Michael Sachs

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I am a data scientist, physicist and designer who is interested in the stories data can tell. I have led teams, been part of technology start-ups, and consulted with companies both large and small. My work has been published in scientific journals, covered by the popular science press, and I have given talks at scientific conferences in Hawaii, Singapore, San Francisco, Santa Fe and New York. I studied physics at Columbia University and the University of California, Davis, and visual design at Virginia Commonwealth University. I am a NASA Earth and Space Science fellow and a Santa Fe Institute Complex Systems Summer School alumni, and most recently, the head of Product at FLYR in San Francisco.

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, HEALPix, GeoFEST, LaGriT, Polspice, Adobe Illustrator, and Adobe Photoshop.

Cloud Platforms

Amazon Web Services, Google Cloud Platform

Professional Experience

FLYR

A SaaS platform that applies advanced AI to airline ticket pricing. Backed by Peter Thiel and JetBlue Technology Ventures.

Head of Product — April 2019 to April 2020

- 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 FLYRs 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.
- Led the development and deployment of FusionRM 2, reenergizing several stalled projects (some stalled for up to a year), and focusing efforts to deliver a working product, deployed in production for both of FLYRs flagship customers, in under four months.
- Transformed the product conversation at FLYR by developing north-star metrics for FusionRM 2. These metrics both focused the efforts of internal teams and the conversations with FLYRs customers. Before these metrics were in place, FLYRs product profile at flagship customers was shrinking, going from managing flights on 20 markets to 5. With these metrics the profile began to grow again back up to 20+ markets. Additionally, these metrics enabled FLYR to expand into pricing flights in peak times on these markets.

Head of ML Ops — November 2018 to April 2019

- Created the charter, defined the roadmap, and managed the work of the ML Ops 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.
- Created 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.
- Designed the system architecture for FLYRs production inference pipeline. This architecture aligned the new ML Ops 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

Delivering B2B marketing data backed by The Network of Record, the most comprehensive, accurate and up-to date directory of businesses in the United States. Backed by Founders Fund and American Express Ventures.

Data Science Manager March 2017 to October 2018

- Built a team of data scientists engaged in expanding and exploring The Network of Record: the most accurate, comprehensive and up-to-date B2B data.
- Led initiatives to deliver business value from first-party data provided by Radius customers. Major projects in this space include models and processes to perform phone and email validation, and net-new contact validation.
- 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.
- Defined the data science charter, vision and scope at Radius. Developed a job ladder for data scientists to provide scope clarity and professional development transparency.
- 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 September 2014 to March 2017

- Designed and built 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.
- Led 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.
- Created flexible data dashboards which delivered performance data on hundreds of distribution sources including YouTube channels, Facebook pages, owned and operated web sites, and Freewheel ad services.
- Directed the design, implementation, and deployment of a modern RESTful 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 development time.
- Led the migration of all of Discovery Digital Networks web and data infrastructure to Amazon Web Services.
- Led the successful development and deployment of seekernetwork.com, an online video network featuring original content focused on travel and adventure.

Data Scientist April 2014 to September 2014

- Developed 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 corporate dashboards and used to report predicted financial performance.
- Created and deployed 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 algorithms predictions were within 10% of the actual 30 day view totals.
- Using machine learning classification algorithms, developed and deployed 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%.
- Created a process 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 videos success.
- Developed RESTful API endpoints using Python and Flask to deliver all analytics data to end users and applications.

Department of Physics, University of California, Davis

Researcher April 2008 to April 2014

- Working under Professors John Rundle and Donald Turcotte, developed, extended and analyzed Virtual California, a computer simulation of the earthquake fault systems in California and analyzed the results of the Regional Earthquake Likelihood Models earthquake forecasting results.
- Working under Professor Steve Carlip, developed a method of testing various properties of 2+1-dimensional spacetimes which emerge from causal dynamical triangulations, a lattice approach to approximating the gravitational path integral.
- Working under Professor David Wittman, analyzed weak gravitational lensing observations using wavelet techniques.

Department of Astronomy and Astrophysics, Columbia University

Research Assistant May 2006 to September 2006

- Modeled the effects of dust contamination on Wolter type x-ray optics.
- Presented preliminary results at Columbia University's "Astrofest" in September 2006.

Mikesachs.com

Founder/Principal January 2005 to September 2007

- Created compelling web experiences for a diverse set of organizations.
- Successful completion of five major projects for a variety of organizations including the New York Ad Club and Fountain House.
- Enabled small organizations to take control of their web presence.
- Collaborated with designers and subcontractors to deliver on client requirements.

Weill Cornell Medical College/NewYork-Presbyterian Hospital

Senior Web Designer June 2002 to January 2005

- Led the successful completion of over 30 websites for both Weill Cornell Medical College and NewYork-Presbyterian Hospital.
- Led the development of institutionalized IT project management within Weill Cornell Medical College.
- Improved the web development process by integrating project management, source control and reusable design components.

