

HIGHLIGHTED SKILLS

Data-Driven Experience

- **Applications to Plasma** - ideal MHD, particle-in-cell (PIC), Hall MHD, Direct Simulation Monte Carlo (DSMC)
- **Machine Learning** - sparse regression, template matching, neural networks (PyTorch and TensorFlow)
- **Reduced Order Models** - SVD based representations, fluid approximations

Computing

- **Language Skills** - C++, Python, MATLAB, Fortran, Bash
- **High Performance Computing** - parallelization, distributed systems, version control

EXPERIENCE

Los Alamos National Laboratory

Applied Mathematics and Plasma Physics

Postdoctoral Research Associate

Los Alamos, NM

Oct 2025 - Present

- High Energy Density Plasma (HEDP) Research
- State-of-the-art coupled radiation kinetic plasma codes as well as radiation hydrodynamic codes

Michigan State University

Computational Mathematics, Science, and Engineering

Graduate Assistant

East Lansing, MI

Aug 2020 - Oct 2025

- Apply and develop sparse-regression methods for plasma simulations
- Mentor beginning graduate students on code development, distributed systems, and data analysis tools

Sandia National Laboratories

Radiation & ICF Target Design

Graduate Research and Development Intern

Albuquerque, NM

May 2021 - Sep 2025

- Training of surrogate models based on post-processed simulation data sets using machine learning algorithms
- Creating fast, high fidelity surrogate models of expensive simulations used to optimize experimental configurations

Wright State University (in Association with Air Force Research Labs)

Summer Intern

Dayton, OH

Summers 2017 - 2020

- Develop educational program to teach K12 students about code `sensorcraft.org`
- Apply computer vision techniques to data from varied domains

University of Michigan

Electrical Engineering and Computer Science

Multidisciplinary Design Program

Ann Arbor, MI

Academic Year 2017

- Helped develop centralized analysis code for variety of satellite data formats
- Implemented image processing techniques

EDUCATION AND HONORS

Michigan State University

Computational Mathematics, Science, and Engineering

PhD, Expected Completion August 2025

GPA: 3.9/4.0

Aug 2020 - Aug 2025

- Dissertation Completion Fellowship
- Michigan Institute for Plasma Science and Engineering Fellow
- Engineering Distinguished Scholarship

Fall 2024

Academic Year 2022

Academic Year 2020

University of Michigan

Physics and Computer Science

Bachelor of Science

GPA: 3.7/4.0

Sep 2015 - Dec 2019

- University Honors
- James B. Angell Scholar

PUBLICATIONS

Quantifying Hall Conductivity using Data-Driven Model Identification

Vasey G., Bennett N., Welch D., Watson E.

In preparation

Data-Driven Recovery of Fluid Plasma Closures from Particle Simulation Data

Vasey G., Christlieb A., O'Shea B.

In preparation

Influence of initial conditions on data-driven model identification and information entropy for ideal mhd problems

Gina Vasey, Daniel Messenger, David Bortz, Andrew Christlieb, Brian O'Shea

Mar 2025

Journal of Computational Physics, Volume 524 (Peer Reviewed)

<https://www.sciencedirect.com/science/article/pii/S0021999125000026>

Developing and applying quantifiable metrics for diagnostic and experiment design on Z

William E Lewis, Patrick F Knapp, Kristian Beckwith, Evstati Evstatiev, Jeffrey Fein, Christopher Jennings, Roshan Joseph, Brandon Klein, Kathryn Maupin, Taisuke Nagayama, Ravi Patel, Marc-Andre Schaeuble, Gina Vasey, David J Ampleford

Nov 2023

Technical SAND Report (Not peer reviewed)

<https://doi.org/10.2172/2335899>

PRESENTATIONS

Quantifying Hall Conductivity of the Inner MITL on Z

Pulsed Power and Plasma Science Conference

Berlin, Germany

June 2025

Quantifying Hall Conductivity using Data-Driven Model Identification

American Physical Society Division of Plasma Physics

Atlanta, GA

Oct 2024

Data-Driven Recovery of Hammett-Perkins Closure from Particle Data

Z Fundamental Science Workshop

Albuquerque, NM

Aug 2024

Learning Plasma Fluid Equation via Data-Driven Model Identification

NRT Scientific Machine Learning Workshop

East Lansing, MI

Mar 2024

Successes and Challenges Using a Data-Driven Model Selection Algorithm on Plasma Simulations

Z Fundamental Science Workshop

Albuquerque, NM

Aug 2023

Successes and Challenges Using a Data-Driven Model Selection Algorithm on Plasma Simulations

Dense Z-Pinch Conference

Ann Arbor, MI

Jul 2023

POSTERS

Data-Driven Recovery of Hammett-Perkins Closure from Particle Data

American Physical Society Division of Plasma Physics

Atlanta, GA

Oct, 2024

Influence of Initial Conditions on Data-Driven Model Identification for Ideal MHD Test Problems

International Conference on Data-Driven Plasma Science

Berkeley, CA

Aug, 2024

Influence of Initial Conditions on Data-Driven Model Identification for Ideal MHD Test Problems

International Conference on Plasma Science

Santa Fe, NM

May, 2023

Identifying Governing ODEs in Irregular Physical Domain with Diffusion

American Physical Society Division of Plasma Physics

Spokane, WA

Oct 2022

HIGHLIGHTED COURSE WORK

My studies have covered high performance computing on CPUs and GPUs, theory and applications for machine learning, numerical methods and theory for simulating PDEs, and generalized as well as plasma specific physics.

Computer Science

- CMSE 822: Parallel Computing *Fall 2020*
- CMSE 890: Applied Machine Learning *Spring 2022*
- CSE 847: Machine Learning *Spring 2023*

Physics

- Physics 405: Intermediate Electricity and Magnetism *Winter 2018*
- Physics 453: Quantum Mechanics *Winter 2018*
- Physics 406: Statistical and Thermal Physics *Fall 2018*
- ECE 850: Electrodynamics of Plasmas *Spring 2021*

Applied Math

- CMSE 820: Mathematical Foundations of Data Science *Fall 2020*
- CMSE 821: Numerical Methods for Differential Equations *Spring 2021*
- CMSE 823: Numerical Linear Algebra *Spring 2021*
- CMSE 890: Hyperbolic Conservation Laws *Spring 2023*