Shane A. McQuarrie

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Education

2016 BS, Mathematics (applied and computational mathematics emphasis), *magna cum laude*
Minors in Computer Science and Music (trumpet performance, jazz studies)
Brigham Young University

2018 MS, Mathematics
Thesis: *Data Assimilation in the Boussinesq Approximation for Mantle Convection*
Advisor: Jared P. Whitehead, PhD
Brigham Young University

2020 MS, Computational Science, Engineering, and Mathematics
Oden Institute for Computational Engineering and Sciences, University of Texas at Austin

2022 PhD, Computational Science, Engineering, and Mathematics (expected graduation date)
Advisor: Karen E. Willcox, PhD, MNZM
Oden Institute for Computational Engineering and Sciences, University of Texas at Austin

Research Interests

My current research focuses primarily on methods for data-driven parametric model reduction, with applications in plasma physics, additive manufacturing, and rocket combustion. I am also interested in many areas of applied mathematics and scientific machine learning, especially numerical analysis, inverse problems, data assimilation, and education in the computational sciences.

Experience

2018– Directed Reading Program Mentor, *Department of Mathematics, University of Texas at Austin*

2017 Software Systems R&D Graduate Intern, *Sandia National Laboratory*

2015–2018 Lab Instructor / Teaching Assistant, *Department of Mathematics, Brigham Young University*

2014–2018 Manager / Developer, *ACME Development Team, Brigham Young University*

Awards and Honors

2018–2022 CSEM Fellowship, *Oden Institute, University of Texas at Austin*

2015–2017 Outstanding SRC Presentation Award (3), *Department of Mathematics, Brigham Young University*

2014 Language Certificate: Spanish, Advanced Level, *ACTFL*

2010–2016 Thomas S. Monson Scholarship, *Brigham Young University*

Publications

Preprints

1. McQuarrie, S. A., Huang, C., and Willcox, K. (2020). Data-driven reduced-order models via regularized operator inference for a single-injector combustion process. *arXiv preprint arXiv:2008.02862*. `github.com/Willcox-Research-Group/ROM-OpInf-Combustion-2D`

Refereed Journal Articles

2. Farhat, A., Glatt-Holtz, N. E., Martinez, V. R., McQuarrie, S. A., and Whitehead, J. P. (2020). Data assimilation in large-Prandtl Rayleigh-Bénard convection from thermal measurements. *SIAM Journal on Applied Dynamical Systems*, 19(1):510–540. `github.com/shanemcq18/DAiLPRBCfTM-Paper`

3. Bartholomew, P., McQuarrie, S. A., Purcell, J. S., and Weser, K. (2015). Volume and geometry of homogeneously adequate knots. *Journal of Knot Theory and Its Ramifications*, 24(08):1550044, 29

Software and Projects

4. Operator Inference for data-driven, non-intrusive model reduction of dynamical systems.
`github.com/Willcox-Research-Group/rom-operator-inference-Python3`

5. Labs for the Foundation of Applied Mathematics curriculum.
`github.com/Foundations-of-Applied-Mathematics/Labs`

Other Publications

6. McQuarrie, S. A. (2018). Data assimilation in the Boussinesq approximation for mantle convection. Master's thesis, Brigham Young University

7. McQuarrie, S. A., Garcia, A. X., and Spomer, J. E. (2017). Information extraction and logical inference for derivative classifier assistance. Technical report, Sandia National Lab (SNL-NM), Albuquerque, NM (United States)