

# Forrest Wolfgang Glines

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## CONTACT INFORMATION

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## SUMMARY

I am a sixth year doctoral student at Michigan State University, pursuing a dual PhD in Astrophysics and Computational Mathematics, Science and Engineering, and seeking post doctoral positions starting Summer 2022. My research focuses on astrophysics simulations of magnetic fields in galaxy clusters, feedback from active galactic nuclei in the intracluster medium, computational magnetohydrodynamics and relativistic hydrodynamics methods, and performance-portable multi-physics simulations of astrophysical and terrestrial plasmas using high performance computing resources.

## EDUCATION

**Michigan State University, Astronomy** **August 2016 - Present**  
*East Lansing, Michigan*  
Dual PhD in Astrophysics and Computational Mathematics, Science and Engineering

**Brigham Young University, B.S. (magna cum laude)** **April 2016**  
*Provo, Utah*  
Dual Major in Physics and Mathematics with emphasis in Applied and Computational Mathematics  
Computer Science Minor

## EXPERIENCE

**Graduate Research Assistant** **August 2016 - Present**  
*MSU Department of Physics and Astronomy*  
Developing and running multiphysics simulations of galaxy clusters with thermal and magnetic feedback from active galactic nuclei  
Developing performance-portable astrophysics codes for exascale GPU and CPU supercomputers  
Investigating the development of magnetized turbulence in astrophysical plasmas

**Graduate Student Researcher** **December 2018 - Present**  
*Sandia National Laboratory*  
Developing robust relativistic hydrodynamics methods and IMEX methods for relativistic two-fluid electrodynamics

**Teaching Assistant** **Spring 2018, Fall 2018**  
*MSU Department of Physics and Astronomy*  
Taught introduction to astronomy for non-science majors for Spring 2018  
Assisted with a graduate course on parallel computing

**Undergraduate Student Researcher** **May - August 2015, 2016**  
*Los Alamos National Laboratory*  
Developed a ray tracing radiative transfer package for a cosmology code with meshless hydrodynamics

**Research Assistant** **December 2013 - April 2016**  
*BYU Department of Physics and Astronomy*  
Developed a relativistic magnetohydrodynamics code for GPUs using CUDA

**Project Assistant** **November 2013 - April 2016**  
*BYU Department of Mathematics*  
Edited a textbook on mathematical foundations for numerical methods  
Helped write lab manuals on numerical methods using Python

## AWARDS

NCSA Blue Waters Graduate Fellowship 2019  
Michigan Institute for Plasma Science and Engineering (MIPSE) Fellowship, 2018  
MSU Distinguished Graduate Fellowship 2016  
BYU Mathematics Don Robinson Scholar 2015  
BYU Mathematics Award for Academic Excellence 2015  
BYU Heritage Scholar 2010, 2013-2015

## PUBLICATIONS

Glines, F.W., Grete, P., O'Shea, B.W. "Magnetized Decaying Turbulence in the Weakly Compressible Taylor-Green Vortex," 2021, Phys. Rev. E 103, 043203.

Prasad, D., Voit, G.M., O'Shea, B.W., Glines F.W., "Environmental Dependence of Self-regulating Black Hole Feedback in Massive Galaxies," 2020, The Astrophysical Journal, 905, 50.

Glines, F.W., O'Shea, B.W., and Voit, G.M. "Tests of AGN Feedback Kernels in Simulated Galaxy Clusters," 2020, The Astrophysical Journal 901, 117.

Grete, P., Glines, F.W., and O'Shea, B.W. "K-Athena: A Performance Portable Structured Grid Finite Volume Magnetohydrodynamics Code," 2020 IEEE Transactions on Parallel and Distributed Systems 32, 85–97.

Glines, F.W., Anderson, M., and Neilsen, D. "Scalable Relativistic High-Resolution Shock-Capturing for Heterogeneous Computing," 2015, IEEE International Conference on Cluster Computing, pp. 611–618.