- Collaborated with NewYork-Presbyterian Hospital marketing and Weill Cornell Medical College directors to solve business problems on the web.
- Supported Weill Cornell Medical College Geriatric Division in completing grant audits.

Xperts Inc.

Creative Director — March 1997 to June 2002

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

Letterbrain.com

Co-founder — May 1999 to October 2000

- Partner and co-creator of an Internet-based business conceived to leverage web technologies in easing the process of traditional paper-based correspondence.
- Designed and developed an innovative WYSIWYG letter writing web interface using Flash 4 and Generator 2.
- Created the visual identity for the Letterbrain.com brand.

Education

University of California, Davis

Completed physics PhD, 2013

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

Columbia University

Completed undergraduate physics curriculum, 2007

- 3.99 GPA

Virginia Commonwealth University

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

- Tied for #1 public university school of arts and design in the country (#4 among public & private institutions) by U.S. News & World Report (2015).
- 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)14529-37(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 GeophysicsIn press(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 Letters83994-1006(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 Letters83959-963(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 Letters83973-978(2012)

Forecasting Earthquakes: The RELM Test
M. K. Sachs , D. L. Turcotte, J. R. Holliday and J. B. Rundle
Computing in Science and Engineering1443(2012)

Understanding Long-Term Earthquake Behavior through Simulation
E. M. Heien and **M. K. Sachs**
Computing in Science and Engineering1410(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 Topics205167-182(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 Geophysics2e10(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 Geophysics2012(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 International187225-236(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)10816533-16538(2011)

Testing Lattice Quantum Gravity in 2+1 Dimensions
M. K. Sachs
arXiv:1110.6880 [gr-qc](2011)

Awards and Recognition

- Three time Discovery D-Lighter award winner
- 2014 and 2015 Discovery Digital Networks Hackathon winner
- 2011 NASA Earth and Space Science Fellowship
- 2011 Santa Fe Institute Complex Systems Summer School
- Member of the Golden Key International Honor Society
- Interactive Best in Show, Richmond Ad Show 2004: AdCenter Website
- 10 eHealthcare Leadership Awards including 2 Platinum Awards for work done on the Weill Cornell Medical College Environmental Geriatrics Continuing Medical Education Application 2002-2005
- Artwork exhibited in the 2002 Paperveins Museum of Art Biennial at the Here Arts Center in New York City
- Xperts Employee of the Month May 1999, June 2001, August 2001
- Addy Award: Xperts Self Promotional Website 2000
- Xperts Outstanding Engineering Sales Support December 1999
- Xperts Excellence in Engineering Award August 1999
- 9 Xperts customer service awards 1997-2002

Conferences

AGU 2013

Earthquake Simulations and Historical Patterns of Events: Forecasting the Next Great Earthquake in California
***M. K. Sachs** , J. B. Rundle, E. M. Heien, K. Schultz, D. L. Turcotte, M. B. Yikilmaz, and L. H. Kellogg2013
Abstract NG41A-1662 (Poster) presented at 2013 Fall MeetingAGUSan Francisco, Calif.7-13 Dec.

Monitoring Earthquake Fault Slip from Space: Model Implications for a High Precision, High Resolution Dedicated Gravity Mission (Invited)
J. B. Rundle, ***M. K. Sachs** , K. F. Tiampo, J. Fernandez, D. L. Turcotte, A. Donnellan, E. M. Heien and L. H. Kellogg2013
Abstract G13C-08 presented at 2013 Fall MeetingAGUSan Francisco, Calif.7-13 Dec.

AGU 2012

Virtual California: studying earthquakes through simulation
***M. K. Sachs** , E. M. Heien, D. L. Turcotte, M. B. Yikilmaz, J. B. Rundle and L. H. Kellogg2012
Abstract NG43C-02 presented at 2012 Fall MeetingAGUSan Francisco, Calif.3-7 Dec.

Dynamics, Patterns, and Migration in Earthquake Fault Systems (Invited)
*J. B. Rundle, **M. K. Sachs** , J. R. Holliday, E. M. Heien, D. L. Turcotte, A. Donnellan and Z. Meadows2012
Abstract S13A-2518 (Poster) presented at 2012 Fall MeetingAGUSan Francisco, Calif.3-7 Dec.

EcoSummit 2012

Using Insights from Statistical Physics to Model Common Pool Resource Management
***M. K. Sachs** , N. Kunz, Z. A. Hamstead, A. Fajardo2012
Abstract GS07.28 presented at 2012 MeetingEcoSummitColumbus, Ohio30 Sept. - 5 Oct.

AOGS 2012

Delivery of Earthquake Forecasts on Web-Based Platforms: Estimating Reliability and Forecast Skill
J. B. Rundle, J. R. Holliday, ***M. K. Sachs** , W. Graves, P. B. Rundle, S. N. Ward and A. Donnellan2012
Abstract SE61-75-A001 presented at 2012 MeetingAOGSSingapore13-17 Aug.

