Ashley K. W. Warren

Cascade, CO
Personal Website | LinkedIn | GitHub | Tableau Portfolio
ashleykwwarren@gmail.com

Summary

Mathematics PhD with over 10 years of experience researching, teaching, and mentoring. Certified in data science and data visualization with completed projects in machine learning, including a top 18% ranking in a Kaggle competition. Strengths: presenting complex topics in an aesthetic, approachable way to diverse stakeholders; compiling code; higher mathematics; leadership.

Skills & Certifications

- **Data science:** Python (2 yrs), SQL (1 yr), machine learning (scikit-learn, XGBoost, PyTorch), data preprocessing and feature engineering, predictive modeling, time series, model evaluation metrics.
- **Software engineering:** VS Code, GitHub, data structures and algorithm design principles, command line interface (CLI) and bash scripting.
- **Data analysis/presentation:** matplotlib, pandas, Tableau (1 yr), LaTeX (Beamer, PlainTeX, BibTeX).
- **Web technologies:** HTML/CSS, JavaScript (d3.js), Markdown (for documentation).
- **Statistical analysis:** R/RStudio, inferential statistics methodologies, hypothesis testing protocols, confidence interval calculations.
- **Other:** Fluent in English. Objective- and efficiency-driven. Thrives both independently and in teams. Able to delegate tasks to achieve overall success within prescribed timelines.
- **Certifications:** Data science, Erdös Institute [certificate]. Data visualization, Erdös Institute [certificate].

Selected Data Projects

Housing Prices [link] **Dec 2024 - Jan 2025**

- Kaggle competition to predict housing prices given 79 features. First submission ranked in the 82nd percentile out of over 28,000 submissions.
- Performed feature engineering like imputing, scaling, and multiple correspondence analysis (MCA) using Python's pipeline objects.
- Tested 5 models: linear regression, elastic net with polynomial regression, random forest, adaptive boosting, extreme gradient boosting, neural network (2 linear layers with a leaky ReLu activation function).

2024 Election Forecast [link] **Oct - Nov 2024**

- Forecasted the outcome of the 2024 U.S. presidential election with scikit-learn's double exponential smoothing algorithm applied to selected polling data from fivethirtyeight.com.

Media Bias vs. Reliability [link] **Sep 2024**

- Scraped ∼800 media ratings from Ad Fontes Media with requests and Beautiful Soup. Plotted media reliability as a function of left wing or right wing bias in Tableau.

Do-nothing Congress [link] **May - Jun 2024**

- Aggregated data with Python on over 15,000 bills introduced in the 118th Congress, then predicted which bills would become law. Algorithm outperformed the baseline of 99.6% accuracy.

Ashley's FitBit Stats [link] **Apr 2023**

- Cleaned one year's worth of FitBit data, stored in separate files and formats for each date, with Python.
- In 11 days learned enough d3.js to create a dashboard displaying the impact of daily exercise on sleep and resting heart rate.

Leadership

Mentor **ICERM *(Providence, RI)*** **Jun 2024 (FT)**

- Institute for Computational and Experimental Research in Mathematics (ICERM), Roots of Unity. Mentored 30 graduate students of color who were women, non-binary, and/or gender fluid.
- Guided the students through two classic papers on Gorenstein rings over a period of four days. Recommended community-standard background literature.
- Fostered a culture that students reported as validative and inclusive for members of traditionally underrepresented groups to discuss mathematics.

Teaching Assistant [certificate] **Erdös Institute *(Online)*** **May 2023 (PT)**

- Data science boot camp. Supervised daily problem sessions with machine learning exercises using Python.

Research Mentor **Georgia Institute of Technology *(Atlanta, GA)*** **May - Jul 2022 (FT)**

- Georgia Tech Research Experience for Undergraduates (REU). Selected three students from over 500 applicants to contribute to a research program on toric ideals.
- Conducted weekly professional development seminars for all participants (∼30). Provided direct instruction and original templates for writing technical papers, preparing slide shows, and making posters using LaTeX. Controlled the $2000 budget for the participants' recreational activities (pizzas, museum visits).
- Presented the results at Joint Math Meetings 2023, attracting the attention of grad school recruiters; the most senior participant is now a PhD student at UC Berkeley.

