

# Sara Ichinaga

I am an applied mathematician with extensive experience with data analysis, mathematical modeling, and machine learning. I am interested in developing data-driven algorithms and software for applications across various scientific and engineering disciplines.

Department of Applied Mathematics  
University of Washington, Seattle  
(253)335-4132  
sarami7@uw.edu  
[sichinaga.github.io](https://sichinaga.github.io)  
[github.com/sichinaga](https://github.com/sichinaga)  
[linkedin.com/in/sara-ichinaga](https://linkedin.com/in/sara-ichinaga)

## SUMMARY OF QUALIFICATIONS

- Ph.D. candidate in applied mathematics with a focus on algorithm development for data-driven modeling.
- Python expert with experience developing software packages and collaborating on open-source code.
- Experience presenting high-level mathematics and machine learning concepts to various audiences.

## EDUCATION

**Ph.D. in Applied Mathematics**, GPA 3.92/4.0, University of Washington, Seattle, WA

**Expected June 2026**

**M.S. in Applied Mathematics**, GPA 3.87/4.0, University of Washington, Seattle, WA

**Dec 2022**

**B.S. in Applied and Computational Mathematical Sciences**,

**June 2021**

GPA 3.94/4.0, Magna Cum Laude, University of Washington, Seattle, WA

## RELEVANT COURSEWORK

- (CSE 414) Database Systems
- (CSE 546) Machine Learning
- (CSE 547) Machine Learning for Big Data
- (AMATH 515) Optimization: Fundamentals and Applications
- (AMATH 582) Computational Methods for Data Analysis
- (AMATH 584) Numerical Linear Algebra

## SELECTED PROFESSIONAL EXPERIENCE

**Graduate Research and Teaching Assistant** to Dr. J. Nathan Kutz and Dr. Steven L. Brunton  
**Department of Applied Mathematics, University of Washington**

**Sept 2021-Present**  
**Seattle, WA**

- Developed two noise-robust methodological extensions of the dynamic mode decomposition (DMD) algorithm: (1) sparse-mode DMD for learning spatially local and global structures from time-varying snapshot data, and (2) mrCOSTS for decomposing multi-scale data into dominant frequency components.
- Formulating new noise-robust methods for DMD with control (DMDc) by utilizing the weak form of the differential equation. Investigating methods by examining data from real-world material heating scenarios.
- Developer and maintainer for the open-source Python package PyDMD: <https://github.com/PyDMD/PyDMD>.
- Teaching assistant for ENGR 510, an introductory machine learning course for engineering professionals.

**Computational Software Development Graduate Student Intern**  
**National Renewable Energy Laboratory (NREL)**

**June 2025-Sept 2025**  
**Golden, CO**

- Developed PyRidge, an NREL Python package for data-driven surrogate modeling, active subspace learning, and parameter dimension reduction via ridge function approximation: <https://github.com/NREL/PyRidge>.
- Applied PyRidge to NREL data sets and determined under-sampled regions of design parameter space.
- Developed optimization formulations beyond what was currently being used at NREL, including active subspace optimization over multiple output functions for learning shared active subspaces.

## SELECTED PUBLICATIONS AND PREPRINTS

- [Sara M. Ichinaga](#), Steven L. Brunton, Aleksandr Y. Aravkin, and J. Nathan Kutz. "Sparse-mode dynamic mode decomposition for disambiguating local and global structures." *In review, SIAM Journal on Applied Dynamical Systems*. 2025. [\[preprint\]](#)
- [Sara M. Ichinaga](#), Francesco Andreuzzi, Nicola Demo, Marco Tezzele, Karl Lapo, Gianluigi Rozza, Steven L. Brunton, and J. Nathan Kutz. "PyDMD: A Python package for robust dynamic mode decomposition." *JMLR*. 2024. **25**(417):1-9. [\[paper\]](#) [\[long version on arXiv\]](#)
- Karl Lapo, [Sara M. Ichinaga](#), and J. Nathan Kutz. "A method for unsupervised learning of coherent spatiotemporal patterns in multi-scale data." *PNAS*. 2024. **122**(7):e2415786122. [\[paper\]](#)

## TECHNICAL SKILLS

**Coding Languages:** Python (expert), MATLAB, Bash, Java, SQL, R

**Python Libraries:** NumPy, Matplotlib, SciPy, PyTorch, Scikit-Learn, Pandas, CVXPY, PyTest

**Technologies:** Git/GitHub, Jupyter, Anaconda, LaTeX, Microsoft Azure