

Reformat portfolio section layout

Exported on 9/13/2025 at 13:21:28 EDT from Cursor (1.5.11)

User

please reformat the index.html file so that in the portfolio section, we remove the three column format. instead, make it two columns, where the main body of each project appears above the skills used section in one column, and the image appears in the other column. alternate the images left to right.

Cursor

I'll help you reformat the portfolio section in your index.html file. Let me first read the current file to understand the structure and then make the requested changes.

Now I'll create a todo list to track the changes needed and then implement the reformatting:

Now I'll implement the reformatting. I'll start with the VoteKit section and work through each project, alternating the image placement as requested:

```
<!DOCTYPE html>
<html lang="en">
<head>

  <title>Christopher Donnay</title>

  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=Edge">
  <meta name="description" content="">
  <meta name="keywords" content="">
  <meta name="author" content="Tooplate">
  <meta name="viewport" content="width=device-width, initial-scale=1,
maximum-scale=1">

  <link rel="stylesheet" href="css/bootstrap.min.css">
  <link rel="stylesheet" href="css/all.min.css">
  <link rel="stylesheet" href="css/owl.carousel.min.css">
  <link rel="stylesheet" href="css/owl.theme.default.min.css">

  <!-- MAIN CSS -->
  <link rel="stylesheet" href="css/tooplate-ben-resume-style.css">

  <!-- Custom link styling for about and portfolio sections -->
  <style>
    #about a, #portfolio a {
      color: #3182ce !important;
      text-decoration: underline !important;
    }
  </style>
```

```

        #about a:hover, #portfolio a:hover {
            color: #2b6cb0 !important;
            text-decoration: underline !important;
        }
    </style>
<!--
Tooplate 2120 Ben Resume
https://www.tooplate.com/view/2120-ben-resume
-->
</head>

<body data-spy="scroll" data-target="#navbarNav" data-offset="50">

    <!-- MENU BAR -->
    <nav class="navbar navbar-expand-lg sticky-top">
        <div class="container">

            <a class="navbar-brand" href="#">
                Christopher Donnay
            </a>

            <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav" aria-
expanded="false" aria-label="Toggle navigation">
                <span class="navbar-toggler-icon"></span>
            </button>

            <div class="collapse navbar-collapse" id="navbarNav">
                <ul class="navbar-nav mx-auto">
                    <li class="nav-item">
                        <a href="#about" class="nav-link
smoothScroll">About Me</a>
                    </li>

                    <li class="nav-item">
                        <a href="#portfolio" class="nav-link
smoothScroll">Portfolio</a>
                    </li>

                    <li class="nav-item">
                        <a href="#contact" class="nav-link
smoothScroll">Contact</a>
                    </li>
                </ul>

                <div class="mt-lg-0 mt-3 mb-4 mb-lg-0">
                    <a href="files/CDonnay Resume.pdf" class="custom-btn
btn" target="_blank">Download Resume</a>
                </div>
            </div>
        </div>
    </nav>

```

```

<!-- HERO -->
<section class="hero d-flex flex-column justify-content-center align-items-center" id="intro">

    <div class="container">
        <div class="row about-third">

            <div class="mx-auto col-lg-5 col-md-5 col-10">
                
            </div>

            <div class="d-flex flex-column justify-content-center align-items-center col-lg-7 col-md-7 col-12">
                <div class="hero-text">

                    <h1 class="hero-title">Christopher Donnay</h1>

                    <a href="mailto:christopherdonnay@gmail.com" class="email-link">
                        christopherdonnay@gmail.com
                    </a>

                </div>
            </div>

        </div>
    </div>
</section>

<section class="about section-padding" id="about">
    <div class="container">
        <div class="row">

            <div class="col-lg-6 col-md-6 col-12">
                <h3 class="mb-4">About me</h3>

                <p>Chris Donnay is currently the lab manager for
                    <a rel="nofollow" href="https://www.mggg.org" target="_blank">the Data and Democracy Lab</a>
                    at Cornell University.
                    As lab manager, he has extensive experience
                    translating
                    real-world problems into technical solutions for non-
                    profits and advocacy groups.
                    He has a knack for communicating high-level
                    mathematics to a wide range
                    of audiences, with a focus on clarity and actionable
                    insights.
                    He got his PhD in mathematics from the Ohio State
                    University,

```

where he studied data science, probability, and statistical modeling, with applications to redistricting and voting. Chris also holds a Master's of Science in education from the University of Pennsylvania, where he was a high school math and computer science teaching fellow.

</p>

</div>

<!-- Todo, edit the bounding box -->

<div class="col-lg-5 mx-auto col-md-6 col-12">

</div>

</div>

</div>

</section>

<section class="portfolio section-padding" id="portfolio">

<div class="container">

<div class="row">

<div class="col-12">

<h3 class="mb-4">Portfolio</h3>

<p>Below are a smattering of Chris' past research projects, which include

data science and modeling projects for democracy non-profits and advocacy groups,

applications and Python libraries for civic good,

as well as more traditional mathematical research

projects.

</p>

</div>

</div>

<!-- VoteKit Section -->

<div class="row about-third mb-5">

<div class="col-lg-8 col-md-8 col-12">

<h4>VoteKit</h4>

<p>

<a rel="nofollow"

href="https://github.com/mggg/VoteKit" target="_blank">VoteKit is

a one-stop shop for all things election modeling in

Python. With an end-to-end pipeline for

constructing ballots, running elections, and

analyzing outcomes, VoteKit seeks to be a tool

for academics, researchers, and practitioners alike.

</p>

<p>

Chris is the principal developer, manages the other open source contributors,

```

        writes <a rel="nofollow"
href="https://votekit.readthedocs.io/en/latest/"
target="_blank">documentation and tutorials,</a>
        and designs, prototypes, evaluates, and
        implements new features for the package.
    </p>

    <p>
        Read about more about VoteKit in the
        <a rel="nofollow"
href="https://joss.theoj.org/papers/10.21105/joss.07477"
target="_blank">Journal of Open Source Software.</a>
    </p>

    <h4>Skills Used</h4>
    <ul>
        <li>Python</li>
        <li>Package management: PyPI, Poetry</li>
        <li>Statistical modeling</li>
        <li>Documentation: Sphinx, Jupyter, Markdown</li>
        <li>Open source software: GitHub</li>
    </ul>
</div>
<div class="col-lg-4 col-md-4 col-12">
    <figure>
        
        <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
            A plot showing how different models of ballot
generator perform with respect
            to proportionality under an STV election,
generated by VoteKit.
        </figcaption>
    </figure>
</div>
</div>

<!-- The VRA in Michigan Section -->
<div class="row about-third mb-5">
    <div class="col-lg-4 col-md-4 col-12">
        <figure>
            
            <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
                A restricted area around Detroit where we
focused our efforts on improving partisanship.
                We refer to this as a "partial scramble", where
we fix the rest of the state and
                only pertub this area.

```

```
        </figcaption>
      </figure>
    </div>
    <div class="col-lg-8 col-md-8 col-12">
      <h4>The Voting Rights Act in Michigan</h4>
      <p>
        In 2024, Michigan's legislative maps were struck down
        as being in violation of the Voting Rights Act in
        the Michigan Supreme Court case Agee v. Benson.
        When it came time to create new maps, the advocacy
        group Voters Not Politicians
        asked us to help them model ways to balance different
        metrics of partisanship with the Voting Rights Act.
      </p>
      <p>
        Chris created a model of redistricting plans in
        Michigan, collecting data from
        public and private sources in order to produce maps
        that balanced different metrics of partisanship
        with the Voting Rights Act.
        The results of our study influenced the creation of
        the new legislative maps
        used as a remedy for the case.</p>

      <p>
        While the non-technical summary for Voters Not
        Politicians is not publicly available,
        you can read <a href="files/Sampling Problems in
        Legislative Redistricting.pdf" target="_blank">the technical report</a>
        which was included in Chris' thesis.
      </p>

      <h4>Skills Used</h4>
      <ul>
        <li>Geospatial data: Census, electoral</li>
        <li>Markov chains: optimization, sampling</li>
        <li>Technical solutions for political advocacy</li>
        <li>Technical communication with non-technical
        audiences</li>
        <li>Statistical modeling</li>
      </ul>
    </div>
  </div>

  <!-- Portland OR STV Analysis Section -->
  <div class="row about-third mb-5">
    <div class="col-lg-8 col-md-8 col-12">
      <h4>STV City Council Election in Portland, OR 2024</h4>
      <p>In November of 2024, Portland, OR held their first
        city council election
        with a single-transferable-vote (STV) system,
        electing 12 council members
        across 4 districts. There was concern about how STV
        might impact the ability
```

of communities of color to participate in the process.

</p>

<p>

Chris provided Python support to a

post-mortem study of the election, including processing of ballots with <code>pandas</code>, analysis of the election using <code>VoteKit</code>, developing visualizations with <code>matplotlib</code>, and explaining the code in a <code>Jupyter</code> notebook.

The results showed that dominant media narratives about ballot errors by people of color were misguided, and that STV actually helped increase representation of communities of color.

</p>

<h4>Skills Used</h4>

Data cleaning: pandas

Data visualization: matplotlib

Statistical analysis: VoteKit

Python

Non-technical communication

</div>

<div class="col-lg-4 col-md-4 col-12">

<figure>

<figcaption style="text-align: center; font-size: 0.9em; margin-top: 0.5em;">

Understanding how similar candidates are in an STV election.

Candidate pairs (i,j) that are more green show a kind of "mutual boosting",

where if candidate j appears on a ballot, candidate i is more likely to appear on a ballot as well.

This reveals a slate of candidates (Avalos, Routh, Dunphy, and Ender) who all mutually boost.

</figcaption>

</figure>

</div>

</div>

<!-- The Great British Baking Show Section -->

<div class="row about-third mb-5">

<div class="col-lg-4 col-md-4 col-12">

<figure>

```

        
        <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
            Freddy? Is that you?
        </figcaption>
    </figure>
</div>
<div class="col-lg-8 col-md-8 col-12">
    <h4>Predicting Bake Off Winners</h4>
    <p>
        As part of the Erdős Institute Data Science Bootcamp,
Chris and his team
        trained supervised learning models using
        <code></code>scikit-learn</code>-regression, random
forest, k-nearest neighbors, and Naive Bayes-
        to predict winners and uncover key
drivers of success in the Great British Baking Show.
        Ultimately, they found that the most important factor
in predicting winners
        was performance in the technical challenges
(receiving a handshake
        from Paul Hollywood turned out to be far less
predictive than hoped!).
    </p>
    <p>
        At the end of the bootcamp, they <a
href="https://docs.google.com/presentation/d/1I0hSqWn0BLEwysViAbwRr-
Zx7bJyoMH4HexAY2kCEHo/edit?usp=sharing"
        target="_blank">presented their results</a>
        to a panel of industry experts,
who specifically highlighted the team's clear
communication of modeling
        limitations and results. They were awarded first
place.</p>

    <h4>Skills Used</h4>
    <ul>
        <li>Data collection and cleaning</li>
        <li>Machine Learning: KNN, Random Forest, Naive
Bayes, Regression</li>
        <li>Statistical analysis</li>
        <li>Technical communication</li>
        <li>Python: scikit-learn</li>
        <li>Data visualization: matplotlib</li>
    </ul>
</div>
</div>

<!-- Districtr 2.0 -->
<div class="row about-third mb-5">
    <div class="col-lg-8 col-md-8 col-12">
        <h4>Districtr 2.0</h4>
        <p>

```

```

        <a rel="nofollow" href="https://beta.districtr.org"
target="_blank">Districtr</a> is a web-based tool for creating
        districting plans. After many years of faithful
        service, Districtr 1.0 was retired and replaced with Districtr 2.0.
        Districtr is used by many localities as their official
        submission tool for the redistricting process.

