



# Lucas Pressley

## Education

- 2019–2022 **Ph.D.**, *Johns Hopkins University*, Baltimore, MD  
Chemistry
- 2017–2019 **M.A.**, *Johns Hopkins University*, Baltimore, MD  
Chemistry
- 2013–2017 **B.S.**, *Presbyterian College*, Clinton, SC, Summa Cum Laude  
Chemistry w/Honors, Minor in Mathematics

## Experience

- 2022–present **Postdoctoral Researcher**, *Oak Ridge National Lab*, Knoxville, TN  
Quantum Materials for Quantum Computing
- 2017–2022 **Graduate Student Researcher**, *Johns Hopkins University*, Baltimore, MD, Advisor-Tyrel M. McQueen
- Solid-state synthesis and characterization of multicomponent disordered/high entropy oxides with an emphasis on rare earth magnetism
  - Bulk crystal growth of oxides and metals of novel quantum materials such as quantum spin liquid candidates and topological Kondo Insulators using optical floating zone furnaces
  - Maintenance and training of lab members/external users on variety of lab equipment (furnaces, floating zones, TGA/DSC, etc.)
- 2016–2017 **Undergraduate Researcher**, *Presbyterian College*, Clinton, SC, Advisor-Latha Gearheart
- Synthesis and characterization of Au and Ag nanoparticles using UV-Vis Spectroscopy, Transmission Electron Microscopy, and Dynamic Light Scattering
  - Perform gel electrophoresis and fluorescence spectroscopy to analyze catalytic properties of noble metal nanoparticles on DNA relaxation

## Publications

Chae, S., **Pressley, L. A.**, Paik, H., Gim, J., Werder, D., Goodge, B. H., Kourkoutis, L. F., Hovden, R., McQueen, T. M., Kioupakis, E., (2022). "Germanium dioxide: A new rutile substrate for epitaxial film growth." in: *Journal of Vacuum Science & Technology A: Vacuum, Surfaces, and Films* 40.5, p. 050401.

**Pressley, L. A.**, Sinha, M., Vivanco, H. K., Chamorro, J., Das, S., Ramesh, R., McQueen, T. M., (2022). "Optimization of PbTiO<sub>3</sub> Single Crystals with Flux and Laser Floating Zone Method." in: *Crystal Growth & Design* 22.9, pp. 5629–5638. DOI: 10.1021/acs.cgd.2c00716.

Chamorro, J. R., Chauhan, P., Sun, C., Varnava, N., Winiarski, M. J., Ng, N., Vivanco, H. K., **Pressley, L. A.**, Pasco, C. M., Vanderbilt, D., Li, Y., Armitage, N. P., McQueen, T. M., (2021).

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in [lucas-pressley](https://www.linkedin.com/in/lucas-pressley) • [pressleylucas](https://twitter.com/pressleylucas) • [lapressle](https://github.com/lapressle)

*Anomalous Residual Surface Conductivity in a Superconductor with Strong Spin-Orbit Coupling.*  
DOI: 10.48550/ARXIV.2112.10840.

Sinha, M., Vivanco, H. K., Wan, C., Siegler, M. A., Stewart, V. J., Pogue, E. A., **Pressley, L. A.**, Berry, T., Wang, Z., Johnson, I., Chen, M., Tran, T. T., Phelan, W. A., McQueen, T. M., (2021). "Twisting of 2D Kagomé Sheets in Layered Intermetallics." in: *ACS Central Science* 7.8, pp. 1381–1390. DOI: 10.1021/acscentsci.1c00599.

Wright, C. J. ., Dooryhée, E., **Pressley, L. A.**, Phelan, W. A., Khalifah, P. G., Billinge, S. J. L., (2021). "Toward In Situ Synchrotron Mapping of Crystal Selection Processes during Crystal Growth." in: *Chemistry of Materials* 33.9, pp. 3359–3367. DOI: 10.1021/acs.chemmater.1c00602.

Berry, T., **Pressley, L. A.**, Phelan, W. A., Tran, T. T., McQueen, T. M., (2020). "Laser-Enhanced Single Crystal Growth of Non-Symmorphic Materials: Applications to an Eight-Fold Fermion Candidate." in: *Chemistry of Materials* 32.13, pp. 5827–5834. DOI: 10.1021/acs.chemmater.0c01721.

**Pressley, L. A.**, Torrejon, A., Phelan, W. A., McQueen, T. M., (2020). "Discovery and Single Crystal Growth of High Entropy Pyrochlores." in: *Inorganic Chemistry* 59.23, pp. 17251–17258. DOI: 10.1021/acs.inorgchem.0c02479.

## Presentations

2022 **American Chemical Society (ACS) Spring Meeting**, *Transition Metal Dis(order) in Single Crystal High Entropy Perovskites*

2021 **Materials Research Society Fall Meeting**, *Crystal Growth and Design of Defect Pyrochlores and Related High Entropy Oxides*

2020 **Hot Topic Talk–Cornell University**, *Guided Materials Discovery*

## Mentorship

2022 McQueen lab undergraduate researcher mentor

2019,2021 Platform for the Accelerated Realization, Analysis, and Discovery of Interface Materials (PARADIM) Research Experience for Undergraduates (REU) mentor

2019–2020 Hopkins Extreme Materials Institute (HEMI) Research and Engineering Apprenticeship Program (REAP) mentor

## Outreach/Training

2018-2022 **PARADIM Summer School for Bulk Crystal Growth**, *Group Leader*

2020 **University of Texas at Austin  $\mu$ -Computed Tomography Summer School**, *Attendee*

2019 **STEM Achievement in Baltimore Elementary Schools (SABES)**, *Volunteer*

## Teaching Experience

### Teaching Assistantship

2019 Intermediate Organic Chemistry Laboratory

2018 Applied Chemical Equilibrium and Activity Lecture and Laboratory

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2017-2018 Introductory Chemistry I/II Lecture and Laboratory

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## Reviewer

2022 Journal of Low Temperature Physics

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## Expertise

- Synthesis** Bulk solid-state synthesis, floating zone crystal growth (laser diode, Halogen, Xenon, and 300 bar furnaces), flux growth,  $\mu$ -pulling crystal growth, spark plasma sintering, laser heated pedestal growth, air-sensitive synthesis capabilities (glovebox/tube sealing), low temperature solution-based sol-gel methods
- Analysis** Powder x-ray diffraction, x-ray  $\mu$ -computed tomography, Laue diffraction for crystal alignment, physical property measurement system (PPMS), optical microscopes, scanning electron microscopy (SEM), thermogravimetric analysis/differential scanning calorimetry (TGA/DSC)
- Miscellaneous** Proficiency in fabricating pieces of scientific equipment using machine shop tools (lathe, mill, drill press, band saw, etc.), programming in Matlab and Python

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