

# Joe Koch

## Experience

2023-03 - **evolve24, Washington DC (Remote)**

Present *Senior Machine Learning Engineer*

- Led a company-wide initiative to migrate from Airflow to Dagster, creating a modern data platform to enable data observability and ease of development throughout the product lifecycle. Collaborated across multidisciplinary teams to ensure smooth integration and adoption of the new platform.
- Developed infrastructure tailored for machine learning applications, utilizing GCP for cloud-based resources, Terraform for infrastructure as code, and Helm for orchestration. Automated model deployment processes with robust CI/CD pipelines, ensuring efficient, scalable, and reliable machine learning operations.
- Supported products using LLM and Retrieval-Augmented Generation (RAG) models, processing both structured and unstructured data with event stream processing frameworks to process real-time data.
- Retired technical debt by enhancing security, refining Python packaging and dependency management, and optimizing Docker image and registry workflows.

2019-07 - **Mastercard, Salt Lake City, UT**

2023-02 *Senior Machine Learning Engineer*

- Productionized GPU accelerated NLP ML models into REST/gRPC API's, processing on average .35 million financial transactions per day in products using a combination of real time and batch processing. Developed with a focus on low maintenance over time.
- Matured our MLOps infrastructure, reducing time from prototype to production from ~6 months to under 1 month so AI projects can "fail fast". Enabled data scientists to hit the ground running without any experience with tools like docker.
- Built out our data labeling and model retraining pipelines, increasing security and ensuring adherence with government regulations on financial data including the California Consumer Financial Protection Law.
- Developed a feature store and documentation like data spec sheets to reduce time spent data cleaning and feature engineering and encourage knowledge sharing across data science teams.
- Member of Mastercard's Diversity + Inclusion Council, implementing programs to provide diverse perspectives on our strategic priorities and building a more inclusive culture.

2016-08 - **University of Vermont, Burlington, VT**

2018-05 *Graduate Teaching Assistant*

- Developed a Mask R-CNN model for classifying types of microbes in pictures of urine cultures, identifying where colonies are at the pixel level. Used common machine learning tools like TensorFlow, Microsoft Azure, and scikit-learn.
- Used Word2Vec and statistical methods including decision trees, naive Bayes classification, SVM, and logistic regression to predict a measure of political bias in American politicians' tweets.
- Compared ingredients in American and Korean skincare products, scraped from drugstore websites and put into an ingredient search engine, to construct a bipartite graph of ingredient types and frequencies. Used to create a visualization of ingredients and to compare cultural differences in approaches to skincare.
- Calculus instructor, including all lecturing, lesson planning, quiz/exam writing, and grading.

## Personal Info

### E-mail

kochzoe@gmail.com

### Phone

801-425-0742

### Current Location

Salt Lake City, UT

### LinkedIn

www.linkedin.com/in/joe-koch-76431063

### Website

joe-koch.github.io/personal

### Github

github.com/Joe-Koch

## Education

2016 - 2018

**Masters of Science,  
Applied Mathematics**

University of Vermont

2011 - 2015

**Bachelor of Science,  
Mathematics: Statistics  
Emphasis**

University of Utah

## 2016-02 - **Goldman Sachs, Salt Lake City, UT**

2016-07 *Private Wealth Management Analyst*

- Team lead of developing an application to automate background checks on clients. Ultimately performed checks on 300,000 parties and saved approximately 15,000 hours of labor and remediation processes while minimizing the risk of human error.
- Developed an automated system for uploading files into an internal database, saving \$350,000-\$400,000 annually in scanning fees.
- Updated internal work order website used by hundreds of Goldman Sachs employees.

## 2015-05 - **Zions Bancorporation, Salt Lake City, UT**

2015-09 *Quantitative Analyst Intern*

- Developed and applied stochastic models to analyze potential bank loan losses and ensure compliance with Dodd-Frank Act regulations.
- Performed modeling, data analysis, and data cleaning in SQL, R, SAS and Excel.
- Reported key loan loss indicators and stress test results for supervisors and federal regulators.

## 2015-01 - **eBay, South Jordan, UT**

2015-03 *Statistical Intern*

- Performed time series analysis on large datasets of electrical capacity measurements in order to efficiently allocate power resources to eBay's servers throughout daily and yearly fluctuations.

## 2014-08 - **University of Utah, Salt Lake City, UT**

2014-12 *Research Assistant*

- Researched and modeled electrical breakdown boundaries of composite materials. Presented findings at the SIAM Conference on Computational Science & Engineering in Spring 2015.

## 2013-06 - **Eastern Tennessee State University, Johnson City, TN**

2013-08 *NSF-Funded Undergraduate Researcher*

- Researched probabilistic methods applied to combinatorics problems. Authored the Journal of Mathematics and System Science, presented findings at the 2014 Joint Mathematics Meetings in Baltimore.

## 2012-06 - **University of Oklahoma, Norman, OK**

2012-08 *NSF-Funded Undergraduate Researcher*

- Collected and analyzed giant flat gold nanoparticle data using Asylum AFM computer programs. Modeled molecular interactions in crystal structures.

## Publications

Patrick Bardsley, Jonathan Boyle, Nathan Briggs, Zoë Koch, Michael S. Primrose, Michael Zhao and Graeme W. Milton, Criteria for guaranteed breakdown in two-phase inhomogeneous bodies, Inverse Problems, Volume 33, Number 8, 27 June 2017. <http://iopscience.iop.org/article/10.1088/1361-6420/aa76c5/meta>

Zoë Koch, Anant Godbole, and Ruyue (Julia) Yuan, Covering array bounds using analytical techniques, Congressus Numerantium, Vol. 222, pp. 65—73

Anant Godbole, Zachary Higgins, and Zoë Koch, Multiple finite representability of integers as h-sums. Proceedings of the Integers Conference 2016

## My Stack

Data Pipeline Orchestration:  
Dagster, Prefect, Airflow

Data engineering: BigQuery,  
dbt, Spark, Snowflake,  
Redshift

DevOps: Kubernetes, Docker,  
Terraform, Helm, GitLab,  
Jenkins

Cloud Providers: GCP, AWS,  
Azure

ML: Hopsworks, LlamaIndex,  
FastAI, Ragna, PyTorch,  
Tensorflow, Keras

Some Python Packages I like:  
Polars, Poetry, Pydantic,  
Hypothesis+Schemathesis,  
Opentelemetry, Streamlit

Security: Falco, Splunk,  
Sonarqube,  
CheckmarxPrometheus, New  
Relic

Web/RPC Frameworks:  
FastAPI, gRPC, Falcon, Flask