```

```

    </p>

```

```

    <p>
        Chris was the product manager the development and
        public release of Districtr 2.0
        with a remote team of five full-stack developers.
        Together with his team, Chris ensured that the app was
        robust and scalable,
        that there was smooth communication between the dev
        team and the PI,
        and that the app was easy to use and understand.
    </p>

```

```

    <h4>Skills Used</h4>

```

- ```

 Project management
 Non-technical communication
 Full stack development
 Geospatial data


```

```

</div>

```

```

 <div class="col-lg-4 col-md-4 col-12">

```

```

 <figure>

```

```



```

```

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">

```

```

 A map module for drawing Pennsylvania's
 congressional districts in Districtr 2.0.

```

```

 </figcaption>

```

```

 </figure>

```

```

 </div>

```

```

</div>

```

```

<!-- 3:1 nesting -->

```

```

 <div class="row about-third mb-5">

```

```

 <div class="col-lg-4 col-md-4 col-12">

```

```

 <figure>

```

```



```

```

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">

```

```

 This histogram shows how the number of seats won by
 Democrats in the Ohio Senate varies based on the bias of the
 underlying House map. While the underlying House
 map is incredibly biased,

```

the distribution of seats won by Democrats in the Senate does not separate as widely.

</figcaption>

</figure>

</div>

<div class="col-lg-8 col-md-8 col-12">

<h4>3:1 Nesting Rules in Redistricting</h4>

<p>

A nesting rule is a rule that requires that a senate district be composed of adjacent house districts.

Ohio and Wisconsin have 3:1 nesting rules (3 house districts per senate district).

How does this affect the space of feasible plans? How does this affect the ability of a map-maker to gerrymander?

</p>

<p>

Chris implemented a novel algorithm for generating plans that satisfy a 3:1 nesting rule

in Python using Markov chain methods. He validated his model using different mixing heuristics

and statistical tests. He found that while 3:1 nesting has little impact on the

number of seats won by a party in comparison to unnested plans, it does

curtail the impact of gerrymandered house maps and the ability to gerrymander more broadly.

</p>

<p>

Chris' paper is in revisions with the journal Statistics and Public Policy.

Read the <a href="files/3\_1\_nesting.pdf" target="\_blank">preprint here.</a>

</p>

<h4>Skills Used</h4>

<ul>

<li>Python</li>

<li>Technical communication</li>

<li>Markov chains</li>

<li>Geospatial data</li>

</ul>

</div>

</div>

<!-- Asymptotics of Redistricting Section -->

<div class="row about-third mb-5">

<div class="col-lg-8 col-md-8 col-12">

<h4>Asymptotics of Redistricting</h4>

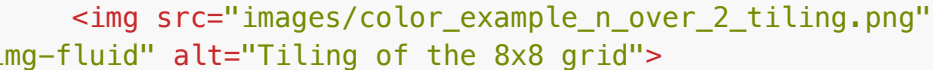
While much of Chris' work has been focused on applications of statistical models and data science, his PhD is technically in theoretical mathematics, and he has a particular interest in combinatorics. This project was part of his PhD dissertation, and is set to appear in the American Mathematical Monthly, which is a prestigious journal known for its high standards of writing.

How many ways are there to redistrict an  $n \times n$  grid into  $n$  districts? How does this grow with  $n$ ? What can this tell us about the shape of a typical district? This mathematical research explores the combinatorial properties of redistricting and their implications for understanding gerrymandering. We find that the number of maps grows exponentially in  $n^2$ , and that a random districting plan is likely to be highly non-compact.

Read the [preprint here](files/Asymptotics of Redistricting.pdf).

#### Skills Used

- Combinatorics
- Asymptotic analysis
- Technical communication



A completed redistricting plan for the 8x8 grid (equivalent to a tiling!).

This completion is part of an algorithm that generates a lower bound on the number of possible redistricting plans for the 8x8 grid.

```

<section class="contact section-padding pt-0" id="contact">
 <div class="container">

 <div class="mx-auto col-lg-4 col-md-6 col-12">
 <h3 class="my-4 pt-4 pt-lg-0">
 Say hello!
 </h3>

 <ul class="social-links mt-2">
 <a href="mailto:christopherdonnay@gmail.com"
rel="noopener" class="fas fa-envelope">
 <a href="https://www.linkedin.com/in/christopher-d-
b1466b82" rel="noopener" class="fab fa-linkedin">
 <a href="https://github.com/cdonnay" rel="noopener"
class="fab fa-github">

 <p class="copyright-text mt-5 pt-3">Copyright © 2020 Ben
Resume Page</p>

 <p>Design: <a href="https://www.tooplate.com" title="free
HTML templates" target="_blank">Tooplate</p>
 </div>
 </div>
</section>
<!-- SCRIPTS -->
<script src="js/jquery.min.js"></script>
<script src="js/bootstrap.min.js"></script>
<script src="js/smoothscroll.js"></script>
<script src="js/owl.carousel.min.js"></script>
<script src="js/custom.js"></script>

</body>
</html>

```

Now let me update the todo list to mark the completed tasks:

Let me check for any linting errors in the updated file:

Perfect! I've successfully reformatted the portfolio section in your `index.html` file. Here's a summary of the changes I made:

## Changes Made:

1. **Converted from 3-column to 2-column layout:** Each project now uses `col-lg-8` and `col-lg-4` instead of three `col-lg-4` columns.

## 2. Alternating image placement as requested:

- **VoteKit**: Content + skills (left), image (right)
- **Michigan VRA**: Image (left), content + skills (right)
- **Portland STV**: Content + skills (left), image (right)
- **Baking Show**: Image (left), content + skills (right)
- **District 2.0**: Content + skills (left), image (right)
- **3:1 Nesting**: Image (left), content + skills (right)
- **Asymptotics**: Content + skills (left), image (right)

## 3. Combined content and skills: The main project description and the "Skills Used" section are now in the same column, with the skills appearing below the main content.

## 4. Maintained responsive design: The layout will still work well on mobile devices with the existing Bootstrap classes.

The layout now provides a cleaner, more streamlined appearance with better visual balance between text content and images, while alternating the image placement to create visual interest as you scroll through the portfolio.

---

### User

Please do the following:

- vertically center the images in their columns
- change the font of the skills used sections and image captions to match the body font
- change the captions of the figures to be right aligned
- change the figure bounding boxes to have sharp corners instead of rounded edges

---

### Cursor

I'll help you make those styling changes. Let me first examine the current CSS file to understand the existing styles, then implement the requested changes.

Now I'll create a todo list and implement the requested styling changes:

Now I'll add the custom CSS styles to the existing style section in the HTML file to implement all the requested changes:

```
<!DOCTYPE html>
<html lang="en">
<head>

 <title>Christopher Donnay</title>

 <meta charset="UTF-8">
 <meta http-equiv="X-UA-Compatible" content="IE=Edge">
 <meta name="description" content="">
 <meta name="keywords" content="">
 <meta name="author" content="Tooplate">
```

```
<meta name="viewport" content="width=device-width, initial-scale=1,
maximum-scale=1">

<link rel="stylesheet" href="css/bootstrap.min.css">
<link rel="stylesheet" href="css/all.min.css">
<link rel="stylesheet" href="css/owl.carousel.min.css">
<link rel="stylesheet" href="css/owl.theme.default.min.css">

<!-- MAIN CSS -->
<link rel="stylesheet" href="css/tooplate-ben-resume-style.css">

<!-- Custom link styling for about and portfolio sections -->
<style>
 #about a, #portfolio a {
 color: #3182ce !important;
 text-decoration: underline !important;
 }

 #about a:hover, #portfolio a:hover {
 color: #2b6cb0 !important;
 text-decoration: underline !important;
 }

 /* Portfolio section customizations */
 /* Vertically center images in their columns */
 #portfolio .col-lg-4 {
 display: flex;
 flex-direction: column;
 justify-content: center;
 }

 /* Change skills used sections to match body font */
 #portfolio h4 {
 font-family: var(--base-font-family);
 font-weight: var(--font-weight-light);
 color: var(--dark-color);
 }

 #portfolio ul {
 font-family: var(--base-font-family);
 font-size: var(--p-font-size);
 font-weight: var(--font-weight-light);
 color: var(--p-color);
 letter-spacing: 0.3px;
 line-height: 2em;
 }

 /* Change image captions to match body font and right align */
 #portfolio figcaption {
 font-family: var(--base-font-family) !important;
 font-size: var(--p-font-size) !important;
 font-weight: var(--font-weight-light) !important;
 color: var(--p-color) !important;
 letter-spacing: 0.3px !important;
 }
```

```

 line-height: 1.5em !important;
 text-align: right !important;
 }

 /* Remove rounded corners from images */
 #portfolio .about-image {
 border-radius: 0 !important;
 }
</style>
<!--
Tooplate 2120 Ben Resume
https://www.tooplate.com/view/2120-ben-resume
-->
</head>

<body data-spy="scroll" data-target="#navbarNav" data-offset="50">

 <!-- MENU BAR -->
 <nav class="navbar navbar-expand-lg sticky-top">
 <div class="container">

 Christopher Donnay

 <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav" aria-
expanded="false" aria-label="Toggle navigation">

 </button>

 <div class="collapse navbar-collapse" id="navbarNav">
 <ul class="navbar-nav mx-auto">
 <li class="nav-item">
 <a href="#about" class="nav-link
smoothScroll">About Me

 <li class="nav-item">
 <a href="#portfolio" class="nav-link
smoothScroll">Portfolio

 <li class="nav-item">
 <a href="#contact" class="nav-link
smoothScroll">Contact

 <div class="mt-lg-0 mt-3 mb-4 mb-lg-0">
 <a href="files/CDonnay Resume.pdf" class="custom-btn
btn" target="_blank">Download Resume
 </div>
 </div>
 </div>
 </nav>

```

```

 </div>
 </nav>

 <!-- HERO -->
 <section class="hero d-flex flex-column justify-content-center align-items-center" id="intro">

 <div class="container">
 <div class="row about-third">

 <div class="mx-auto col-lg-5 col-md-5 col-10">

 </div>

 <div class="d-flex flex-column justify-content-center align-items-center col-lg-7 col-md-7 col-12">
 <div class="hero-text">

 <h1 class="hero-title">Christopher Donnay</h1>

 <a href="mailto:christopherdonnay@gmail.com"
class="email-link">
 christopherdonnay@gmail.com

 </div>
 </div>

 </div>
 </div>
 </section>

 <section class="about section-padding" id="about">
 <div class="container">
 <div class="row">

 <div class="col-lg-6 col-md-6 col-12">
 <h3 class="mb-4">About me</h3>

 <p>Chris Donnay is currently the lab manager for
 <a rel="nofollow" href="https://www.mggg.org"
target="_blank">the Data and Democracy Lab
 at Cornell University.
 As lab manager, he has extensive experience
 translating
 real-world problems into technical solutions for non-
 profits and advocacy groups.
 He has a knack for communicating high-level
 mathematics to a wide range
 of audiences, with a focus on clarity and actionable

```

insights.

