

## HIGHLIGHTED SKILLS

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### 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

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### Los Alamos National Laboratory

Applied Mathematics and Plasma Physics

Los Alamos, NM

Oct 2025 - Present

*Postdoctoral Research Associate*

- 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

East Lansing, MI

Aug 2020 - Oct 2025

*Graduate Assistant*

- 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

Albuquerque, NM

May 2021 - Sep 2025

*Graduate Research and Development Intern*

- 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)

Dayton, OH

*Summer Intern*

Summers 2017 - 2020

- Develop educational program to teach K12 students about code [sensorcraft.org](http://sensorcraft.org)
- Apply computer vision techniques to data from varied domains

### University of Michigan

Electrical Engineering and Computer Science

Ann Arbor, MI

Academic Year 2017

*Multidisciplinary Design Program*

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

## EDUCATION AND HONORS

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### Michigan State University

Computational Mathematics, Science, and Engineering

GPA: 3.9/4.0

Aug 2020 - Aug 2025

*PhD, Expected Completion August 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

GPA: 3.7/4.0

Sep 2015 - Dec 2019

*Bachelor of Science*

- University Honors
- James B. Angell Scholar

## PUBLICATIONS

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### 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

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### 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

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### 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**

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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*