

Kayla Bollinger

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EDUCATION

Carnegie Mellon University – Pittsburgh, PA

Ph.D., Applied Mathematics

May 2022

Relevant Coursework:

- Deep Learning, Methods of Optimization, Computational Linear Algebra

California State University Long Beach – Long Beach, CA

Post-Baccalaureate Coursework, Applied Mathematics

Aug 2015 – May 2017

B.S., Physics, *Summa Cum Laude*, Robert D. Rhodes Award

May 2015

SKILLS

Programming

Python (PyTorch, scikit-learn, NumPy, Matplotlib, Plotly), MATLAB, \LaTeX

Machine Learning Methods

Supervised learning methods (neural networks and random feature methods),
Unsupervised learning methods (dimensionality reduction and sparse representation),
Regularization techniques

RELEVANT WORK EXPERIENCE

CMU Department of Mathematical Sciences

Graduate Researcher

Aug 2020 – May 2022

- Designed a neural network based alternating minimization algorithm and a random feature based algorithm to learn a reduced order model for applications in multiple scientific domains such as aerospace engineering, fluid dynamics, weather prediction, and wind turbine design
- Developed a Python package to implement these models utilizing a combination of original code and several Python machine learning/data science frameworks such as PyTorch, scikit-learn, and NumPy
- Experimentally demonstrated the robustness of these models in the data scarce setting—a regime not typically well suited for standard machine learning models
- Published (co-authored with academic advisor Hayden Schaeffer) and presented “Reduced Order Modeling Using Shallow ReLU Networks” at the 2021 Conference on Mathematical and Scientific Machine Learning

Research Mentor

Jun 2020 – Aug 2020

- Mentored 4 undergraduate research students for CMU’s “Summer Experiences in Mathematical Sciences” through weekly check-in meetings to resolve any problems and to advise them on possible next steps
- Trained students by discussing best practices for using neural networks towards successfully modeling dynamical systems and further guided them on other project tasks such as creating usable datasets and clearly presenting results

Lead Teaching Assistant

Aug 2019 – Dec 2019, Jan 2019 – May 2019

- Designed lessons and led weekly sessions for CMU’s “Integration and Approximation” recitations to supplement and support content learned in lecture
- Supervised 5-7 Teaching Assistants to ensure a standardized recitation experience for ~140 students

LEADERSHIP EXPERIENCE

CMU Association for Women in Mathematics Chapter

Co-President/Founder

Aug 2018 – May 2022

- Established CMU’s first AWM chapter to support underrepresented minorities interested in mathematics by hosting talks, panels, informational seminars, and social gatherings

CMU Graduate Student Assembly

Department Representative

Aug 2018 – May 2022

- Advocated for graduate student rights at the local, state, and federal level by communicating issues affecting higher education directly to congressional staffers on Capitol Hill
- Further supported graduate students’ well being by organizing social events throughout each academic year