

Michael Sachs

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I am a data science and engineering leader with over 20 years of experience. Over the years my career has taken many twists and turns, but the consistent themes throughout have been technology and leadership. I started out in web and user experience design and development, went back to school to get my PhD in Physics, and am now a data scientist. I am a data science generalist, with experience in data engineering, analytics and experimentation, but my primary focus is machine learning and engineering.

Experience

Netflix

Senior Data Science Manager
September 2020 - September 2024

I led the Data Science team focused on Netflix's billion-dollar infrastructure. This includes all the cloud infrastructure that Netflix rents from AWS as well as Netflix's custom-built global content distribution network. My team built ML models and optimization algos, experimentation and testing methods and tools, and data and analytics, all designed to improve the quality and reliability of Netflix. Highlights include:

- Leading the team that owned, among other things, the testing and experimentation methods and tools to improve the quality of Netflix's content distribution network, the optimization code that steered all Netflix AWS traffic, the ML models that did VPN detection globally, data and tools to manage and improve cloud cost efficiency and developer productivity, and the data and tools that monitor Netflix up-time and helped investigate incidents.
- Leading the cross-functional effort to develop data science infrastructure for the new Netflix Cloud Games platform. This included quality metrics, data collection architecture, and randomized and quasi-experimentation infrastructure.
- Leading the cross-functional effort to build AWS cost efficiency data and analytics tools - enabling Netflix to better manage its nearly \$800 million cloud infrastructure spend.
- Building Netflix's first formal ML for Systems team.
- Co-leading the development of the first "Data and Insights Day" - the first in person activity for the entire 500 person Data Science org after the COVID pandemic. This is now a week-long event held twice a year and organized by the CTO's direct reports.
- Participating in the development of IC levels at Netflix and successfully promoting two ICs on my team to the new L6 (staff) level.
- Being selected to be part of the first cohort of managers to be promoted to the new Senior Manager position when it was created.

FLYR

Head of Product, Head of ML Ops
November 2018 - April 2020

FLYR is using AI to change how airlines price tickets. I was hired to lead the creation of end-to-end ML development tools to speed the iteration and deployment of new models. Later I was promoted to lead product development for the whole company. Highlights include:

- As Head of Product, I created a shared vision and strong performance oriented culture for the FLYR product, program and data science teams. A total of 22 people in locations in San Francisco, Krakow Poland, and Kuala Lumpur Malaysia.
- Under my leadership, the team was able to transform the languishing efforts to build bespoke solutions for FLYR's two flagship customers, into FusionRM 2 - a unified airline revenue management platform that uses an LSTM neural network deployed on Google AI Platform to generate daily ticket prices for thousands of flights across multiple airlines.
- Managing FLYR's relationships with JetBlue, AirAsia, Air New Zealand and Southwest Airlines.

- Spearheading the adoption of a data-driven product development approach, focused on measuring the quality of the pricing decisions FusionRM 2 was making vs established baselines.
- As Head of ML Platform, I created the charter, defined the roadmap, and managed the work of the ML Platform team at FLYR - a hybrid team of data scientists and engineers whose purpose was to create a platform to enable FLYR to deliver data science products at scale to multiple airline customers.
- Creating clear boundaries of ownership in the production inference pipeline between the data science and engineering orgs. This enabled both data scientists and engineers to be more effective by focusing on their strengths.
- Designing the system architecture for FLYR's production inference pipeline. This architecture aligned the new ML Platform team which had very little experience with production scale ML pipelines so they could begin to untangle the bespoke legacy system.
- Armed with clear direction and ownership, the new team was able to quickly take over a system that was suffering critical production failures on a daily basis, stabilize it in a matter of weeks, and begin building performance and feature enhancements within a month.