Numerical Simulations for Space-time Seismic Pattern Analysis and Earthquake Forecasting
***M. K. Sachs** , E. M. Heien, D. L. Turcotte, M. B. Yikilmaz, J. B. Rundle and L. H. Kellogg2012
Abstract SE61-75-A002 presented at 2012 MeetingAOGSSingapore13-17 Aug.

AGU 2011

RELM Test Results: How Good Were the Forecasts?
***M. K. Sachs** , Y. T. Lee, D. L. Turcotte, J. R. Holliday and J. B. Rundle2011
Abstract NG44B-02 presented at 2011 Fall MeetingAGUSan Francisco, Calif.5-9 Dec.

Using Speculative Execution to Reduce Communication in a Parallel Large Scale Earthquake Simulation
E. M. Heien, M. B. Yikilmaz, **M. K. Sachs** , J. B. Rundle, D. L. Turcotte and L. H. Kellogg2011
Abstract NG51D-1672 (Poster) presented at 2011 Fall MeetingAGUSan Francisco, Calif.5-9 Dec.

E-DECIDER: Earthquake Disaster Decision Support and Response Tools - Development and Experiences
M. T. Glasscoe, R. G. Blom, G. W. Bawden, G. Fox, M. Pierce, J. B. Rundle, J. Wang, Y. Ma, M. R. Yoder, **M. K. Sachs** and J. W. Parker2011
Abstract IN11A-1269 (Poster) presented at 2011 Fall MeetingAGUSan Francisco, Calif.5-9 Dec.

SCEC Earthquake Simulator Comparison Results for California (Invited)
*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 O. Zielke2011
Abstract NG44B-01 presented at 2011 Fall MeetingAGUSan Francisco, Calif.5-9 Dec.

SCEC 2011

An Evaluation of the RELM Test Forecasts
M. K. Sachs , Y. T. Lee, D. L. Turcotte, J. R. Holliday and J. B. Rundle2011
Abstract B-120 (Poster) presented at 2011 Annual MeetingSCECPalm Springs, Calif.11-14 Sep.

Parallelization of the Virtual California Earthquake Simulator
E. M. Heien, M. B. Yikilmaz, **M. K. Sachs** , J. B. Rundle, L. H. Kellogg, and D. L. Turcotte2011
Abstract B-087 (Poster) presented at 2011 Annual MeetingSCECPalm Springs, Calif.11-14 Sep.

The Future of Virtual California Simulations
M. B. Yikilmaz, J. B. Rundle, D. L. Turcotte, E. M. Heien, **M. K. Sachs** , and L. H. Kellogg2011
Abstract B-110 (Poster) presented at 2011 Annual MeetingSCECPalm Springs, Calif.11-14 Sep.

Comparisons Among Earthquake Simulator Results for UCERF2 Fault Model of California and Observed Seismicity
T. E. Tullis, K. Richards-Dinger, M. Barall, J. H. Dieterich, E. H. Field, E. Heien, L. H. Kellogg, F. Pollitz, J. B. Rundle, **M. K. Sachs** , D. L. Turcotte, S. N. Ward, M. B. Yikilmaz, and O. Zielke2011
Abstract B-109 (Poster) presented at 2011 Annual MeetingSCECPalm Springs, Calif.11-14 Sep.

ACES 2011

Virtual California: Inner Workings, Recent Results and Future Development
***M. K. Sachs** , J. B. Rundle, D. L. Turcotte, A. Donnellan and J. W. Parker2011
Abstract 7400 presented at 2011 MeetingACESMaui, Hawaii1-5 May

Virtual California: A Guided Tour
M. K. Sachs , E. M. Heien, J. B. Rundle, D. L. Turcotte, M. B. Yikilmaz, L. H. Kellogg, K. F. Tiampo, A. Donnellan, W. Klein and J. W. Parker2011
Presented at 2011 MeetingACESMaui, Hawaii1-5 May

Teaching Experience

Department of Physics, University of California, Davis

Associate Instructor — January 2010 to July 2010

- Developed ten weeks of lectures for introductory undergraduate physics.
- Led weekly lectures to 250+ students.
- Created quizzes and exams.
- Organized small groups graduate teaching assistants to assist in grading and interacting with students.

Teaching Assistant — September 2007 to September 2010

- Led discussion lab of more than 30 students.

Press

scientificamerican.com

Test Pits Earthquake Forecasts against Each Other :
http://www.scientificamerican.com/article.cfm?id=test-pits-earthquake-forecasts

msnbc.com

Flagging quake hotspots an inexact science :
http://www.msnbc.msn.com/id/44676488/ns/technology_and_science-science/#.TrB2c2B8tjB

UCDavis News

Assessing California earthquake forecasts :
http://www.news.ucdavis.edu/search/news_detail.lasso?id=10025

NASA

Managing the Deluge of 'Big Data' From Space :
http://www.jpl.nasa.gov/news/news.php?release=2013-299

QuakeSim and NASA Mobile App Win NASA Software Award :
http://www.nasa.gov/topics/earth/features/quakesim20120920.html