# Ashley K. W. Warren

Cascade, CO

[Website](#) | [LinkedIn](#) | [GitHub](#) | [Tableau](#)

ashleykwwarren@gmail.com

## Summary

Mathematics PhD with over 10 years of experience researching, teaching, and mentoring. Certified in data science and data visualization, with additional 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 sklearn's double exponential smoothing algorithm applied to polling data from fivethirtyeight.com.

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

- Scraped ~800 media ratings from Ad Fontes Media with Python. 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 ($\sim$30). 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 graduate school recruiters for the most senior participant.

**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 $\sim$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, $\sim$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, $\sim$100 students each. Graduate level commutative algebra, $\sim$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 $\sim$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, $\sim$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: 10/120 (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, $\sim$30 students each. 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 seven different courses using custom source code.
- Advised and recruited students the Putnam Math Competition. Top UArk score: 26/120.

## 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.

**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.
- Nominee, Barry Goldwater Scholarship.