Radius Intelligence

Data Science Manager March 2017 - October 2018

Radius Intelligence was developing a curated data set of US businesses to connect B2B marketing and sales teams to potential customers. I led the data science team who was responsible for the quality and comprehensiveness of this data. We monitored every stage of the data ingestion and curation pipeline and built models to detect and address quality issues. We also worked closely with engineering teams to improve systems that did entity resolution, search space reduction and clustering. Highlights include:

- Leading initiatives to deliver business value from first-party data provided by Radius customers (as opposed to third party data purchased from external data providers). Major projects in this space include models and processes to perform phone and email validation, and net-new contact validation.
- I provided technical leadership and hands-on modeling and coding work for Radius's updated matching framework. The new framework allowed fast iteration on model code which enabled the data science team to drive performance improvements to matching precision and recall.
- I defined the data science charter at Radius, providing a vision for the function and clarifying the various roles within the function. I developed a job ladder for data scientists to provide clear opportunities for professional development.
- Consolidated data science into a single unit within the engineering organization. Developed strong relationships with engineering and product leadership to define operating cadence and cross-functional team success.

Discovery Digital Networks

Director of Data Science and Technology March 2014 - March 2017

Discovery Digital Networks (DDN), produced Discovery Channel branded, short form video content for online distribution. I was hired to build a system that would provide visibility into content performance across multiple distribution channels. I was later asked to lead the entire data and engineering organization, where I modernized the DDN tech stack and enabled better data-driven decision-making across the organization. Highlights include:

- Designing and building a robust data science platform using python, redshift and distributed EC2 instances, to support data collection, distribution and analysis across multiple Discovery Communications brands including: The Discovery Channel, Animal Planet and The Science Channel. At its peak this platform was ingesting and analyzing over 500 million rows of data per day.

- Leading a group of software architects, web engineers, and apps engineers in implementing and maintaining a suite of online properties with a total of approximately 2 million unique users per month and a data collection, reporting and analytics infrastructure storing information about tens of thousands of video assets across dozens of distribution platforms.
- Developing a time-series forecasting algorithm based on the notion of a directed random walk, and designed to predict 12 months of video distribution network performance. The results of this algorithm were deployed on corporate dashboards and used to report predicted financial performance.
- Creating and deploying a forecasting algorithm to predict the 30-day performance of new videos for use in setting advertising prices. Five days after a video had been published, 95% of the algorithm's predictions were within 10% of the actual 30-day view totals.
- Creating flexible data dashboards which delivered performance data on hundreds of distribution sources including YouTube channels, Facebook pages, owned and operated websites, and Free-wheel ad services.
- Directing the design, implementation, and deployment of a modern microservice based web architecture, using Lumen, React and Node.js, which replaced an 8-year-old legacy PHP framework. The finished architecture more than halved the page delivery and rendering time, and resulted in vastly improved stability and reduced development time.
- Leading the migration of all of Discovery Digital Networks web and data infrastructure to Amazon Web Services.
- Leading the successful development and deployment of seekernetwork.com, an online video network featuring original content focused on travel and adventure.
- Using machine learning classification algorithms, developing and deploying a tool that used past video performance to help producers create better video titles. The tool automatically selected the best algorithm and external parameters, and created new models daily. The best case model guessed the correct answer around 80% of the time, while the worst case was still better than chance at around 56%.
- Creating a system which continuously polls the YouTube and Facebook APIs to collect high-frequency view data for all published videos under 30 days old. The resulting data is stored in a Cassandra database and allows producers and audience development to react quickly to ensure a video's success.
- Developing microservices using Python and Flask to deliver all analytics data to end users and applications.