He got his PhD in mathematics from the Ohio State University, where he studied data science, probability, and statistical modeling, with applications to redistricting and voting. Chris also holds a Master's of Science in education from the University of Pennsylvania, where he was a high school math and computer science teaching fellow.

&lt;/p&gt;

&lt;/div&gt;

&lt;!-- Todo, edit the bounding box --&gt;

&lt;div class="col-lg-5 mx-auto col-md-6 col-12"&gt;



&lt;/div&gt;

&lt;/div&gt;

&lt;/div&gt;

&lt;/section&gt;

&lt;section class="portfolio section-padding" id="portfolio"&gt;

&lt;div class="container"&gt;

&lt;div class="row"&gt;

&lt;div class="col-12"&gt;

&lt;h3 class="mb-4"&gt;Portfolio&lt;/h3&gt;

Below are a smattering of Chris' past research projects, which include

data science and modeling projects for democracy non-profits and advocacy groups, applications and Python libraries for civic good, as well as more traditional mathematical research projects.

&lt;/p&gt;

&lt;/div&gt;

&lt;/div&gt;

&lt;!-- VoteKit Section --&gt;

&lt;div class="row about-third mb-5"&gt;

&lt;div class="col-lg-8 col-md-8 col-12"&gt;

&lt;h4&gt;VoteKit&lt;/h4&gt;

&lt;p&gt;

[VoteKit](https://github.com/mggg/VoteKit) is a one-stop shop for all things election modeling in Python. With an end-to-end pipeline for constructing ballots, running elections, and analyzing outcomes, VoteKit seeks to be a tool for academics, researchers, and practitioners alike.

&lt;/p&gt;

```

 <p>
 Chris is the principal developer, manages the other
open source contributors,
 writes <a rel="nofollow"
href="https://votekit.readthedocs.io/en/latest/"
target="_blank">documentation and tutorials,
 and designs, prototypes, evaluates, and
 implements new features for the package.
 </p>

```

```

 <p>
 Read about more about VoteKit in the
 <a rel="nofollow"
href="https://joss.theoj.org/papers/10.21105/joss.07477"
target="_blank">Journal of Open Source Software.
 </p>

```

#### Skills Used

- Python
- Package management: PyPI, Poetry
- Statistical modeling
- Documentation: Sphinx, Jupyter, Markdown
- Open source software: GitHub

```

</div>

```

```

<div class="col-lg-4 col-md-4 col-12">

```

```

 <figure>

```

```



```

```

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">

```

```

 A plot showing how different models of ballot
generator perform with respect
 to proportionality under an STV election,
generated by VoteKit.

```

```

 </figcaption>

```

```

 </figure>

```

```

</div>

```

```

</div>

```

```

<!-- The VRA in Michigan Section -->

```

```

<div class="row about-third mb-5">

```

```

 <div class="col-lg-4 col-md-4 col-12">

```

```

 <figure>

```

```



```

```

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">

```

```

 A restricted area around Detroit where we
focused our efforts on improving partisanship.

```

We refer to this as a "partial scramble", where we fix the rest of the state and only perturb this area.

</figcaption>  
</figure>  
</div>  
<div class="col-lg-8 col-md-8 col-12">  
<h4>The Voting Rights Act in Michigan</h4>  
<p>  
In 2024, Michigan's legislative maps were struck down as being in violation of the Voting Rights Act in the Michigan Supreme Court case Agee v. Benson. When it came time to create new maps, the advocacy group Voters Not Politicians asked us to help them model ways to balance different metrics of partisanship with the Voting Rights Act.  
</p>  
<p>  
Chris created a model of redistricting plans in Michigan, collecting data from public and private sources in order to produce maps that balanced different metrics of partisanship with the Voting Rights Act. The results of our study influenced the creation of the new legislative maps used as a remedy for the case.</p>  
  
<p>  
While the non-technical summary for Voters Not Politicians is not publicly available, you can read <a href="files/Sampling Problems in Legislative Redistricting.pdf" target="\_blank">the technical report</a> which was included in Chris' thesis.  
</p>  
  
<h4>Skills Used</h4>  
<ul>  
<li>Geospatial data: Census, electoral</li>  
<li>Markov chains: optimization, sampling</li>  
<li>Technical solutions for political advocacy</li>  
<li>Technical communication with non-technical audiences</li>  
<li>Statistical modeling</li>  
</ul>  
</div>  
</div>  
  
<!-- Portland OR STV Analysis Section -->  
<div class="row about-third mb-5">  
<div class="col-lg-8 col-md-8 col-12">  
<h4>STV City Council Election in Portland, OR 2024</h4>  
<p>In November of 2024, Portland, OR held their first city council election with a single-transferable-vote (STV) system,

electing 12 council members  
across 4 districts. There was concern about how STV  
might impact the ability  
of communities of color to participate in the  
process.

</p>

<p>

Chris provided Python support to a

<a rel="nofollow" href="https://mggg.org/PPM"

target="\_blank">

post-mortem study</a> of the election,

including processing of ballots with

<code>pandas</code>, analysis of the election using <code>VoteKit</code>,&br/>developing visualizations with

<code>matplotlib</code>, and explaining the code in a <code>Jupyter</code>  
notebook.

The results showed that dominant media

narratives about ballot errors by people of color

were misguided, and that STV actually

helped increase representation of communities of

color.

</p>

<h4>Skills Used</h4>

<ul>

<li>Data cleaning: pandas</li>

<li>Data visualization: matplotlib</li>

<li>Statistical analysis: VoteKit</li>

<li>Python</li>

<li>Non-technical communication</li>

</ul>

</div>

<div class="col-lg-4 col-md-4 col-12">

<figure>



<figcaption style="text-align: center; font-size:  
0.9em; margin-top: 0.5em;">

Understanding how similar candidates are in an  
STV election.

Candidate pairs (i,j) that are more green show  
a kind of "mutual boosting",

where if candidate j appears on a ballot,  
candidate i is more likely to appear on a ballot as well.

This reveals a slate of candidates (Avalos,  
Routh, Dunphy, and Ender) who all

mutually boost.

</figcaption>

</figure>

</div>

</div>

<!-- The Great British Baking Show Section -->

```

<div class="row about-third mb-5">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 Freddy? Is that you?
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>Predicting Bake Off Winners</h4>
 <p>
 As part of the Erdős Institute Data Science Bootcamp,
Chris and his team
 trained supervised learning models using
 <code></code>scikit-learn</code>-regression, random
forest, k-nearest neighbors, and Naive Bayes-
 to predict winners and uncover key
drivers of success in the Great British Baking Show.
 Ultimately, they found that the most important factor
in predicting winners
 was performance in the technical challenges
(receiving a handshake
 from Paul Hollywood turned out to be far less
predictive than hoped!).
 </p>
 <p>
 At the end of the bootcamp, they <a
href="https://docs.google.com/presentation/d/1I0hSqWn0BLEwysViAbwRr-
Zx7bJyoMH4HexAY2kCEHo/edit?usp=sharing"
 target="_blank">presented their results
 to a panel of industry experts,
 who specifically highlighted the team's clear
communication of modeling
 limitations and results. They were awarded first
place.</p>

 <h4>Skills Used</h4>

 Data collection and cleaning
 Machine Learning: KNN, Random Forest, Naive
Bayes, Regression
 Statistical analysis
 Technical communication
 Python: scikit-learn
 Data visualization: matplotlib

 </div>
</div>

<!-- Districtr 2.0 -->
<div class="row about-third mb-5">

```

```

<div class="col-lg-8 col-md-8 col-12">
 <h4>Districtr 2.0</h4>
 <p>
 <a rel="nofollow" href="https://beta.districtr.org"
target="_blank">Districtr is a web-based tool for creating
 districting plans. After many years of faithful
 service, Districtr 1.0 was retired and replaced with Districtr 2.0.
 Districtr is used by many localities as their official
 submission tool for the redistricting process.

 </p>

 <p>
 Chris was the product manager the development and
 public release of Districtr 2.0
 with a remote team of five full-stack developers.
 Together with his team, Chris ensured that the app was
 robust and scalable,
 that there was smooth communication between the dev
 team and the PI,
 and that the app was easy to use and understand.
 </p>

 <h4>Skills Used</h4>

 Project management
 Non-technical communication
 Full stack development
 Geospatial data

</div>
<div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A map module for drawing Pennsylvania's
 congressional districts in Districtr 2.0.
 </figcaption>
 </figure>
</div>
</div>

<!-- 3:1 nesting -->
<div class="row about-third mb-5">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 This histogram shows how the number of seats won by

```

Democrats in the Ohio Senate varies based on the bias of the underlying House map. While the underlying House map is incredibly biased, the distribution of seats won by Democrats in the Senate does not separate as widely.

</figcaption>

</figure>

</div>

<div class="col-lg-8 col-md-8 col-12">

<h4>3:1 Nesting Rules in Redistricting</h4>

<p>

A nesting rule is a rule that requires that a senate district be composed of adjacent house districts.

Ohio and Wisconsin have 3:1 nesting rules (3 house districts per senate district).

How does this affect the space of feasible plans? How does this affect the ability of a map-maker to gerrymander?

</p>

<p>

Chris implemented a novel algorithm for generating plans that satisfy a 3:1 nesting rule

in Python using Markov chain methods. He validated his model using different mixing heuristics

and statistical tests. He found that while 3:1 nesting has little impact on the

number of seats won by a party in comparison to unnested plans, it does

curtail the impact of gerrymandered house maps and the ability to gerrymander more broadly.