Research Mentor **SLMath *(Berkeley, CA)*** **Jun - Jul 2016 (FT)**

- Simons Laufer Mathematical Sciences Institute (SLMath), formerly Mathematical Sciences Research Institute Undergrad Program (MSRI-UP). Directed a summer research project for ∼30 minoritized students.
- Produced and presented over 200 group theory slides, up through the classification theorem for finitely generated abelian groups, with an introduction to sandpile groups. Over 50 exercises with full solutions.
- Published *The sandpile group of a thick cycle graph* with four coauthors [Arxiv version].

Work Experience

Visiting Assistant Professor (VAP) **Centre College *(Danville, KY)*** **Aug 2023 - Aug 2024 (FT)**

- Intro to stats with R, ∼140 students. Mathematics in society, 11 students. Assigned a final regression study to include on a data science resumé. Debugged students' code with MS Excel and R commands. Facilitated and mediated group activities.
- Increased the department's statistics problem bank for automated quizzes and exams by 10% using the course management system Moodle's syntax for randomized questions.
- Addressed the problem of faculty frequently running out of lecture time by cutting the department's shared materials down 25% and typing all of the solutions.

VAP **Georgia Institute of Technology *(Atlanta, GA)*** **Aug 2021 - May 2023 (FT)**

- Intro and intermediate linear algebra, ∼100 students each. Graduate level commutative algebra, ∼20 students. Compiled a list of canon literature from which students could choose a final project topic.
- Managed the website for the weekly faculty algebra seminar, invited ∼30 outside speakers, gave two talks.

VAP **Mount Holyoke College *(South Hadley, MA)*** **Jul 2018 - Jun 2021 (FT)**

- Women's college. Calc I-III, abstract algebra, discrete math, ∼30 students each. Produced over 350 lecture slides for the pandemic era SY. Recorded pre-lecture videos and conducted virtual synchronous instruction five times a week.
- Collaborated with two other authors to publish *Geometric equations for matroid varieties* [Arxiv version].
- Advised the William Lowell Putnam Math Competition (Putnam) team. Top MHC score: 10 (∼ top 33% nationwide; national average: 0). Invited to judge the HackHolyoke 24-hour hackathon, over 50% of participants identifying as women.

VAP **James Madison University *(Harrisonburg, VA)*** **Aug 2017 - May 2018 (FT)**

- Calc I-II and linear algebra with differential equations, ∼30 students each. Learned and taught students SageMath commands for visualizing solutions to differential equations.

VAP **University of Arkansas *(Fayetteville, AR)*** **Aug 2014 - May 2017 (FT)**

- Calc I-III, survey of calculus, discrete math, 50-100 students each. Transcribed over 600 calculus slides using LaTeX to overcome MS Powerpoint's limitations for properly formatting math equations and graphics.
- Maintained a professional website including pages for 7 different courses using custom source code.
- Advised and recruited students for the Putnam team. Top UArk score: 26 (top < 20% nationwide).

Education

PhD, Mathematics **University of Michigan *(Ann Arbor, MI)*** **May 2014**

- *Ideals generated by principal minors*, under Mel Hochster. Solving systems of polynomial equations. Published in two parts: Arxiv version of [part 1] and [part 2].
- Embedded MS, Mathematics, 2011.
- Primary instructor for 6 calculus sequence courses ranging from pre-calculus to differential equations.

BS, Mathematics **Kansas State University *(Manhattan, KS)***

- Minor in Physics.
- McNair Scholar: *Symplectic topology of Hamiltonian systems with one degree of freedom*, under Ricardo Castaño-Bernard. Designed and taught a quantitative reasoning GRE prep course to the McNair scholars at my university.
- Nominee, Barry Goldwater Scholarship.
- 19 (∼ top 20% nationwide), Putnam. Earned Fung's Achievement Award for attaining the highest score at my university.