

John Darges

CONTACT INFORMATION

North Carolina State University
Department of Mathematics
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INTERESTS

General:

Scientific computing; inverse problems; uncertainty quantification; machine learning

Specific:

Sensitivity analysis; surrogate-based methods for uncertainty quantification; Bayesian non-linear inverse problems; approximation of high-dimensional model; randomized numerical linear algebra and approximation

EDUCATION

North Carolina State University, Raleigh, NC, USA

Ph.D., Mathematics, Expected 2024

Co-advisors: Alen Alexanderian and Pierre A. Gremaud

Committee members: Ralph C. Smith and Xu Wu

M.S., Mathematics 2020

University of North Carolina, Chapel Hill, NC, USA

B.S., Mathematics, 2017

B.A., Chemistry, 2017

TEACHING

Department of Mathematics, North Carolina State University, Raleigh, NC, USA

Graduate Instructor: MA 511 (Advanced Calculus I) **Fall 2020**

Graduate Instructor: MA 241 (Calculus II) **Summer 2020**

Teaching Assistant: MA 131 (Calculus for Life and Management Sciences A) **Spring 2020**

Teaching Assistant: MA 241 (Calculus II) **Fall 2019**

Department of Chemistry, University of North Carolina, Chapel Hill, NC, USA

Teaching Assistant: CHEM 101L (Introductory Chemistry Lab I) **May 2016 to June 2016**

EMPLOYMENT

Department of Mathematics, North Carolina State University, Raleigh, NC, USA

Research Assistant **Spring 2021 to Present**

Grader: MA 231H (Calculus for Life and Management Sciences B) **Spring 2019**

Grader: MA 351 (Discrete Mathematics) **Fall 2018**

Avioq, Inc., Durham, NC, USA

Contractor **February 2018 to August 2018**

Department of Chemistry, University of North Carolina, Chapel Hill, NC, USA

Undergraduate Researcher

August 2014 to May 2016

Lab Technician

August 2013 to May 2014

PUBLICATIONS *Variance-based sensitivity of Bayesian inverse problems to the prior distribution.* John Darges, Alen Alexanderian, Pierre A. Gremaud. Submitted 2023.

Extreme learning machines for variance-based global sensitivity analysis. John Darges, Alen Alexanderian, Pierre A. Gremaud. Submitted 2023.

PRESENTATIONS **Seminar Talk**

Randomized function approximation. North Carolina State University, Raleigh, NC, USA. Applied Mathematics Graduate Student Seminar. November 2023.

Seminar Talk

Variance-based sensitivity of Bayesian inverse problems to the prior distribution. North Carolina State University, Raleigh, NC, USA. Research Training Group Seminar. October 2023.

Seminar Talk

Identifying important prior hyperparameters in Bayesian inverse problems with efficient variance-based global sensitivity analysis. North Carolina State University, Raleigh, NC, USA. Applied Mathematics Graduate Student Seminar. April 2023.

Poster Talk

Extreme learning machines for variance-based global sensitivity analysis. RAI Amsterdam Convention Center, Amsterdam, Netherlands. SIAM Conference on Computational Science and Engineering. March 2023.

Invited Talk

Extreme learning machines for variance-based global sensitivity analysis. Walter E. Washington Convention Center, Washington, D.C., USA. Joint Statistical Meetings. August 2022.

Poster Talk

Extreme learning machines for variance-based global sensitivity analysis. Florida State University, Tallahassee, FL, USA. Conference on Sensitivity Analysis of Model Output (SAMO). March 2022.

**SERVICE
ACTIVITIES**

North Carolina Science Olympiad **2023**

Member of volunteer team running and scoring competition events

Association of Women in Mathematics **2022**

Volunteered at educational workshops to encourage and foster young women's interest in mathematical sciences

Math Doesn't Bug Me **2019**

Volunteered at mathematics outreach events by helping participants solve mathematics-related games and puzzles and explaining the mathematics involved

Alpha Chi Sigma

2015 to 2017

Volunteered at science outreach events by demonstrating and helping participants conduct chemistry experiments. Provided tutoring services to primary school students

Centro Para Familias Hispanas

2012 to 2013

Tutored students in elementary school level mathematics, science, and language arts

MEMBERSHIPS Society for Industrial and Applied Mathematics (SIAM), American Mathematical Society (AMS), American Statistical Association (ASA)

SKILLS Python, MATLAB, LaTeX

LANGUAGES English, Spanish