</p>

<p>

Chris' paper is in revisions with the journal Statistics and Public Policy.

Read the <a href="files/3\_1\_nesting.pdf" target="\_blank">preprint here.</a>

</p>

<h4>Skills Used</h4>

<ul>

<li>Python</li>

<li>Technical communication</li>

<li>Markov chains</li>

<li>Geospatial data</li>

</ul>

</div>

</div>

<!-- Asymptotics of Redistricting Section -->

```

<div class="row about-third mb-5">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>Asymptotics of Redistricting</h4>
 <p>While much of Chris' work has been focused on
applications of statistical models
 and data science, his PhD is technically in
theoretical mathematics, and he has a particular interest in combinatorics.
 This project was part of his PhD dissertation, and is
set to appear in the American Mathematical Monthly,
 which is a prestigious journal known for its high
standards of writing.
 </p>
 <p>
 How many ways are there to redistrict an $n \times n$ grid
into n districts? How does this grow with n ?
 What can this tell us about the shape of a typical
district? This mathematical research
 explores the combinatorial properties of
redistricting and their implications for
 understanding gerrymandering. We find that the number
of maps grows exponentially
 in n^2 , and that a random districting plan is likely to
be highly non-compact.</p>

 <p>
 Read the <a href="files/Asymptotics of
Redistricting.pdf" target="_blank">preprint here.
 </p>

 <h4>Skills Used</h4>

 Combinatorics
 Asymptotic analysis
 Technical communication

 </div>
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A completed redistricting plan for the 8x8 grid
(equivalent to a tiling!).
 This completion is part of an algorithm that
generates a lower bound
 on the number of possible redistricting plans
for the 8x8 grid.
 </figcaption>
 </figure>
 </div>
</div>
</div>
</section>

```

```

<section class="contact section-padding pt-0" id="contact">
 <div class="container">

 <div class="mx-auto col-lg-4 col-md-6 col-12">
 <h3 class="my-4 pt-4 pt-lg-0">
 Say hello!
 </h3>

 <ul class="social-links mt-2">
 <a href="mailto:christopherdonnay@gmail.com"
rel="noopener" class="fas fa-envelope">
 <a href="https://www.linkedin.com/in/christopher-d-
b1466b82" rel="noopener" class="fab fa-linkedin">
 <a href="https://github.com/cdonnay" rel="noopener"
class="fab fa-github">

 <p class="copyright-text mt-5 pt-3">Copyright © 2020 Ben
Resume Page</p>

 <p>Design: <a href="https://www.tooplate.com" title="free
HTML templates" target="_blank">Tooplate</p>
 </div>
 </div>
</section>
<!-- SCRIPTS -->
<script src="js/jquery.min.js"></script>
<script src="js/bootstrap.min.js"></script>
<script src="js/smoothscroll.js"></script>
<script src="js/owl.carousel.min.js"></script>
<script src="js/custom.js"></script>

</body>
</html>

```

Now let me update the todo list to mark all tasks as completed:

Let me check for any linting errors:

Perfect! I've successfully implemented all the requested styling changes to your portfolio section. Here's a summary of what I've done:

## Changes Made:

1. **✓ Vertically centered images:** Added flexbox styling to the image columns (`col-lg-4`) to center the images vertically within their containers.
2. **✓ Changed skills font:** Updated the "Skills Used" sections to use the same font family, weight, size, color, and spacing as the body text, ensuring consistency throughout the portfolio.
3. **✓ Changed caption font:** Modified the image captions to match the body font styling, using the same font family, weight, size, and color variables.
4. **✓ Right-aligned captions:** Changed the text alignment of all figure captions from center to right alignment.
5. **✓ Sharp corners:** Removed the rounded corners from all images in the portfolio section by setting `border-radius: 0`.

## Technical Details:

- Used CSS custom properties (variables) from the existing stylesheet to maintain consistency
- Applied `!important` declarations where needed to override existing styles
- Used flexbox for vertical centering of images
- Targeted only the portfolio section (`#portfolio`) to avoid affecting other parts of the site
- Maintained responsive design principles

The portfolio section now has a more cohesive and professional appearance with consistent typography, properly aligned content, and clean, sharp-edged images that are vertically centered in their columns.

---

### User

please change the formatting of the portfolio sections so that when the image is on the left, all text is left aligned, including figure captions. when the image is on the right, do right text alignment.

---

### Cursor

I'll help you implement conditional text alignment based on the image position. Let me create a todo list and then implement the changes.

Now I'll update the CSS to implement conditional text alignment. I'll add specific classes to target sections based on their image position:

```
<!DOCTYPE html>
<html lang="en">
<head>

 <title>Christopher Donnay</title>

 <meta charset="UTF-8">
 <meta http-equiv="X-UA-Compatible" content="IE=Edge">
 <meta name="description" content="">
 <meta name="keywords" content="">
 <meta name="author" content="Tooplate">
```

```
<meta name="viewport" content="width=device-width, initial-scale=1,
maximum-scale=1">

<link rel="stylesheet" href="css/bootstrap.min.css">
<link rel="stylesheet" href="css/all.min.css">
<link rel="stylesheet" href="css/owl.carousel.min.css">
<link rel="stylesheet" href="css/owl.theme.default.min.css">

<!-- MAIN CSS -->
<link rel="stylesheet" href="css/tooplate-ben-resume-style.css">

<!-- Custom link styling for about and portfolio sections -->
<style>
 #about a, #portfolio a {
 color: #3182ce !important;
 text-decoration: underline !important;
 }

 #about a:hover, #portfolio a:hover {
 color: #2b6cb0 !important;
 text-decoration: underline !important;
 }

 /* Portfolio section customizations */
 /* Vertically center images in their columns */
 #portfolio .col-lg-4 {
 display: flex;
 flex-direction: column;
 justify-content: center;
 }

 /* Change skills used sections to match body font */
 #portfolio h4 {
 font-family: var(--base-font-family);
 font-weight: var(--font-weight-light);
 color: var(--dark-color);
 }

 #portfolio ul {
 font-family: var(--base-font-family);
 font-size: var(--p-font-size);
 font-weight: var(--font-weight-light);
 color: var(--p-color);
 letter-spacing: 0.3px;
 line-height: 2em;
 }

 /* Change image captions to match body font with conditional
alignment */
 #portfolio figcaption {
 font-family: var(--base-font-family) !important;
 font-size: var(--p-font-size) !important;
 font-weight: var(--font-weight-light) !important;
 color: var(--p-color) !important;
 }
</style>
```

```

 letter-spacing: 0.3px !important;
 line-height: 1.5em !important;
 }

 /* Left alignment for sections with images on the left */
 #portfolio .image-left .col-lg-8,
 #portfolio .image-left figcaption {
 text-align: left !important;
 }

 /* Right alignment for sections with images on the right */
 #portfolio .image-right .col-lg-8,
 #portfolio .image-right figcaption {
 text-align: right !important;
 }

 /* Remove rounded corners from images */
 #portfolio .about-image {
 border-radius: 0 !important;
 }
</style>
<!--
Tooplate 2120 Ben Resume
https://www.tooplate.com/view/2120-ben-resume
-->
</head>

<body data-spy="scroll" data-target="#navbarNav" data-offset="50">

 <!-- MENU BAR -->
 <nav class="navbar navbar-expand-lg sticky-top">
 <div class="container">

 Christopher Donnay

 <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav" aria-
expanded="false" aria-label="Toggle navigation">

 </button>

 <div class="collapse navbar-collapse" id="navbarNav">
 <ul class="navbar-nav mx-auto">
 <li class="nav-item">
 <a href="#about" class="nav-link
smoothScroll">About Me

 <li class="nav-item">
 <a href="#portfolio" class="nav-link
smoothScroll">Portfolio

 </div>
 </div>
 </nav>

```

```
 <li class="nav-item">
 <a href="#contact" class="nav-link
smoothScroll">Contact

 <div class="mt-lg-0 mt-3 mb-4 mb-lg-0">
 <a href="files/CDonnay Resume.pdf" class="custom-btn
btn" target="_blank">Download Resume
 </div>
 </div>
 </nav>

 <!-- HERO -->
 <section class="hero d-flex flex-column justify-content-center align-
items-center" id="intro">

 <div class="container">
 <div class="row about-third">

 <div class="mx-auto col-lg-5 col-md-5 col-10">

 </div>

 <div class="d-flex flex-column justify-content-center
align-items-center col-lg-7 col-md-7 col-12">
 <div class="hero-text">

 <h1 class="hero-title">Christopher Donnay</h1>

 <a href="mailto:christopherdonnay@gmail.com"
class="email-link">
 christopherdonnay@gmail.com

 </div>
 </div>
 </div>
 </div>
 </section>

 <section class="about section-padding" id="about">
 <div class="container">
 <div class="row">

 <div class="col-lg-6 col-md-6 col-12">
 <h3 class="mb-4">About me</h3>
```

Chris Donnay is currently the lab manager for
 [the Data and Democracy Lab](https://www.mggg.org)
 at Cornell University.
 As lab manager, he has extensive experience
 translating
 real-world problems into technical solutions for non-
 profits and advocacy groups.
 He has a knack for communicating high-level
 mathematics to a wide range
 of audiences, with a focus on clarity and actionable
 insights.
 He got his PhD in mathematics from the Ohio State
 University,
 where he studied data science, probability, and
 statistical modeling,
 with applications to redistricting and voting.
 Chris also holds a Master's of Science in education
 from the University of Pennsylvania,
 where he was a high school math and computer science
 teaching fellow.

&lt;/p&gt;

&lt;/div&gt;

&lt;!-- Todo, edit the bounding box --&gt;

&lt;div class="col-lg-5 mx-auto col-md-6 col-12"&gt;

&lt;img src="images/cdonnay.jpg" class="about-image img-
 fluid" alt="CDonnay"&gt;

&lt;/div&gt;

&lt;/div&gt;

&lt;/div&gt;

&lt;/section&gt;

&lt;section class="portfolio section-padding" id="portfolio"&gt;

&lt;div class="container"&gt;

&lt;div class="row"&gt;

&lt;div class="col-12"&gt;

&lt;h3 class="mb-4"&gt;Portfolio&lt;/h3&gt;

&lt;p&gt;Below are a smattering of Chris' past research
 projects, which include

data science and modeling projects for democracy non-
 profits and advocacy groups,
 applications and Python libraries for civic good,
 as well as more traditional mathematical research
 projects.

