

# Anthony Pizzimenti

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github.com/apizzimenti

apizzimenti.com

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## Education

The University of Iowa B.S. – Computer Science

May 2020 (Expected)

The University of Iowa B.S. – Mathematics

May 2020 (Expected)

The University of Iowa Large Data Analysis Certificate

May 2020 (Expected)

## Languages, Tools, and Frameworks

Considerable Experience Python • Java • Bash • JavaScript • TypeScript • Git • Subversion • LaTeX • QGIS

Moderate Experience C++ • C • C# • R • MATLAB • Prolog

## Employment

**Undergraduate Tutor** *The University of Iowa Student-Athlete Academic Services (SAAS)* January 2020 – Present

- Tutoring mathematics and computer science to NCAA Division I athletes enrolled at the University of Iowa.

**Research Partner** *Metric Geometry and Gerrymandering Group – MIT, Tufts University, Harvard University* July 2018 – Present

- Continued involvement with the Metric Geometry and Gerrymandering Group after the completion of the Voting Rights Data Institute.
- Conducting research on MCMC seeding methods by applying clustering algorithms to graphs.
- Software development work on Districtr and Gerrychain, district-drawing and MCMC random walk software.

**Undergraduate Tutor** *The University of Iowa Departments of Computer Science, Mathematics* February 2017 – Present

- Tutoring mathematics, informatics, and computer science.

**Undergraduate Researcher** *The University of Iowa Department of Computer Science* January 2017 – Present

- Member of the Numerical, Parallel, and Optimization Algorithms Group.
- Focus on graph theory, combinatorics, algorithms, and data analysis.
- Primary work on graph algorithms, cluster analysis, the application of classical cluster analysis methods to graphs, and optimal algorithm parallelization.

**Data Science and Research Contractor** *FairVote – Remote* August 2019

- Collected and analyzed demographic and cartographic data for the city of Lowell, Massachusetts.
- Generated three ensembles of ~20,000 individual maps based on the above data.
- Map ensembles and resulting data were presented by FairVote to the Lowell City Council to demonstrate ranked choice voting's positive effects on political representation in racially and ethnically diverse populations.

**Data Science and Research Intern** *FairVote – Washington, D.C.* June – August 2019

- Developed novel mathematical tools to analyze voting record data.
- Wrote an extensive research document on these novel voting record data analysis tools when applied to UK Parliament vote data.
- Authored a series of blog posts detailing the mathematics of a potential redistricting in Houston.
- Programmed groundwork for the FairVote Monopoly Politics redesign.

**Student Application Developer** *The University of Iowa Information Technology Services* September 2015 – May 2019

- Responsibilities included project architecture, programming, documentation, and maintenance for both enterprise and individual software.
- Was a member of the C# .NET Development Team, which works on applications at an institutional scale.

**Tisch Summer Fellow** *Voting Rights Data Institute – MIT, Tufts University, Harvard University* June – July 2018

- Completed a six-week computer science- and mathematics-intensive program at Tufts, MIT, and Harvard.
- One of 52 team members working toward the detection and prevention of partisan, racial, and incumbent gerrymandering through statistical analysis, MCMC methods, legal review, and mathematical modeling.

## Major Projects

- Redistricting in Houston** *Python, R* [[github.com/apizzimenti/houston](https://github.com/apizzimenti/houston)] July – August 2019
- Demonstrated the effects of a theoretical redistricting of Houston after the 2020 census.
  - Collected and preprocessed geospatial and demographic data from multiple sources.
  - Used GerryChain to describe the space of possible districting maps.
  - Developed a novel method to help guide MCMC walks.
  - Wrote an extensive blog post series on the mathematics, intentions, and consequences of redistricting in Houston.
- Districtr** *Python, JavaScript* [[mggg.org/Districtr](https://mggg.org/Districtr)] October 2018 – Present
- Currently working on the MGGG's online district-drawing tool.
  - Programming responsibilities include building out the back-end API as well as the front-end API interface.
- GerryChain** *Python, Bash* [[gerrychain.readthedocs.io](https://gerrychain.readthedocs.io)] June 2018 – Present
- Actively developing and maintaining the MGGG's Monte Carlo Markov Chain random walk implementation.
  - Used to provide quantitative results in the MGGG's *amicus curiae* brief for the United States Supreme Court cases *Rucho v. Common Cause* and *Lamone v. Benisek*.
- Bongo** *Python, JavaScript, PHP* [[bongo.org](https://bongo.org)] April 2016 – May 2019
- One of three University of Iowa ITS team members who managed the Bongo ecosystem.
  - Provides real-time GPS data on all buses for the Iowa City, Coralville, and Cambus transit agencies.
  - Web and mobile Bongo sessions total more than 24.4 million per year.
  - Responsibilities include data management and API development.
- AutoGraphs** *Python, Make* [[pypi.org/project/autographs](https://pypi.org/project/autographs)] July – October 2018
- Created a software package for specific, high-level graph operations required by the MGGG.
  - Currently, the package contains code to find and display the faces of a planar graph using a traversal on the total ordering of each vertex's outgoing edges.
- Mississippi** *Python* [[github.com/apizzimenti/Mississippi](https://github.com/apizzimenti/Mississippi)] July – August 2018
- Designed and programmed a tool to find and custom-color the faces of Mississippi's Congressional districts using the AutoGraphs package.
  - Part of an informational art project showcasing the MGGG's analysis of Mississippi's electoral results.
- ## Papers, Presentations, and Conferences
- Seeds of Democracy *MAA Texas Section Conference – Tarleton State University* March 2019
- ## Volunteer Work
- University of Iowa Office of Admissions January 2019 – Present  
Friends of Hickory Hill Park October, November 2019  
Poweshiek Democratic Party June – November 2018  
Iowa Democratic Party June – November 2018
- ## Activities
- Webmaster, SIAM Student Chapter *The University of Iowa* [[ui-siam.org](https://ui-siam.org)] August 2018 – Present  
Member, Undergraduate Mathematics Club *The University of Iowa* January 2017 – May 2019  
Men's Hockey Team *The University of Iowa* September 2017 – March 2018
- ## Awards
- Undergraduate Research Assistantship *The University of Iowa Department of Computer Science* 2017 – Present  
Dean's List *The University of Iowa* Spring Semester 2019  
Arthur Collins Scholarship *The University of Iowa Department of Computer Science* Academic Year 2017-2018