# Shane McQuarrie

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## Education

**Ph.D., Computational Science, Engineering, and Mathematics** *The University of Texas*        2022

**M.S., Mathematics** *Brigham Young University*   4.00/4.00 GPA        2018
- Thesis topic: data assimilation in the Boussinesq approximation for mantle convection; final version available at https://scholarsarchive.byu.edu/etd/6951/

**B.S., Applied and Computational Mathematics** *Brigham Young University*   3.98/4.00 GPA        2016
- **Music Minor**: three-time trumpet section leader of Synthesis, BYU's premier jazz ensemble
- **Computer Science Minor**: experience with C++, Java, SQL, and C
- **Spanish Language Certificate**: advanced level, ACTFL certified

## Work Experience

**Software Systems R&D Graduate Intern** *Sandia National Laboratories*        2017
- Automated data harvesting and processing, analyzed performance of supervised learning algorithms, and researched logical inference systems for a text classification project to reduce the substantial cost of sharing sensitive information

**Developer, Manager, and Instructor** *BYU ACME Development Team*        2014–2018
- Top contributor to the project at foundations-of-applied-mathematics.github.io
- Managed several developers for final drafting of over 30 programming projects
- Instructed four 40-student Python classes on data structures, optimization, tools for statistical analysis, and machine learning techniques
- Devised a test driver framework to automate the grading process
- Designed websites and organized materials to deploy the curriculum

**Research Assistant** *BYU Mathematics Department*        2013–2016
- Knot theory with Dr. Jessica Purcell. Publication citation:
  - Bartholomew, P., McQuarrie, S., Purcell, J. S., & Weser, K. (2015). "Volume and geometry of homogeneously adequate knots." *Journal of Knot Theory and Its Ramifications*, 24(08), 1550044.
- Analysis of optimal heat flow through a rotating fluid with Dr. Jared Whitehead

## Relevant Skills and Coursework

**Applied Mathematics and Engineering**
- Numerical analysis, including linear algebra and methods for differential equations
- Theory of ordinary and partial differential equations and mathematical modeling
- Fluid mechanics, electrodynamics, quantum mechanics, and statistical mechanics
- Probability theory, statistics, machine learning algorithms and techniques
- Optimization theory and methods for unconstrained, linear, and convex problems
- Real analysis, complex analysis, and functional analysis

**Computer Programming**
- Strong experience with Python, including NumPy, SciPy, Matplotlib, pandas, etc.
- Proficient with bash, MATLAB, and git; familiar with Java, C++, SQL
- Algorithm design and complexity theory, including graph theory and search algorithms
- Data structures, databases logic, and large program design
- Program validation practices, including unit testing