&lt;/p&gt;

&lt;/div&gt;

&lt;/div&gt;

&lt;!-- VoteKit Section --&gt;

```

<div class="row about-third mb-5">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>VoteKit</h4>
 <p>
 <a rel="nofollow"
href="https://github.com/mggg/VoteKit" target="_blank">VoteKit is
 a one-stop shop for all things election modeling in
Python. With an end-to-end pipeline for
 constructing ballots, running elections, and
analyzing outcomes, VoteKit seeks to be a tool
 for academics, researchers, and practitioners alike.
 </p>
 <p>
 Chris is the principal developer, manages the other
open source contributors,
 writes <a rel="nofollow"
href="https://votekit.readthedocs.io/en/latest/"
target="_blank">documentation and tutorials,
 and designs, prototypes, evaluates, and
 implements new features for the package.
 </p>

 <p>
 Read about more about VoteKit in the
 <a rel="nofollow"
href="https://joss.theoj.org/papers/10.21105/joss.07477"
target="_blank">Journal of Open Source Software.
 </p>

 <h4>Skills Used</h4>

 Python
 Package management: PyPI, Poetry
 Statistical modeling
 Documentation: Sphinx, Jupyter, Markdown
 Open source software: GitHub

 </div>
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A plot showing how different models of ballot
generator perform with respect
 to proportionality under an STV election,
generated by VoteKit.
 </figcaption>
 </figure>
 </div>
</div>

```

```

<!-- The VRA in Michigan Section -->
<div class="row about-third mb-5">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A restricted area around Detroit where we
focused our efforts on improving partisanship.
 We refer to this as a "partial scramble", where
we fix the rest of the state and
 only perturb this area.
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>The Voting Rights Act in Michigan</h4>
 <p>
 In 2024, Michigan's legislative maps were struck down
as being in violation of the Voting Rights Act in
 the Michigan Supreme Court case Agee v. Benson.
 When it came time to create new maps, the advocacy
group Voters Not Politicians
 asked us to help them model ways to balance different
metrics of partisanship with the Voting Rights Act.
 </p>
 <p>
 Chris created a model of redistricting plans in
Michigan, collecting data from
 public and private sources in order to produce maps
that balanced different metrics of partisanship
 with the Voting Rights Act.
 The results of our study influenced the creation of
the new legislative maps
 used as a remedy for the case.</p>

 <p>
 While the non-technical summary for Voters Not
Politicians is not publicly available,
 you can read <a href="files/Sampling Problems in
Legislative Redistricting.pdf" target="_blank">the technical report
 which was included in Chris' thesis.
 </p>

 <h4>Skills Used</h4>

 Geospatial data: Census, electoral
 Markov chains: optimization, sampling
 Technical solutions for political advocacy
 Technical communication with non-technical
audiences

```

```
 Statistical modeling

 </div>
 </div>

 <!-- Portland OR STV Analysis Section -->
 <div class="row about-third mb-5">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>STV City Council Election in Portland, OR 2024</h4>
 <p>In November of 2024, Portland, OR held their first
city council election
 with a single-transferable-vote (STV) system,
electing 12 council members
 across 4 districts. There was concern about how STV
might impact the ability
 of communities of color to participate in the
process.

 </p>

 <p>
Chris provided Python support to a
 <a rel="nofollow" href="https://mogg.org/PPM"
target="_blank">
 post-mortem study of the election,
 including processing of ballots with
<code>pandas</code>, analysis of the election using <code>VoteKit</code>,
 developing visualizations with
<code>matplotlib</code>, and explaining the code in a <code>Jupyter</code>
notebook.

 The results showed that dominant media
 narratives about ballot errors by people of color
were misguided, and that STV actually
 helped increase representation of communities of
color.

 </p>

 <h4>Skills Used</h4>

 Data cleaning: pandas
 Data visualization: matplotlib
 Statistical analysis: VoteKit
 Python
 Non-technical communication

 </div>
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 Understanding how similar candidates are in an
STV election.

 Candidate pairs (i,j) that are more green show
```

```

a kind of "mutual boosting",
 where if candidate j appears on a ballot,
candidate i is more likely to appear on a ballot as well.
 This reveals a slate of candidates (Avalos,
Routh, Dunphy, and Ender) who all
 mutually boost.
 </figcaption>
 </figure>
 </div>
 </div>

<!-- The Great British Baking Show Section -->
<div class="row about-third mb-5">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 Freddy? Is that you?
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>Predicting Bake Off Winners</h4>
 <p>
 As part of the Erdős Institute Data Science Bootcamp,
Chris and his team
 trained supervised learning models using
 <code></code>scikit-learn</code>-regression, random
forest, k-nearest neighbors, and Naive Bayes-
 to predict winners and uncover key
drivers of success in the Great British Baking Show.
 Ultimately, they found that the most important factor
in predicting winners
 was performance in the technical challenges
(receiving a handshake
 from Paul Hollywood turned out to be far less
predictive than hoped!).
 </p>
 <p>
 At the end of the bootcamp, they <a
href="https://docs.google.com/presentation/d/1I0hSqWn0BLEwysViAbwRr-
Zx7bJyoMH4HexAY2kCEHo/edit?usp=sharing"
 target="_blank">presented their results
 to a panel of industry experts,
 who specifically highlighted the team's clear
communication of modeling
 limitations and results. They were awarded first
place.</p>

 <h4>Skills Used</h4>

 Data collection and cleaning

```

```

 Machine Learning: KNN, Random Forest, Naive
Bayes, Regression
 Statistical analysis
 Technical communication
 Python: scikit-learn
 Data visualization: matplotlib

</div>
</div>

<!-- Districtr 2.0 -->
<div class="row about-third mb-5">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>Districtr 2.0</h4>
 <p>
 <a rel="nofollow" href="https://beta.districtr.org"
target="_blank">Districtr is a web-based tool for creating
 districting plans. After many years of faithful
 service, Districtr 1.0 was retired and replaced with Districtr 2.0.
 Districtr is used by many localities as their official
 submission tool for the redistricting process.

 </p>

 <p>
 Chris was the product manager the development and
 public release of Districtr 2.0
 with a remote team of five full-stack developers.
 Together with his team, Chris ensured that the app was
 robust and scalable,
 that there was smooth communication between the dev
 team and the PI,
 and that the app was easy to use and understand.
 </p>

 <h4>Skills Used</h4>

 Project management
 Non-technical communication
 Full stack development
 Geospatial data

 </div>
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A map module for drawing Pennsylvania's
 congressional districts in Districtr 2.0.
 </figcaption>
 </figure>
 </div>
</div>

```

```

</div>

<!-- 3:1 nesting -->
<div class="row about-third mb-5">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 This histogram shows how the number of seats won by
Democrats in the Ohio Senate varies based on the bias of the
 underlying House map. While the underlying House
map is incredibly biased,
 the distribution of seats won by Democrats in the
Senate does not separate as widely.
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>3:1 Nesting Rules in Redistricting</h4>
 <p>
 A nesting rule is a rule that requires that a senate
district be composed of adjacent house districts.
 Ohio and Wisconsin have 3:1 nesting rules (3 house
districts per senate district).
 How does this affect the space of feasible plans? How
does this affect the ability of a map-maker to gerrymander?

 </p>

 <p>
 Chris implemented a novel algorithm for generating plans
that satisfy a 3:1 nesting rule
 in Python using Markov chain methods. He validated his
model using different mixing heuristics
 and statistical tests. He found that while 3:1 nesting
has little impact on the
 number of seats won by a party in comparison to unnested
plans, it does
 curtail the impact of gerrymandered house maps and the
ability to gerrymander more broadly.
 </p>

 <p>
 Chris' paper is in revisions with the journal Statistics
and Public Policy.
 Read the <a href="files/3_1_nesting.pdf"
target="_blank">preprint here.
 </p>

 <h4>Skills Used</h4>


```

```

 Python
 Technical communication
 Markov chains
 Geospatial data

</div>
</div>

```

```

<!-- Asymptotics of Redistricting Section -->
<div class="row about-third mb-5">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>Asymptotics of Redistricting</h4>
 <p>While much of Chris' work has been focused on
applications of statistical models
 and data science, his PhD is technically in
theoretical mathematics, and he has a particular interest in combinatorics.
 This project was part of his PhD dissertation, and is
set to appear in the American Mathematical Monthly,
 which is a prestigious journal known for its high
standards of writing.
 </p>
 <p>
How many ways are there to redistrict an $n \times n$ grid
into n districts? How does this grow with n ?
 What can this tell us about the shape of a typical
district? This mathematical research
 explores the combinatorial properties of
redistricting and their implications for
 understanding gerrymandering. We find that the number
of maps grows exponentially
 in n^2 , and that a random districting plan is likely to
be highly non-compact.</p>

 <p>
Read the <a href="files/Asymptotics of
Redistricting.pdf" target="_blank">preprint here.
 </p>

 <h4>Skills Used</h4>

 Combinatorics
 Asymptotic analysis
 Technical communication

 </div>
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">

```

A completed redistricting plan for the 8x8 grid (equivalent to a tiling!). This completion is part of an algorithm that generates a lower bound on the number of possible redistricting plans for the 8x8 grid.

```

 </figcaption>
 </figure>
 </div>
 </div>
</div>
</section>

```

```

<section class="contact section-padding pt-0" id="contact">
 <div class="container">

 <div class="mx-auto col-lg-4 col-md-6 col-12">
 <h3 class="my-4 pt-4 pt-lg-0">
 Say hello!
 </h3>

 <ul class="social-links mt-2">
 <a href="mailto:christopherdonnay@gmail.com"
rel="noopener" class="fas fa-envelope">
 <a href="https://www.linkedin.com/in/christopher-d-
b1466b82" rel="noopener" class="fab fa-linkedin">
 <a href="https://github.com/cdonnay" rel="noopener"
class="fab fa-github">

 <p class="copyright-text mt-5 pt-3">Copyright © 2020 Ben
Resume Page</p>

 <p>Design: <a href="https://www.tooplate.com" title="free
HTML templates" target="_blank">Tooplate</p>
 </div>
 </div>
</section>
<!-- SCRIPTS -->
<script src="js/jquery.min.js"></script>
<script src="js/bootstrap.min.js"></script>
<script src="js/smoothscroll.js"></script>
<script src="js/owl.carousel.min.js"></script>
<script src="js/custom.js"></script>

