

Christopher Donnay

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SUMMARY

I am a mathematician specializing in the application of mathematics and data science to democratic systems. I have experience developing and coding models of electoral outcomes, finding and cleaning election results, Census data, and voter files, and communicating results to advise political advocacy groups on proposed policy and voter outreach strategies. I am seeking a position as a data scientist.

SKILLS & CERTIFICATIONS

- **Languages & Platforms:** Python, C++, SQL, Slurm, Bash, GitHub, QGIS, Mathematica, LaTeX.
- **Python libraries:** jupyter, networkx, numpy, (geo)pandas, poetry, scikit-learn, uv.
- **Mathematics:** Markov chains, graphs and networks, data science, probability, combinatorics, discrete geometry, gerrymandering, computational social choice, voting methods, ecological inference/regression.
- **Certifications:** The Erdős Institute Data Science Boot Camp.
- **Soft skills:** Leadership, project management, clarity, science communication, problem solving, open source collaboration.

EXPERIENCE

Data and Democracy Lab, Cornell University

Lab Manager

Remote

January 2025 - Present

- Lead a team of six contributors to **VoteKit**, the Lab's Python package for modeling and analyzing elections. Plan for the stable continuation of the package and implement speed improvements and organizational refactorings.
- Manage the development and successful 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. Coordinate communication between the development team and the PI. Facilitate the addition of new features and improve user experience.
- Design, write, and execute training experiences for collaborators and partner organizations, including a 3-day workshop in modeling alternative systems of election, a 6-session program in statistical inference of polarized voting run by the Southern Poverty Law Center, and Python tutorials of the Lab's software.

Research Scientist

January 2024 - January 2025

- Developed and maintained the codebase, as well as produced documentation, for **VoteKit**. Was the top contributor on GitHub with over 450 commits.
- Conducted computational research on the Voting Rights Act, polarized voting, and election modeling using Python, geospatial data, and voter files. Results were used to inform the efforts of political advocacy groups in three states.
- Communicated and presented modeling results to community groups, academics, non-profits, and technical stakeholders.

SELECTED PROJECTS

- **“VoteKit: A Python package for computational social choice research”:** Together with Lab employees, developed an end-to-end Python package for modeling and analyzing elections, which is available on PyPI. The package is used by academics for research and grassroots organizations for modeling democratic system reform. A summary of the package appeared in the *Journal of Open Source Software*, May 2025.
- **“Portland, OR 2024 STV Election Analysis”:** Provided Python support to an analysis of the recent STV election in Portland, including processing of the cast vote record with **pandas**, analysis of the ballots using **VoteKit**, developing visualizations with **matplotlib**, and explaining the code in an interactive **jupyter** notebook. Presented findings at five invited seminars and conferences in the spring of 2025. White paper available at mggg.org/ppm.

EDUCATION

The Ohio State University

PhD Mathematics, December 2024

The Ohio State University

MS Mathematics, May 2024

University of Pennsylvania

MS Education, May 2020

Pomona College

BA Mathematics, May 2018