

# Zach Siegel

Full-Stack Engineering | Data Science

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I'm a proficient and enthusiastic application builder. I'm passionate about optimization, automation, and statistics-driven decision-making. Opening doors recently unlocked by AI.

## Professional Experience

### Full-Stack Data/AI Engineer *Current AI / Walleye Capital*

March 2024 - Present

Drove product end-to-end, from ETL to UI. Deployed bulk ingestion pipelines for millions of records per day; managed event-handlers for each record to reach users; designed customer-facing features.

Grounded generative AI in software best practices. Evaluated and tuned workflows for structured extraction and generative prose. Built a robust *named entity resolution* service. Combined ranking, chunking, and retrieval strategies to identify and generate content about developing trends in real-time.

Innovated on tooling. Used a custom agentic loop to generate thousands of unique scripts that scrape high-quality structured data (without AI) from different websites each day.

Centered software rigor. Maintained high test coverage for backend and frontend code in Python and Typescript, and extended testing paradigms to evaluate non-deterministic AI features.

### Software Engineer & Data Scientist *Capsida Biotherapeutics, Inc.*

January 2022 - March 2024

Led widely-used internal software platform (AWS+React+Django) providing: customized genomic design tools; long-running bioinformatics pipelines; scheduling automation and visualization; executive BI analyses; automated handoffs across platforms; integrations with lab robots; IP-related data mining. Onboarded cross-functional contributors, maintained testing suite, documented, and socialized tools.

Automated lab data plumbing by connecting platforms including: lab information database (Benchling), project management software (Smartsheet), and networked lab instruments. Built a QR-based inventory update system. Fully automated several lab instrument data ingest operations.

Developed forecasting models for primate immunogenicity, with a decision-support tool that anticipates spontaneous interruptions to animal availability (a widespread challenge in biotech). Built automated analysis pipeline that delivers increasingly precise recommendations to decision-makers as new assay results are recorded in lab information database. C suite relied on forecasts for (expensive!) contracts.

### Teaching Assistant for MBA Program *Anderson School of Management, UCLA*

2020 - 2021

Taught "Data and Analytics" to students in the MBA programs as part of PhD track teaching requirements.

Created (great) statistics course materials with a JupyterHub/git-based deployment pipeline. Students clicked a "magic link" to access cloud-provisioned, SSO-enabled compute environments.

## Freelance Software Development

### Automated Scheduling *Sinai Temple*

2018, 2019

Automated and optimized scheduling Bar/Bar Mitzvah dates for ~130 students via mixed-integer linear programming.

### Carpool Assignment Optimization *GroupThere - grouptherenow.com (offline)*

2017 - 2020

Launched a carpool optimization tool for organizations. Minimizes total drive-time sum across groups of 2-100.

### Community Safety Intervention Modeling *LA Community Action Network*

2017

Re-implemented LAPD's "hotspot" generation algorithm. Compared hotspots to historical arrest/citation/crime report data from City of Los Angeles. Contributed results to community-generated report "Predictive Policing in Los Angeles".

### Supply Chain Forecasting, Automation, and Optimization *FactoryOfEverything*

2016 - 2017

Developed a model for purchasing, production, shipping, and holding over a factory-warehouse-retail system. Forecasting using classical signal processing, regression, and machine learning. Implemented MVP in MATLAB.

## Education

### University of California, Los Angeles MS - Operations Research. GPA 3.94

2019-2021

### Pomona College BA - Mathematics, Computer Science minor. GPA 3.63

2010-2014

Awarded "Llewellyn Bixby Mathematics Prize" 2014: to the student with highest achievement in the Mathematics dept.

## Research

### Pandemic Mitigation Optimization *Anderson School of Management, UCLA*

2021

Optimizes decisions that affect compartment flow parameters in discrete-time SIRD disease progression model.

### Fairness, Efficiency, and Feature-Awareness *Anderson School of Management, UCLA*

2020

Extends strategies for algorithmic fairness from machine learning community to resource-allocation optimization setting.

### Generative Models and Sparse Coding *Department of Mathematics, Pomona College*

2014

Formalizes connections between Boltzmann Machine Distribution and unsupervised learning via sparse coding.

### Anomaly Detection Using Dictionary Learning *University of Minnesota, Minneapolis*

2013

Unsupervised anomaly detection in video data using dictionary learning and sparse coding. An NSF-funded REU.

Awarded "Outstanding Presentation Award" at Joint Mathematics Meeting, 2014: top 15% undergraduate groups.