```

```
</body>
</html>
```

Now I need to add the appropriate CSS classes to each portfolio section. Let me update each section to add the correct class based on image position:

```
<!DOCTYPE html>
<html lang="en">
<head>

 <title>Christopher Donnay</title>

 <meta charset="UTF-8">
 <meta http-equiv="X-UA-Compatible" content="IE=Edge">
 <meta name="description" content="">
 <meta name="keywords" content="">
 <meta name="author" content="Tooplate">
 <meta name="viewport" content="width=device-width, initial-scale=1,
maximum-scale=1">

 <link rel="stylesheet" href="css/bootstrap.min.css">
 <link rel="stylesheet" href="css/all.min.css">
 <link rel="stylesheet" href="css/owl.carousel.min.css">
 <link rel="stylesheet" href="css/owl.theme.default.min.css">

 <!-- MAIN CSS -->
 <link rel="stylesheet" href="css/tooplate-ben-resume-style.css">

 <!-- Custom link styling for about and portfolio sections -->
 <style>
 #about a, #portfolio a {
 color: #3182ce !important;
 text-decoration: underline !important;
 }

 #about a:hover, #portfolio a:hover {
 color: #2b6cb0 !important;
 text-decoration: underline !important;
 }

 /* Portfolio section customizations */
 /* Vertically center images in their columns */
 #portfolio .col-lg-4 {
 display: flex;
 flex-direction: column;
 justify-content: center;
 }

 /* Change skills used sections to match body font */
 #portfolio h4 {
 font-family: var(--base-font-family);
```

```

 font-weight: var(--font-weight-light);
 color: var(--dark-color);
 }

 #portfolio ul {
 font-family: var(--base-font-family);
 font-size: var(--p-font-size);
 font-weight: var(--font-weight-light);
 color: var(--p-color);
 letter-spacing: 0.3px;
 line-height: 2em;
 }

 /* Change image captions to match body font with conditional
alignment */
 #portfolio figcaption {
 font-family: var(--base-font-family) !important;
 font-size: var(--p-font-size) !important;
 font-weight: var(--font-weight-light) !important;
 color: var(--p-color) !important;
 letter-spacing: 0.3px !important;
 line-height: 1.5em !important;
 }

 /* Left alignment for sections with images on the left */
 #portfolio .image-left .col-lg-8,
 #portfolio .image-left figcaption {
 text-align: left !important;
 }

 /* Right alignment for sections with images on the right */
 #portfolio .image-right .col-lg-8,
 #portfolio .image-right figcaption {
 text-align: right !important;
 }

 /* Remove rounded corners from images */
 #portfolio .about-image {
 border-radius: 0 !important;
 }
</style>
<!--
Tooplate 2120 Ben Resume
https://www.tooplate.com/view/2120-ben-resume
-->
</head>

<body data-spy="scroll" data-target="#navbarNav" data-offset="50">

 <!-- MENU BAR -->
 <nav class="navbar navbar-expand-lg sticky-top">
 <div class="container">


```

```

 Christopher Donnay

 <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav" aria-
expanded="false" aria-label="Toggle navigation">

 </button>

 <div class="collapse navbar-collapse" id="navbarNav">
 <ul class="navbar-nav mx-auto">
 <li class="nav-item">
 <a href="#about" class="nav-link
smoothScroll">About Me

 <li class="nav-item">
 <a href="#portfolio" class="nav-link
smoothScroll">Portfolio

 <li class="nav-item">
 <a href="#contact" class="nav-link
smoothScroll">Contact

 <div class="mt-lg-0 mt-3 mb-4 mb-lg-0">
 <a href="files/CDonnay Resume.pdf" class="custom-btn
btn" target="_blank">Download Resume
 </div>
 </div>
</div>
</nav>

<!-- HERO -->
<section class="hero d-flex flex-column justify-content-center align-
items-center" id="intro">

 <div class="container">
 <div class="row about-third">

 <div class="mx-auto col-lg-5 col-md-5 col-10">

 </div>

 <div class="d-flex flex-column justify-content-center
align-items-center col-lg-7 col-md-7 col-12">
 <div class="hero-text">

 <h1 class="hero-title">Christopher Donnay</h1>

```

```

 <a href="mailto:christopherdonnay@gmail.com"
class="email-link">
 christopherdonnay@gmail.com

 </div>
</div>

</div>
</div>
</section>

<section class="about section-padding" id="about">
 <div class="container">
 <div class="row">

 <div class="col-lg-6 col-md-6 col-12">
 <h3 class="mb-4">About me</h3>

 <p>Chris Donnay is currently the lab manager for
 <a rel="nofollow" href="https://www.mggg.org"
target="_blank">the Data and Democracy Lab
 at Cornell University.
 As lab manager, he has extensive experience
translating
 real-world problems into technical solutions for non-
profits and advocacy groups.
 He has a knack for communicating high-level
mathematics to a wide range
 of audiences, with a focus on clarity and actionable
insights.
 He got his PhD in mathematics from the Ohio State
University,
 where he studied data science, probability, and
statistical modeling,
 with applications to redistricting and voting.
 Chris also holds a Master's of Science in education
from the University of Pennsylvania,
 where he was a high school math and computer science
teaching fellow.

 </p>

 </div>

 <!-- Todo, edit the bounding box -->
 <div class="col-lg-5 mx-auto col-md-6 col-12">

 </div>

 </div>
 </div>

```

```

 </div>
</section>

<section class="portfolio section-padding" id="portfolio">
 <div class="container">
 <div class="row">
 <div class="col-12">
 <h3 class="mb-4">Portfolio</h3>
 <p>Below are a smattering of Chris' past research
projects, which include
 data science and modeling projects for democracy non-
profits and advocacy groups,
 applications and Python libraries for civic good,
 as well as more traditional mathematical research
projects.
 </p>
 </div>
 </div>
 </div>

 <!-- VoteKit Section -->
 <div class="row about-third mb-5 image-right">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>VoteKit</h4>
 <p>
 <a rel="nofollow"
href="https://github.com/mggg/VoteKit" target="_blank">VoteKit is
 a one-stop shop for all things election modeling in
Python. With an end-to-end pipeline for
 constructing ballots, running elections, and
analyzing outcomes, VoteKit seeks to be a tool
 for academics, researchers, and practitioners alike.
 </p>
 <p>
 Chris is the principal developer, manages the other
open source contributors,
 writes <a rel="nofollow"
href="https://votekit.readthedocs.io/en/latest/"
target="_blank">documentation and tutorials,
 and designs, prototypes, evaluates, and
implements new features for the package.
 </p>

 <p>
 Read about more about VoteKit in the
 <a rel="nofollow"
href="https://joss.theoj.org/papers/10.21105/joss.07477"
target="_blank">Journal of Open Source Software.
 </p>

 <h4>Skills Used</h4>

 Python
 Package management: PyPI, Poetry

```

```

 Statistical modeling
 Documentation: Sphinx, Jupyter, Markdown
 Open source software: GitHub

</div>
<div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A plot showing how different models of ballot
generator perform with respect
 to proportionality under an STV election,
generated by VoteKit.
 </figcaption>
 </figure>
</div>
</div>

<!-- The VRA in Michigan Section -->
<div class="row about-third mb-5 image-left">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A restricted area around Detroit where we
focused our efforts on improving partisanship.
 We refer to this as a "partial scramble", where
we fix the rest of the state and
 only perturb this area.
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>The Voting Rights Act in Michigan</h4>
 <p>
 In 2024, Michigan's legislative maps were struck down
as being in violation of the Voting Rights Act in
 the Michigan Supreme Court case Agee v. Benson.
 When it came time to create new maps, the advocacy
group Voters Not Politicians
 asked us to help them model ways to balance different
metrics of partisanship with the Voting Rights Act.
 </p>
 <p>
 Chris created a model of redistricting plans in
Michigan, collecting data from
 public and private sources in order to produce maps
that balanced different metrics of partisanship

```

with the Voting Rights Act.  
 The results of our study influenced the creation of  
 the new legislative maps  
 used as a remedy for the case.</p>
 <p>
 While the non-technical summary for Voters Not  
 Politicians is not publicly available,  
 you can read <a href="files/Sampling Problems in  
 Legislative Redistricting.pdf" target="\_blank">the technical report</a>  
 which was included in Chris' thesis.  
 </p>
 <h4>Skills Used</h4>
 <ul>
 <li>Geospatial data: Census, electoral</li>
 <li>Markov chains: optimization, sampling</li>
 <li>Technical solutions for political advocacy</li>
 <li>Technical communication with non-technical  
 audiences</li>
 <li>Statistical modeling</li>
 </ul>
 </div>
 </div>
 <!-- Portland OR STV Analysis Section -->
 <div class="row about-third mb-5 image-right">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>STV City Council Election in Portland, OR 2024</h4>
 <p>In November of 2024, Portland, OR held their first  
 city council election  
 with a single-transferable-vote (STV) system,  
 electing 12 council members  
 across 4 districts. There was concern about how STV  
 might impact the ability  
 of communities of color to participate in the  
 process.  
 </p>
 <p>
 Chris provided Python support to a  
 <a rel="nofollow" href="https://mggg.org/PPM"  
 target="\_blank">  
 post-mortem study</a> of the election,  
 including processing of ballots with  
 <code>pandas</code>, analysis of the election using <code>VoteKit</code>,  
 developing visualizations with  
 <code>matplotlib</code>, and explaining the code in a <code>Jupyter</code>  
 notebook.  
 The results showed that dominant media  
 narratives about ballot errors by people of color  
 were misguided, and that STV actually  
 helped increase representation of communities of  
 color.
 </p>
 </div>
 </div>

```

 </p>

 <h4>Skills Used</h4>

 Data cleaning: pandas
 Data visualization: matplotlib
 Statistical analysis: VoteKit
 Python
 Non-technical communication

 </div>
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 Understanding how similar candidates are in an
STV election.
 Candidate pairs (i,j) that are more green show
a kind of "mutual boosting",
 where if candidate j appears on a ballot,
candidate i is more likely to appear on a ballot as well.
 This reveals a slate of candidates (Avalos,
Routh, Dunphy, and Ender) who all
 mutually boost.
 </figcaption>
 </figure>
 </div>
</div>

<!-- The Great British Baking Show Section -->
<div class="row about-third mb-5 image-left">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 Freddy? Is that you?
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>Predicting Bake Off Winners</h4>
 <p>
 As part of the Erdős Institute Data Science Bootcamp,
Chris and his team
 trained supervised learning models using
 <code>scikit-learn</code>-regression, random
forest, k-nearest neighbors, and Naive Bayes-
 to predict winners and uncover key
drivers of success in the Great British Baking Show.
 Ultimately, they found that the most important factor

```

in predicting winners was performance in the technical challenges (receiving a handshake from Paul Hollywood turned out to be far less predictive than hoped!).

At the end of the bootcamp, they [presented their results](https://docs.google.com/presentation/d/1I0hSqWn0BLEwysViAbwRr-Zx7bJyoMH4HexAY2kCEHo/edit?usp=sharing) to a panel of industry experts, who specifically highlighted the team's clear communication of modeling limitations and results. They were awarded first place.

#### Skills Used

- Data collection and cleaning
- Machine Learning: KNN, Random Forest, Naive Bayes, Regression
- Statistical analysis
- Technical communication
- Python: scikit-learn
- Data visualization: matplotlib

#### Districtr 2.0

[Districtr](https://beta.districtr.org) is a web-based tool for creating districting plans. After many years of faithful service, Districtr 1.0 was retired and replaced with Districtr 2.0. Districtr is used by many localities as their official submission tool for the redistricting process.

