

# Ashley K. W. Warren

Cascade, CO

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

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## Summary

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Math PhD with over 10 years of experience researching, mentoring, and teaching. 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; leadership; higher mathematics.

## Skills & Certifications

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- **Data science:** Python (2 yrs), SQL (1 yr), machine learning (sklearn, XGBoost, PyTorch), data preprocessing and feature engineering, predictive modeling, time series, model evaluation metrics.
- **Software engineering:** GitHub, data structures/algorithm design principles, command line interface (CLI) and bash scripting.
- **Data analysis/presentation:** Tableau (1 yr),  $\LaTeX$  (Beamer, PlainTeX, BibTeX).
- **Web technologies:** HTML/CSS, JavaScript (d3.js), Markdown (documentation), YAML configuration files.
- **Statistical analysis:** R/RStudio, inferential statistics methodologies, hypothesis testing protocols, confidence interval calculations.
- **Other:** Fluent in English. Objective- and efficiency-oriented. Thrives both independently and in teams.
- **Certifications:** Data science, Erdős Institute [\[certificate\]](#). Data visualization, Erdős Institute [\[certificate\]](#).

## Selected Data Projects

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### Housing Prices [\[link\]](#)

December 2024 - January 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 pipelines.
- Models tested: 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 [\[link\]](#)

October - November 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 [\[link\]](#)

September 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 - June 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 [\[link\]](#)

April 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

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### Mentor

ICERM (*Providence, RI*)

June 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 validating and inclusive for members of traditionally underrepresented groups to discuss mathematics.

### Teaching Assistant [\[certificate\]](#)

Erdős 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 - July 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). 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)**    **June - July 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

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

- Intro to stats, ~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)**                      **August 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)**                      **August 2018 - May 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: 10/120 (national average: 0). Invited to judge the HackHolyoke 24-hour hackathon (over 50% of participants identifying as women).

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

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

**VAP**    **University of Arkansas (Fayetteville, AR)**                      **August 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

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**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.