. *Acta Mater.* (2019).
6. **E. C. O'Quinn**, J. L. Bishop, R. Sherrod, J. Neuefeind, M. SAGRARIO, A. F. Fuentes, M. Lang, *Advanced Characterization Technique for Mechanochemically Synthesized Materials: Neutron Total Scattering Analysis*. *J. Mater. Sci.* (2018).
5. Lang, M. **O'Quinn, E.C.**, Shamblin J., Neuefeind, J., *Advanced Experimental Technique for Radiation Damage Effects in Nuclear Waste Forms: Neutron Total Scattering Analysis*. MRS Advances. (In Press)
4. Park, S.; Rittman, D. R.; Tracy, C. L.; Chapman, K. W.; Zhang, F.; Park, C.; Tkachev, S. N.; **O'Quinn, E.**; Shamblin, J.; Lang, M.; Mao, W. L.; Ewing, R. C. *A<sub>2</sub>TiO<sub>5</sub> (A = Dy, Gd, Er, Yb) at High Pressure*. *Inorg. Chem.* (2018)
3. Shamblin, J., Tracy C., Palomares, R.I., **O'Quinn, E.C.**, Ewing, R.C., Neuefeind, J., Feyngenson, M., Behrens, J., Trautmann, C., Lang, M., *Similar local order in disordered fluorite and aperiodic pyrochlore structures*. *Acta Mater.* **144**, 60–67 (2018).
2. Chung, C.K., Shamblin, J., **O'Quinn, E. C.**, Shelyug, A., Gussev, I., Lang, M., Navrotsky, A., *Thermodynamic and Structural Evolution of Dy<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> Pyrochlore after Swift Heavy Ion Irradiation*. *Acta Mater.* **145**:1–26 (2017)
1. **O'Quinn, E. C.**, Shamblin, J.; Perlov, B.; Ewing, R. C.; Neuefeind, J.; Feyngenson, M.; Gussev, I.; Lang, M., *Inversion in Mg<sub>1-x</sub>Ni<sub>x</sub>Al<sub>2</sub>O<sub>4</sub> Spinel: New Insight into Local Structure*. *J. Am. Chem. Soc.* **139**, 10395–10402 (2017).

## **Presentations**

*Neutron Scattering Analysis of Nuclear Materials*

February 2024

Eric O'Quinn

*International Conference and Exposition on Advanced Ceramics and Composites (ICACC) 2024, Daytona Beach, Florida, USA. (Invited Talk)*

*Investigating the Radiation Response of Oxide Materials with Neutron Scattering*

October 2023

Eric O'Quinn, Jörg Neuefeind, Clara Grygiel, Christina Trautmann, and Maik Lang  
Materials Science & Technology 2023, Columbus, Ohio, USA. (Invited Talk)

*Phase Transformations in Ceramic Materials under Extreme External Forcing*

October 2023

Eric O'Quinn, Alexandre Solomon, Casey Corbridge, and Maik Lang

Materials Science & Technology 2023, Columbus, Ohio, USA. (**Invited** Talk)

*Neutron Scattering Analysis of Nuclear Materials* September 2023  
Eric O'Quinn  
Nuclear Engineering Departmental Colloquium, University of Tennessee, Knoxville, USA

*Structural Manipulation of Ceramic Materials via Extreme Conditions* September 2023  
Eric O'Quinn and Maik Lang  
Condensed Matter Division of the European Physical Society, Milan, Italy. (**Invited** Talk)

*Characterization of Disordered Oxides with Neutron Total Scattering* October 2022  
Eric O'Quinn  
Materials Science & Technology 2022, Pittsburgh, Pennsylvania, USA. (**Invited** Talk)

*Far-From-Equilibrium Processing of Materials with Swift Heavy Ions and Mechanical Milling* October 2022  
Eric O'Quinn  
Materials Science & Technology 2022, Pittsburgh, Pennsylvania, USA. (Talk)

*Probing Short-Range Order in Disordered Crystalline Materials for Extreme Environments* October 2022  
Eric O'Quinn  
Materials Science & Technology 2022, Pittsburgh, Pennsylvania, USA. (Talk)

*Far-from-Equilibrium Processing of Materials Under Extreme Conditions* August 2022  
Eric O'Quinn and Maik Lang  
Condensed Matter Division of the European Physical Society, Manchester, United Kingdom. (**Invited** Talk)

*Multi-scale investigation of heterogeneous swift heavy ion tracks in pyrochlore oxides* June 2022  
Eric C. O'Quinn, Cameron L. Tracy, William F. Cureton, Ritesh Sachan, Joerg C. Neuefeind, Christina Trautmann, Alexandre Solomon, and Maik K. Lang  
Swift Heavy Ions in Materials 2022, Helsinki, Finland. (Talk)

*Far-from-Equilibrium Processing of Materials Under Extreme Conditions* October 2021  
Eric O'Quinn, Alexandre Solomon, Casey Corbridge, Antonio Fuentes, Maik Lang  
Materials Science & Technology 2021, Columbus, Ohio, USA. (**Invited** Talk)

*Multi-scale structural response of pyrochlore oxides to far-from-equilibrium conditions* December 2020  
Eric O'Quinn, Devon Drey, Antonio Fuentes, Gianguido Baldinozzi, Maik Lang  
MRS Fall Meeting 2020, Boston, USA (**"Hot Topic"** Talk)

*Characterizing Disordered Crystalline Materials with Pauling's Rules* November 2020  
Eric O'Quinn, Kurt Sickafus, Rodney Ewing, Gianguido Baldinozzi, Joerg Neuefeind, Matthew Tucker, Antonio Fuentes, Devon Drey, Maik Lang  
Materials Science & Technology 2020, Pittsburgh, Pennsylvania, USA. (**Invited** Talk)