Chris was the product manager the development and public release of Districtr 2.0 with a remote team of five full-stack developers. Together with his team, Chris ensured that the app was robust and scalable, that there was smooth communication between the dev team and the PI, and that the app was easy to use and understand.

```

<h4>Skills Used</h4>

 Project management
 Non-technical communication
 Full stack development
 Geospatial data

</div>
<div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A map module for drawing Pennsylvania's
congressional districts in Districtr 2.0.
 </figcaption>
 </figure>
</div>
</div>

<!-- 3:1 nesting -->
<div class="row about-third mb-5 image-left">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 This histogram shows how the number of seats won by
Democrats in the Ohio Senate varies based on the bias of the
 underlying House map. While the underlying House
map is incredibly biased,
 the distribution of seats won by Democrats in the
Senate does not separate as widely.
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>3:1 Nesting Rules in Redistricting</h4>
 <p>
 A nesting rule is a rule that requires that a senate
district be composed of adjacent house districts.
 Ohio and Wisconsin have 3:1 nesting rules (3 house
districts per senate district).
 How does this affect the space of feasible plans? How
does this affect the ability of a map-maker to gerrymander?

 </p>
 <p>
 Chris implemented a novel algorithm for generating plans

```

that satisfy a 3:1 nesting rule  
in Python using Markov chain methods. He validated his  
model using different mixing heuristics  
and statistical tests. He found that while 3:1 nesting  
has little impact on the  
number of seats won by a party in comparison to unnested  
plans, it does  
curtail the impact of gerrymandered house maps and the  
ability to gerrymander more broadly.

</p>

<p>

Chris' paper is in revisions with the journal Statistics  
and Public Policy.

Read the <a href="files/3\_1\_nesting.pdf"  
target="\_blank">preprint here.</a>

</p>

<h4>Skills Used</h4>

<ul>

<li>Python</li>

<li>Technical communication</li>

<li>Markov chains</li>

<li>Geospatial data</li>

</ul>

</div>

</div>

<!-- Asymptotics of Redistricting Section -->

<div class="row about-third mb-5 image-right">

<div class="col-lg-8 col-md-8 col-12">

<h4>Asymptotics of Redistricting</h4>

<p>While much of Chris' work has been focused on  
applications of statistical models

and data science, his PhD is technically in  
theoretical mathematics, and he has a particular interest in combinatorics.

This project was part of his PhD dissertation, and is  
set to appear in the American Mathematical Monthly,  
which is a prestigious journal known for its high  
standards of writing.

</p>

<p>

How many ways are there to redistrict an  $n \times n$  grid  
into  $n$  districts? How does this grow with  $n$ ?

What can this tell us about the shape of a typical  
district? This mathematical research

explores the combinatorial properties of  
redistricting and their implications for

understanding gerrymandering. We find that the number  
of maps grows exponentially

in  $n^2$ , and that a random districting plan is likely to

be highly non-compact.</p>

<p>  
Read the <a href="files/Asymptotics of  
Redistricting.pdf" target="\_blank">preprint here.</a>  
</p>

#### <h4>Skills Used</h4>

<ul>

<li>Combinatorics</li>

<li>Asymptotic analysis</li>

<li>Technical communication</li>

</ul>

</div>

<div class="col-lg-4 col-md-4 col-12">

<figure>



<figcaption style="text-align: center; font-size:  
0.9em; margin-top: 0.5em;">

A completed redistricting plan for the 8x8 grid  
(equivalent to a tiling!).

This completion is part of an algorithm that  
generates a lower bound

on the number of possible redistricting plans  
for the 8x8 grid.

</figcaption>

</figure>

</div>

</div>

</div>

</section>

<section class="contact section-padding pt-0" id="contact">

<div class="container">

<div class="mx-auto col-lg-4 col-md-6 col-12">

<h3 class="my-4 pt-4 pt-lg-0">

Say hello!

</h3>

<ul class="social-links mt-2">

<li><a href="mailto:christopherdonnay@gmail.com"  
rel="noopener" class="fas fa-envelope"></a></li>

<li><a href="https://www.linkedin.com/in/christopher-d-  
b1466b82" rel="noopener" class="fab fa-linkedin"></a></li>

<li><a href="https://github.com/cdonnay" rel="noopener"  
class="fab fa-github"></a></li>

</ul>

```

 <p class="copyright-text mt-5 pt-3">Copyright © 2020 Ben
Resume Page</p>

 <p>Design: <a href="https://www.tooplate.com" title="free
HTML templates" target="_blank">Tooplate</p>
 </div>

</div>
</div>
</section>
<!-- SCRIPTS -->
<script src="js/jquery.min.js"></script>
<script src="js/bootstrap.min.js"></script>
<script src="js/smoothscroll.js"></script>
<script src="js/owl.carousel.min.js"></script>
<script src="js/custom.js"></script>

</body>
</html>

```

Now let me update the todo list to mark the tasks as completed:

Let me check for any linting errors:

Perfect! I've successfully implemented the conditional text alignment for your portfolio sections. Here's what I've done:

## Changes Made:

### 1. Updated CSS for Conditional Alignment

- Removed the fixed left alignment from captions
- Added conditional CSS rules that apply different text alignment based on the image position
- Created `.image-left` and `.image-right` classes to control alignment

### 2. Applied Classes to Each Section

Based on the image position, I added the appropriate class to each portfolio section:

**Sections with images on the LEFT** (now have left-aligned text):

- ☒ **Michigan VRA** - `image-left` class
- ☒ **Baking Show** - `image-left` class
- ☒ **3:1 Nesting** - `image-left` class

**Sections with images on the RIGHT** (now have right-aligned text):

- ☒ **VoteKit** - `image-right` class
- ☒ **Portland STV** - `image-right` class
- ☒ **Districtr 2.0** - `image-right` class
- ☒ **Asymptotics** - `image-right` class



```
 text-decoration: underline !important;
 }

 /* Portfolio section customizations */
 /* Vertically center images in their columns */
 #portfolio .col-lg-4 {
 display: flex;
 flex-direction: column;
 justify-content: center;
 }

 /* Change skills used sections to match body font */
 #portfolio h4 {
 font-family: var(--base-font-family);
 font-weight: var(--font-weight-light);
 color: var(--dark-color);
 }

 #portfolio ul {
 font-family: var(--base-font-family);
 font-size: var(--p-font-size);
 font-weight: var(--font-weight-light);
 color: var(--p-color);
 letter-spacing: 0.3px;
 line-height: 2em;
 }

 /* Change image captions to match body font and right align */
 #portfolio figcaption {
 font-family: var(--base-font-family) !important;
 font-size: var(--p-font-size) !important;
 font-weight: var(--font-weight-light) !important;
 color: var(--p-color) !important;
 letter-spacing: 0.3px !important;
 line-height: 1.5em !important;
 text-align: left !important;
 }

 /* Remove rounded corners from images */
 #portfolio .about-image {
 border-radius: 0 !important;
 }

 /* Center the photo vertically in the about section */
 #about .col-lg-5 {
 display: flex;
 flex-direction: column;
 justify-content: center;
 }
</style>
```

<!--

Tooplate 2120 Ben Resume

<https://www.tooplate.com/view/2120-ben-resume>

-->

```

</head>

<body data-spy="scroll" data-target="#navbarNav" data-offset="50">

 <!-- MENU BAR -->
 <nav class="navbar navbar-expand-lg sticky-top">
 <div class="container">

 Christopher Donnay

 <button class="navbar-toggler" type="button" data-
toggle="collapse" data-target="#navbarNav" aria-controls="navbarNav" aria-
expanded="false" aria-label="Toggle navigation">

 </button>

 <div class="collapse navbar-collapse" id="navbarNav">
 <ul class="navbar-nav mx-auto">
 <li class="nav-item">
 <a href="#about" class="nav-link
smoothScroll">About Me

 <li class="nav-item">
 <a href="#portfolio" class="nav-link
smoothScroll">Portfolio

 <li class="nav-item">
 <a href="#contact" class="nav-link
smoothScroll">Contact

 <div class="mt-lg-0 mt-3 mb-4 mb-lg-0">
 <a href="files/CDonnay Resume.pdf" class="custom-btn
btn" target="_blank">Download Resume
 </div>
 </div>
 </nav>

 <!-- HERO -->
 <section class="hero d-flex flex-column justify-content-center align-
items-center" id="intro">

 <div class="container">
 <div class="row about-third">

 <div class="mx-auto col-lg-5 col-md-5 col-10">

```

```


 </div>

 <div class="d-flex flex-column justify-content-center
align-items-center col-lg-7 col-md-7 col-12">
 <div class="hero-text">

 <h1 class="hero-title">Christopher Donnay</h1>

 <a href="mailto:christopherdonnay@gmail.com"
class="email-link">
 christopherdonnay@gmail.com

 </div>
 </div>

</div>
</div>
</section>

<section class="about section-padding" id="about">
 <div class="container">
 <div class="row">

 <div class="col-lg-6 col-md-6 col-12">
 <h3 class="mb-4">About me</h3>

 <p>Chris Donnay is currently the lab manager for
 <a rel="nofollow" href="https://www.mggg.org"
target="_blank">the Data and Democracy Lab
 at Cornell University.
 As lab manager, he has extensive experience
 translating
 real-world problems into technical solutions for non-
 profits and advocacy groups.
 He has a knack for communicating high-level
 mathematics to a wide range
 of audiences, with a focus on clarity and actionable
 insights.
 He got his PhD in mathematics from the Ohio State
 University,
 where he studied data science, probability, and
 statistical modeling,
 with applications to redistricting and voting.
 Chris also holds a Master's of Science in education
 from the University of Pennsylvania,
 where he was a high school math and computer science
 teaching fellow.

 </p>

```

```

 </div>

 <div class="col-lg-5 mx-auto col-md-6 col-12">

 </div>

</div>
</div>
</section>

<section class="portfolio section-padding" id="portfolio">
 <div class="container">
 <div class="row">
 <div class="col-12">
 <h3 class="mb-4">Portfolio</h3>
 <p>Below are a smattering of Chris' past research
projects, which include
 data science and modeling projects for democracy non-
profits and advocacy groups,
 applications and Python libraries for civic good,
 as well as more traditional mathematical research
projects.

 </p>
 </div>
 </div>
 </div>

 <!-- VoteKit Section -->
 <div class="row about-third mb-5">
 <div class="col-lg-8 col-md-8 col-12">
 <h4>VoteKit</h4>
 <p>
 <a rel="nofollow"
href="https://github.com/mggg/VoteKit" target="_blank">VoteKit is
 a one-stop shop for all things election modeling in
Python. With an end-to-end pipeline for
 constructing ballots, running elections, and
analyzing outcomes, VoteKit seeks to be a tool
 for academics, researchers, and practitioners alike.
 </p>
 <p>
 Chris is the principal developer, manages the other
open source contributors,
 writes <a rel="nofollow"
href="https://votekit.readthedocs.io/en/latest/"
target="_blank">documentation and tutorials,
 and designs, prototypes, evaluates, and
implements new features for the package.
 </p>

 <p>
 Read about more about VoteKit in the

