Benjamin Daniel

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(703) 577-9516

Education

Ph.D., Applied Mathematics, North Carolina State University — Expected 2025
Advisor: Hangjie Ji

M.S., Applied Mathematics, North Carolina State University, 3.804 GPA — 2020

B.S., Mathematics, James Madison University — 2018

Research Interests

Numerical analysis, neural ODEs, data-driven modeling, machine learning, numerical linear algebra, and randomized algorithms

Research Experience

Graduate Student Researcher, North Carolina State University — 2021 – Present
Advisor: Hangjie Ji
Funded in part by NSF grant DMS-2309774

- Studies fiber coating systems using data-driven techniques and neural ODEs
- Modifies neural ODEs to enforce constrained quantities

Graduate Student Researcher, North Carolina State University — 2019 – 2021
Advisors: Ilse Ipsen and Arvind Saibaba
Funded in part by NSF Grant DMS-1745654

- Investigated efficient randomized algorithms for column subset selection
- Developed bounds to quantify the accuracy of randomized algorithms

Papers

Structural-Preserving Neural ODEs for Fiber Coating Dynamics — (in preparation)

Presentations

Rank Revealing QR Factorizations, — July 2020
Randomized Numerical Analysis RTG, NC State University,

Randomized Rank-Revealing QR Factorizations, — Oct 2020
Graduate Student Numerical Analysis Seminar, NC State University

An Efficient Randomized Algorithm for Rank-Revealing QR Factorizations, Apr 2021
Graduate Student Numerical Analysis Seminar, NC State University

Analyzing a Randomized Algorithm for Rank-Revealing QR Factorizations, Sep 2021
Graduate Student Numerical Analysis Seminar, NC State University

Posters

A New Analysis for Randomized Rank-Revealing QR Factorizations, Mar 2021
SIAM Conference on Computational Science and Engineering, Virtual

Teaching Experience

North Carolina State University 2018 – Present

MA 121: Elements of Calculus, Summer 2023 (Instructor of Record, 10 students)
MA 241: Calculus II, Fall 2022 (Instructor of Record, 100 students)
MA 121: Elements of Calculus, Summer 2021 (Instructor of Record, 10 students)
MA 241: Calculus I, Summer 2021 (Instructor of Record, 10 students)
MA 241: Calculus II, Spring 2022 (Instructor of Record, 60 students)
MA 141: Calculus I, Fall 2021 (Instructor of Record, 110 students)
MA 241: Calculus II, Spring 2020 (Recitation Leader)
MA 242: Calculus III, Fall 2019 (Recitation Leader)
MA 141: Calculus I, Summer 2019 (Recitation Leader)
MA 341: Applied Differential Equations I, Spring 2019 (Lecture Assistant)
MA 107: Precalculus I, Fall 2018 (Lecture Assistant)

Professional Memberships

Society for Industrial and Applied Mathematics (SIAM)
American Mathematical Society (AMS)

Graduate Courses: Linear Transformations and Matrix Theory, Analysis, Mathematical Modeling of Physical and Biological Processes, Numerical Analysis, Probability and Stochastic Processes, Partial Differential Equations, Data-Driven Modeling and Analysis of Dynamical Systems, Inverse Problems, Matrix Methods in Data Science and Scientific Computing