*Neutron Total Scattering Analysis of Materials Prepared by Far-From Equilibrium Methods* October 2019  
Eric C. O'Quinn, J. Neuefeind, A. Fuentes, M. Tucker, M. Lang  
Materials Science & Technology 2019, Portland, Oregon, USA. (**Invited** Talk)

*The nature of amorphization and recrystallization in irradiated complex oxides* October 2018  
Eric C. O'Quinn, W. Cureton, C-K. Chung, J. Neuefeind, A. Navrotsky, M. Lang

Nuclear Materials Conference 2018, Seattle, Washington, USA. (Poster)

*Characterizing Radiation Effects with Neutron Total Scattering* July 2018  
Eric C. O'Quinn, R.I. Palomares, W. Cureton, C.L. Tracy, J. Neuefeind, C. Trautmann, R.C. Ewing, and  
M. Lang  
Swift Heavy Ions in Materials 2018, Caen, France. (Talk)

*Short-range Ordering in Spinel Oxides* April 2018  
Eric O'Quinn, Jacob Shamblin, Brandon Perlov, R.C. Ewing, Joerg Neuefeind, Igor Gussev, Maik Lang  
MRS Spring Meeting 2018, Phoenix, USA (Talk)

*Radiation-Induced Correlated Disorder and its Impact on Ionic Conductivity* August 2017  
Eric O'Quinn, Jacob Shamblin, C.K. Chung, C. Trautmann, Joerg Neuefeind,  
A. Navrotsky, Maik Lang  
2017 Joint Nanoscience and Neutron Scattering User Meeting, Oak Ridge, USA. (Poster)

*Radiation-Induced Correlated Disorder and its Impact on Ionic Conductivity* July 2017  
Eric O'Quinn, Jacob Shamblin, Joerg Neuefeind, Maik Lang  
Radiation Effects in Insulators 2017, Versailles, France. (Poster)  
Awarded Best Poster Presentation

*Characterizing Disorder in Titanate Pyrochlores* November 2016  
Eric O'Quinn, Jacob Shamblin, Maik Lang  
Materials Science of Actinides – Energy Frontier Research Center 2016, South Bend, USA. (Talk)

*Characterizing Mechanically Milled Pyrochlores with Neutron Total Scattering* October 2016  
Eric O'Quinn, Jacob Shamblin, Antonio Fuentes, Maik Lang  
Materials Science & Technology 2016, Salt Lake City, USA. (Poster)

## **Teaching**

Principles of Health Physics (substitute lecturer) - NE 233 2023  
University of Tennessee

Principles of Health Physics (substitute lecturer) - NE 433 2017-2023  
University of Tennessee

Nuclear Reactor Theory (Graduate Teaching Assistant) - NE 470 2016  
University of Tennessee

Introduction to Nuclear & Radiological Engineering (Graduate Teaching Assistant) - NE 200 2015  
University of Tennessee

## **Mentoring**

William Cureton (Ph.D.)

Jessica Bishop (Ph.D.)

Alexandre Solomon (Ph.D.)

Devon Drey (M.S.)

Patrick Huston (M.S.)

Zachary Chaney (M.S.)

Igor Gussev (M.S.)

Jacob Minnette (M.S.)

Evan Williams (M.S.)

Casey Corbridge (M.S.)

Mason King (M.S.)

John Hirtz (B.S.)

Cale Overstreet (B.S.)

Edward Fejedelem (B.S.)

## **Grants, Honors & Awards**

Navrotsky Award for Experimental Thermodynamics of Solids Co-author of “Radiation Damage and Thermal Annealing in Tunnel Structured Hollandite Materials” The American Ceramic Society	2023
Research Faculty Excellence Award Nuclear Engineering Department – University of Tennessee	2023
Outstanding Ph.D. Student Nuclear Engineering Department – University of Tennessee	2019
Graduate Student Research (SCGSR) Fellowship Department of Energy Office of Science	2018
Innovations in Nuclear Technology Research & Development Award US Department of Energy, Office of Nuclear Technology	2018
US School on Total Scattering Analysis Participant Oak Ridge National Laboratory	2017
National School on Neutron & X-ray Scattering Participant Argonne National Laboratory and Oak Ridge National Laboratory	2016
Summer Graduate Research Assistantship Fund Recipient University of Tennessee Office of Research and Engagement	2016

## **Peer Reviewing**

Chemistry of Materials	Journal of Applied Physics
Crystals	Nuclear Instruments and Methods in Physics Research, B
Electronics	Physics and Chemistry of Minerals
Frontiers in Chemistry	Quantum Beam Science

## **Graduate Coursework**

Nuclear Cross Section Modeling - NE 640  
Fundamentals of Radiation Damage in Materials - NE 540  
Radiological Assessment and Dosimetry - NE 552  
Radiation Protection - NE 551  
Broadband Dielectric Spectroscopy – CBE 691  
Solid State Physics/Structure of Matter - PHYS 555  
Fundamentals of Materials Science and Engineering - MSE 511  
Particle Accelerators: Technology and Applications - NE 588  
Isotope Production – NE 597  
Nuclear Security Science and Analysis - NE 530  
Global Nuclear Security Culture - NE 531  
Application of Linear Algebra in Engineering Systems - NE 529  
Principles of Health Physics - NE 433  
Medical Physics – NE 567  
Radiation Biology - NE 490

Nuclear Reactor Theory - NE 470  
Nuclear Fuel Cycle - NE 404

**Professional Memberships**

American Nuclear Society (ANS)  
Alpha Nu Sigma Honor Society  
American Physical Society (APS)