```

```

 <a rel="nofollow"
href="https://joss.theoj.org/papers/10.21105/joss.07477"
target="_blank">Journal of Open Source Software.
 </p>

 <h4>Skills Used</h4>

 Python
 Package management: PyPI, Poetry
 Statistical modeling
 Documentation: Sphinx, Jupyter, Markdown
 Open source software: GitHub

</div>
<div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A plot showing how different models of ballot
generator perform with respect
 to proportionality under an STV election,
generated by VoteKit.
 </figcaption>
 </figure>
</div>
</div>
</div>

<!-- The VRA in Michigan Section -->
<div class="row about-third mb-5">
 <div class="col-lg-4 col-md-4 col-12">
 <figure>

 <figcaption style="text-align: center; font-size:
0.9em; margin-top: 0.5em;">
 A restricted area around Detroit where we
focused our efforts on improving partisanship.
 We refer to this as a "partial scramble", where
we fix the rest of the state and
 only perturb this area.
 </figcaption>
 </figure>
 </div>
 <div class="col-lg-8 col-md-8 col-12">
 <h4>The Voting Rights Act in Michigan</h4>
 <p>
 In 2024, Michigan's legislative maps were struck down
as being in violation of the Voting Rights Act in
 the Michigan Supreme Court case Agee v. Benson.
 When it came time to create new maps, the advocacy

```

group Voters Not Politicians

asked us to help them model ways to balance different metrics of partisanship with the Voting Rights Act.

</p>

<p>

Chris created a model of redistricting plans in Michigan, collecting data from

public and private sources in order to produce maps that balanced different metrics of partisanship with the Voting Rights Act.

The results of our study influenced the creation of the new legislative maps used as a remedy for the case.</p>

<p>

While the non-technical summary for Voters Not Politicians is not publicly available,

you can read <a href="files/Sampling Problems in Legislative Redistricting.pdf" target="\_blank">the technical report</a> which was included in Chris' thesis.

</p>

<h4>Skills Used</h4>

<ul>

<li>Geospatial data: Census, electoral</li>

<li>Markov chains: optimization, sampling</li>

<li>Technical solutions for political advocacy</li>

<li>Technical communication with non-technical

audiences</li>

<li>Statistical modeling</li>

</ul>

</div>

</div>

<!-- Portland OR STV Analysis Section -->

<div class="row about-third mb-5">

<div class="col-lg-8 col-md-8 col-12">

<h4>STV City Council Election in Portland, OR 2024</h4>

<p>In November of 2024, Portland, OR held their first city council election

with a single-transferable-vote (STV) system, electing 12 council members

across 4 districts. There was concern about how STV might impact the ability of communities of color to participate in the process.

</p>

<p>

Chris provided Python support to a

<a rel="nofollow" href="https://mggg.org/PPM" target="\_blank">

post-mortem study</a> of the election, including processing of ballots with

`pandas`, analysis of the election using `VoteKit`, developing visualizations with `matplotlib`, and explaining the code in a `Jupyter` notebook.

The results showed that dominant media narratives about ballot errors by people of color were misguided, and that STV actually helped increase representation of communities of color.

</p>

#### <h4>Skills Used</h4>

<ul>

- <li>Data cleaning: pandas</li>
- <li>Data visualization: matplotlib</li>
- <li>Statistical analysis: VoteKit</li>
- <li>Python</li>
- <li>Non-technical communication</li>

</ul>

</div>

<div class="col-lg-4 col-md-4 col-12">

<figure>



<figcaption style="text-align: center; font-size: 0.9em; margin-top: 0.5em;">

Understanding how similar candidates are in an STV election.

Candidate pairs (i,j) that are more green show a kind of "mutual boosting",

where if candidate j appears on a ballot, candidate i is more likely to appear on a ballot as well.

This reveals a slate of candidates (Avalos, Routh, Dunphy, and Ender) who all mutually boost.

</figcaption>

</figure>

</div>

</div>

<!-- The Great British Baking Show Section -->

<div class="row about-third mb-5">

<div class="col-lg-4 col-md-4 col-12">

<figure>



<figcaption style="text-align: center; font-size: 0.9em; margin-top: 0.5em;">

Freddy? Is that you?

</figcaption>

</figure>

</div>

<div class="col-lg-8 col-md-8 col-12">

<h4>Predicting Bake Off Winners</h4>

Chris and his team As part of the Erdős Institute Data Science Bootcamp, 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 the Great British Baking Show. Ultimately, they found that the most important factor in predicting winners was performance in the technical challenges (receiving a handshake from Paul Hollywood turned out to be far less predictive than hoped!).

At the end of the bootcamp, they [presented their results](https://docs.google.com/presentation/d/1I0hSqWn0BLEwysViAbwRr-Zx7bJyoMH4HexAY2kCEHo/edit?usp=sharing) to a panel of industry experts, who specifically highlighted the team's clear communication of modeling limitations and results. They were awarded first place.

#### Skills Used

- Data collection and cleaning
- Machine Learning: KNN, Random Forest, Naive Bayes, Regression
- Statistical analysis
- Technical communication
- Python: scikit-learn
- Data visualization: matplotlib

<!-- Districtr 2.0 -->

<div class="row about-third mb-5">

<div class="col-lg-8 col-md-8 col-12">

<h4>Districtr 2.0</h4>

<p>

[Districtr](https://beta.districtr.org) is a web-based tool for creating districting plans. After many years of faithful service, Districtr 1.0 was retired and replaced with Districtr 2.0.

Districtr is used by many localities as their official submission tool for the redistricting process.

</p>

<p>

Chris was the product manager the development and public release of Districtr 2.0 with a remote team of five full-stack developers. Together with his team, Chris ensured that the app was robust and scalable, that there was smooth communication between the dev team and the PI, and that the app was easy to use and understand.

</p>

#### <h4>Skills Used</h4>

<ul>

<li>Project management</li>

<li>Non-technical communication</li>

<li>Full stack development</li>

<li>Geospatial data</li>

</ul>

</div>

<div class="col-lg-4 col-md-4 col-12">

<figure>



<figcaption style="text-align: center; font-size: 0.9em; margin-top: 0.5em;">

A map module for drawing Pennsylvania's congressional districts in Districtr 2.0.

</figcaption>

</figure>

</div>

</div>

<!-- 3:1 nesting -->

<div class="row about-third mb-5">

<div class="col-lg-4 col-md-4 col-12">

<figure>



<figcaption style="text-align: center; font-size: 0.9em; margin-top: 0.5em;">

This histogram shows how the number of seats won by Democrats in the Ohio Senate varies based on the bias of the underlying House map. While the underlying House map is incredibly biased,

the distribution of seats won by Democrats in the Senate does not separate as widely.

</figcaption>

</figure>

</div>

<div class="col-lg-8 col-md-8 col-12">

#### <h4>3:1 Nesting Rules in Redistricting</h4>

<p>

A nesting rule is a rule that requires that a senate district be composed of adjacent house districts.

Ohio and Wisconsin have 3:1 nesting rules (3 house districts per senate district).

How does this affect the space of feasible plans? How does this affect the ability of a map-maker to gerrymander?

</p>

<p>

Chris implemented a novel algorithm for generating plans that satisfy a 3:1 nesting rule

in Python using Markov chain methods. He validated his model using different mixing heuristics

and statistical tests. He found that while 3:1 nesting has little impact on the

number of seats won by a party in comparison to unnested plans, it does

curtail the impact of gerrymandered house maps and the ability to gerrymander more broadly.

</p>

<p>

Chris' paper is in revisions with the journal Statistics and Public Policy.

Read the <a href="files/3\_1\_nesting.pdf" target="\_blank">preprint here.</a>

</p>

<h4>Skills Used</h4>

<ul>

<li>Python</li>

<li>Technical communication</li>

<li>Markov chains</li>

<li>Geospatial data</li>

</ul>

</div>

</div>

<!-- Asymptotics of Redistricting Section -->

<div class="row about-third mb-5">

<div class="col-lg-8 col-md-8 col-12">

<h4>Asymptotics of Redistricting</h4>

<p>While much of Chris' work has been focused on applications of statistical models

and data science, his PhD is technically in theoretical mathematics, and he has a particular interest in combinatorics.

This project was part of his PhD dissertation, and is set to appear in the American Mathematical Monthly,

which is a prestigious journal known for its high standards of writing.

</p>

<p>

How many ways are there to redistrict an  $n \times n$  grid into  $n$  districts? How does this grow with  $n$ ? What can this tell us about the shape of a typical district? This mathematical research explores the combinatorial properties of redistricting and their implications for understanding gerrymandering. We find that the number of maps grows exponentially in  $n^2$ , and that a random districting plan is likely to be highly non-compact.

Read the [preprint here](files/Asymptotics of Redistricting.pdf).

#### Skills Used

- Combinatorics
- Asymptotic analysis
- Technical communication



A completed redistricting plan for the  $8 \times 8$  grid (equivalent to a tiling!). This completion is part of an algorithm that generates a lower bound on the number of possible redistricting plans for the  $8 \times 8$  grid.

Say hello!

```

 <ul class="social-links mt-2">
 <a href="mailto:christopherdonnay@gmail.com"
rel="noopener" class="fas fa-envelope">
 <a href="https://www.linkedin.com/in/christopher-d-
b1466b82" rel="noopener" class="fab fa-linkedin">
 <a href="https://github.com/cdonnay" rel="noopener"
class="fab fa-github">

 <p class="copyright-text mt-5 pt-3">Copyright © 2020 Ben
Resume Page</p>

 <p>Design: <a href="https://www.tooplate.com" title="free
HTML templates" target="_blank">Tooplate</p>
 </div>

</div>
</div>
</section>
<!-- SCRIPTS -->
<script src="js/jquery.min.js"></script>
<script src="js/bootstrap.min.js"></script>
<script src="js/smoothscroll.js"></script>
<script src="js/owl.carousel.min.js"></script>
<script src="js/custom.js"></script>

</body>
</html>

```

Perfect! I've added CSS styling to vertically center the photo in the about me section. Here's what I implemented:

## Change Made:

✅ **Vertically centered the about photo:** Added flexbox styling to the `.col-lg-5` column in the about section (`#about .col-lg-5`) to center the photo vertically within its container.

The CSS uses:

- `display: flex` - Makes the column a flex container
- `flex-direction: column` - Stacks content vertically
- `justify-content: center` - Centers the content vertically

This will ensure that your photo in the about me section is perfectly centered vertically, creating better visual balance with the text content on the left side of the section.