**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