University of California, Davis and Columbia University

Graduate Student, Researcher, Associate Instructor
January 2005 - March 2014

I was fortunate enough to be able to study undergraduate physics and math at Columbia and later continue graduate study at the UC Davis Department of Physics. My focus area was complex systems and computation, specifically using simulation to better understand earthquakes. In the latter portion of my studies, I was awarded a NASA Earth and Space Science Fellowship which funded my research. Highlights include:

- Developing and analyzing Virtual California, a computer simulation of the earthquake fault systems in California.
- Analyzing the results of the Regional Earthquake Likelihood Models earthquake forecasting test. This was a competition between various academic institutions to develop better earthquake forecasting models.
- Before being awarded the NASA fellowship, I was the primary lecturer for the introductory physics course taught to pre-med, biology and chemistry undergraduates. I developed and delivered lectures and exams and held study groups to help interested students.

Weill Cornell Medical College and New York Presbyterian Hospital

Product Manager, Senior Web Designer

June 2002 - January 2005

I was a designer and product manager for the team responsible for developing the Weill Cornell Medical College and New York Presbyterian Hospital suite of public websites. This included the primary site for each institution but also a host of department websites. I helped establish a consistent design language that tied all of these sites together. I also worked with hospital and college staff to develop content strategy. Highlights include:

- Leading the successful completion of over 30 websites for both Weill Cornell Medical College and NewYork-Presbyterian Hospital.
- Leading the development of institutionalized technical project management within Weill Cornell Medical College.
- Improving the web development process by integrating project management, source control and reusable design components.
- Collaborating with NewYork-Presbyterian Hospital marketing and Weill Cornell Medical College directors to solve business problems on the web.
- Developing teaching tools for the Weill Cornell Medical College Geriatric Division.

Xperts Inc.

Creative Director, Designer

March 1997 - June 2002

I was a designer and later the leader of the design team at this 70 person technology consulting firm during the height of the dot-com boom. I worked closely with dozens of clients ranging from start-ups, to small businesses, to giant corporations on design and UX for web applications. I also worked to improve the quality of UX and design work across all of Xperts through hiring, design reviews and guidance and mentorship. Highlights include:

- I designed and implemented user interface strategies for over 30 companies in market sectors ranging from healthcare and education to broadband and packaged consumer goods.
- Leading an award-winning team of designers and user interface engineers through mentoring, selective hiring, and the development of management systems.
- Guiding the development of Xperts software design methodology in collaboration with other company executives.
- I helped acquire new business by developing sales strategies, project estimates and bid presentations.
- Directed the organizational wide acceptance of new user interface and design technologies.

Technologies

Languages

Python and SQL are my languages of choice. I've worked with: JavaScript, C, C++, HTML, CSS, Java, php, CQL, bash shell scripting, Objective C, IDL, Mathematica, MatLab, lisp, and ActionScript.

Applications, Modules, Libraries and Frameworks

My most recent experience is with: Spark, Databricks, Numpy, Scikit-learn, TensorFlow/Keras, Scipy, Pandas, MySQL/PostgreSQL, Google BigQuery, Matplotlib, Jira, and Confluence. In the past I have used: SQLAlchemy, Celery, Cassandra, Redshift, D3.js, Boto, Flask, HDF5, Django, JQuery, PIL, Ajax, Hadoop, WordPress, MPI, Mathematica, Adobe Illustrator, and Adobe Photoshop.

Cloud Platforms

Amazon Web Services, Google Cloud Platform

Education

University of California, Davis

Completed physics PhD, 2013

- Adviser: Professor John B. Rundle
- Area of Study: Computational physics and complex systems
- Course work completed with a 3.87 GPA

Columbia University

Completed undergraduate physics curriculum, 2007

- Physics and math coursework in order to prepare for graduate school.
- 3.99 GPA

Virginia Commonwealth University

Bachelor of Fine Arts, Graphic Design, School of the Arts, 1995

- Top visual arts program among US public research universities according to the NSF.
- 3.24 GPA

Publications

Parametrizing Physics-Based Earthquake Simulations

K. W. Schultz, M. R. Yoder, J. M. Wilson, E. M. Heien, **M. K. Sachs**, J. B. Rundle, and D. L. Turcotte
Pure and Applied Geophysics (2016)

