

Christopher Donnay

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SUMMARY

Recent mathematics PhD from Ohio State specializing in data science and statistical modeling. Demonstrated experience in solving high-impact problems with technical solutions and designing, implementing, and validating statistical models in Python. Strong ability to manage projects, communicate high-level mathematics to non-technical audiences, and provide actionable insights. Seeking a position as a data scientist.

SKILLS & CERTIFICATIONS

- **Languages & Platforms:** Python, SQL, C++, Docker, S3, Lambda, HPC & Slurm, Bash, GitHub, QGIS, Mathematica, LaTeX, Svelte(kit), Sphinx, Markdown.
- **Python libraries:** Jupyter, NetworkX, NumPy, (Geo)Pandas, Poetry, scikit-learn, uv.
- **Mathematics:** Markov chains, graphs and networks, data science, probability, statistics, machine learning, topology, combinatorics, topological data analysis, discrete geometry, gerrymandering, voting methods.
- **Certifications:** The Erdős Institute Data Science Boot Camp.
- **Soft skills:** Leadership, self-motivation, project management, (science) communication, problem solving, open source collaboration, attention to detail, teaching.

EXPERIENCE

Data and Democracy Lab, Cornell University

Lab Manager

Remote

January 2025 - Present

- Lead a team of six contributors to `VoteKit` (votekit.readthedocs.io), the Lab's Python package for statistical modeling and election analytics. Design, prototype, evaluate, and implement new statistical models of voter behavior.
- Product manage the development and public release of `Districtr 2.0` (beta.districtr.org), a browser-based geospatial app for drawing legislative districts, with a remote team of five full-stack developers. Ensure that app is robust and scalable.

Research Scientist

January 2024 - January 2025

- Created a model of redistricting plans in Michigan, collecting data from public and private sources in order to balance different metrics of partisanship with the Voting Rights Act. Results were communicated to the advocacy group `Voters Not Politicians` to influence creation of new legislative maps for the Michigan Supreme Court case *Agee v. Benson*.
- Advised non-profits, like `More Equitable Democracy`, and academics on translating community needs into measurable questions suited for technical models and best practices for modeling, statistical analysis, and simulation of elections.

SELECTED PROJECTS

- **"3:1 Nesting Rules in Redistricting"**: Studied the impact of a particular redistricting rule on gerrymandering in Ohio and Wisconsin. Coded a novel algorithm in Python using Markov chain methods, preprocessed geospatial and electoral data, and validated the model using mixing heuristics and other benchmarking. Was invited to present at the SIAM Annual Meeting, July 2022, and is in revisions with the journal *Statistics and Public Policy*.
- **"Portland, OR 2024 City Council Election Analysis"**: Provided Python support to an analysis of the recent STV election in Portland, including processing of ballots with `pandas`, analysis of the election using `VoteKit`, developing visualizations with `matplotlib`, and explaining the code in a `Jupyter` notebook. Showed that dominant media narratives about ballot errors by people of color were misguided. White paper available at megg.org/ppm.
- **"Predicting the Winner of the Great British Baking Show"**: Trained supervised learning models using `scikit-learn`—regression, random forest, k-nearest neighbors, and Naive Bayes—to predict winners and uncover key drivers of success in GBBS. Presented to a panel of industry experts at the Erdős Institute Data Science Bootcamp, who specifically highlighted our team's clear communication of modeling limitations and results. Awarded first place.

EDUCATION

The Ohio State University
The Ohio State University
University of Pennsylvania
Pomona College

PhD Mathematics, December 2024
MS Mathematics, May 2024
MS Education, May 2020
BA Mathematics, May 2018