Julia R. Allen

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EDUCATION

Cornell University, College of Engineering, *Ithaca, NY* **Expected May 2023**
Bachelor of Science, Operations Research and Engineering
GPA: 4.04 / 4.0, Dean's List (Fall 2021, Spring 2021, Fall 2020, Spring 2020, Fall 2019)
ORIE Honors Program

Relevant Courses: Optimization I & II; Simulation Modeling and Analysis; Engineering Stochastic Processes; Computational Analysis of Big Data; Artificial Intelligence; Applications of Optimization: Modeling and Computation; Engineering Probability and Statistics I & II; Object-Oriented Programming and Data Structures; Sustainable Transportation Systems Design; Introduction to Analysis

RESEARCH EXPERIENCE

Fairmandering Redistricting Group, Cornell University, *Undergraduate Researcher* **June 2022-Present**
Supervised by Professor David Shmoys

- Construct fairness-directed optimization models for legislative districting, using Python to write scripts for column generation, and using Gurobi to solve a Mixed Integer Program for column selection.
- Scrape demographic and census data and preprocess this data for use in the column generation.
- Research local regulations to tailor the model for Buffalo City Council districts in order to construct more specific partitioning models for the city in anticipation of imminent court cases.
- Collaborate with local grassroots community coalitions to allow our model to be informed by sociological factors.

Stochastic Models for Telemedicine Group, Cornell University, *Undergraduate Researcher* **May 2020-May 2021**
Supervised by Professors Mark Lewis and Jamol Pender

- Built a collaborative support model for practitioners to be matched with patients at telemedicine minute clinics, and a mathematical queueing model that allows for simulations to be run to inform staffing decisions.
- Studied previous in-person clinics in order to estimate input variables for the simulation and ran the simulation with a range of input variables to determine how many practitioners will be needed in each clinic.
- Presented findings at the Cornell Undergraduate Research Board Research Fair and defended our staffing decisions to our sponsor, CVS.

Metric Geometry and Gerrymandering Group, Tufts University, *Research Group Member* **June 2020-April 2021**
Supervised by Professor Moon Duchin

- Participated in the Geodata Bootcamp program, where I learned to clean election datafiles, merge election and demographic data with geodata, and use linear regression to detect racial gerrymandering.
- Digitized precinct maps for the state of Illinois using QGIS.
- Presented to community groups on how to use MGGG's redistricting tool, Districtr, and on the importance of community mapping.

WORK EXPERIENCE

International Business Machines, New York, NY, *Data Science Intern* **May 2022-August 2022**

- Created a web interface to facilitate in the annotation of user data for a digital assistant tool which will be rolled out shortly to more than 280,000 IBM employees.
- Designed the user interface for the annotation tool, working with a design team to optimize user experience.
- Wrote code in Python for the frontend UI and the backend system to interface Sanic with PostgreSQL to get and post data.
- Presented the tool at the IBM intern showcase to a group of 80+ current employees.

Space Exploration Technologies Corporation, Hawthorne, CA, *Flight Reliability Intern* **June 2021-Aug. 2021**

- Automated the completion of several regulatory documents using Python, HTML, and SQL, eliminating approximately 5 hours of manual labor for every mission.
- Constructed fault trees and aggregated individual failure probabilities of rocket components to find the total probability of mission failures.
- Presented safety analyses on Technical Interchange Meetings with cross-functional teams of 40+ experts from SpaceX, NASA, and the FAA to demonstrate thorough mission preparedness.

ENGINEERING EXPERIENCE

Cornell Data Science, Cornell University, *Intelligent Systems Subteam, Marketing Chair* **Nov. 2020-Present**

- Created Dynamic Traffic Systems, a project focused on programming stoplights to optimize traffic flow by simulating a network of streets, lights, and vehicles to determine the optimal light timing.
- Utilized Natural Language Processing packages such as NLTK and spaCy to improve passage retrieval accuracy for My Course Index, a search tool for class sites hosted on Piazza and EdStem.
- Managed corporate partnerships and public relations as the full-team Marketing Chair.

CAMPUS INVOLVEMENT

Engineering Applications of Operations Research, Cornell University, *Teaching Assistant* **Jan. 2021-Present**
Tau Beta Pi National Engineering Honor Society, Cornell University, *Executive Board* **Nov. 2020-Present**
Engineering Advising Seminar, Cornell University, *Peer Advisor* **Aug. 2020-Present**
Cornell Running Club, Cornell University, *President* **Aug. 2019-Present**
Cornell International Affairs Society, Cornell University, *Under-Secretary General, PR Director* **Sep. 2019-Present**
Society of Women Engineers, Cornell University, *Outreach Committee* **Sep. 2019-Present**

SPECIALIZED SKILLS

Programming Languages: Python, Java, MATLAB, SQL, R, HTML, AMPL, Simio, Swift, LabVIEW
Packages: PyTorch, Tensorflow, ORTools, geopandas, gurobipy
Programs/Tools: ArcGIS, QGIS, Tableau, Microsoft Office, Jira, Confluence, Inkscape