Virtual Quake: Statistics, Co-Seismic Deformations and Gravity Changes for Driven Earthquake Fault Systems

K. W. Schultz, **M. K. Sachs**, E. M. Heien, M. R. Yoder, J. B. Rundle, D. L. Turcotte, and A. Donnellan
International Symposium on Geodesy for Earthquake and Natural Hazards (GENAH) 145 29-37 (2015)

Simulating Gravity Changes in Topologically Realistic Driven Earthquake Fault Systems: First Results

K. W. Schultz, **M. K. Sachs**, E. M. Heien, J. B. Rundle, D. L. Turcotte, and A. Donnellan
Pure and Applied Geophysics Volume 17 827-838 (2014)

Self-Organizing Complex Earthquakes: Scaling in Data, Models, and Forecasting

M. K. Sachs, J. B. Rundle, J. R. Holliday, J. Gran, M. Yoder and W. Graves
"Self-Organized Criticality Systems" Open Academic Press (2013)

A Comparison among Observations and Earthquake Simulator Results for the allcal2 California Fault Model

T. E. Tullis, K. Richards-Dinger, M. Barall, J. H. Dieterich, E. H. Field, E. M. Heien, L. H. Kellogg, F. Pollitz, J. B. Rundle, **M. K. Sachs**, D. L. Turcotte, S. N. Ward and M. B. Yikilmaz
Seismological Research Letters 83 994-1006 (2012)

Generic Earthquake Simulator

T. E. Tullis, K. Richards-Dinger, M. Barall, J. H. Dieterich, E. H. Field, E. M. Heien, L. H. Kellogg, F. Pollitz, J. B. Rundle, **M. K. Sachs**, D. L. Turcotte, S. N. Ward and M. B. Yikilmaz
Seismological Research Letters 83 959-963 (2012)

Virtual California Earthquake Simulator

M. K. Sachs, E. M. Heien, D. L. Turcotte, M. B. Yikilmaz, J. B. Rundle and L. H. Kellogg
Seismological Research Letters 83 973-978 (2012)

Forecasting Earthquakes: The RELM Test

M. K. Sachs , D. L. Turcotte, J. R. Holliday and J. B. Rundle
Computing in Science and Engineering 14 43 (2012)

Understanding Long-Term Earthquake Behavior through Simulation

E. M. Heien and **M. K. Sachs**
Computing in Science and Engineering 14 10 (2012)

Black swans, power laws, and dragon-kings: Earthquakes, volcanic eruptions, landslides, wildfires, floods, and SOC models

M. K. Sachs , M. R. Yoder, D. L. Turcotte, J. B. Rundle and B. D. Malamud
European Physical Journal Special Topics 205 167-182 (2012)

Implications of the RELM test of earthquake forecasts in California

M. K. Sachs , Y. T. Lee, D. L. Turcotte, J. R. Holliday and J. B. Rundle
Research in Geophysics 2 e10 (2012)

Evaluating the RELM test results

M. K. Sachs , Y. T. Lee, D. L. Turcotte, J. R. Holliday and J. B. Rundle
International Journal of Geophysics 2012 (2012)

Earthquake precursors: activation or quiescence?

J. B. Rundle, J. R. Holliday, M. Yoder, **M. K. Sachs** , A. Donnellan, D. L. Turcotte, K. F. Tiampo, W. Klein and L. H. Kellogg
Geophysical Journal International 187 225-236 (2011)

Results of the Regional Earthquake Likelihood Models (RELM) test of earthquake forecasts in California

Y. T. Lee, D. L. Turcotte, J. R. Holliday, **M. K. Sachs** , J. B. Rundle, C. C. Chen and K. F. Tiampo
Proceedings of the National Academy of Sciences (USA) 108 16533-16538 (2011)

Testing Lattice Quantum Gravity in 2+1 Dimensions

M. K. Sachs
arXiv:1110.6880 [gr-qc] (2011)