

## Contact

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## Top Skills

Machine Learning

Artificial Intelligence (AI)

Data Mining

## Publications

F-15 Pyrophoric Infrared Countermeasure Flare (secret), Space Ordnance Systems

B-52 Pyrophoric Infrared Countermeasure Flare (secret), Space Ordnance Systems

ASRM Propellant Composition Tradeoff Study, JPL D-8765

## Patents

Using A Genetic Algorithm To Select A Subset Of Quality Metrics As Input To A Disk Drive Failure Prediction Algorithm

Predicting Disk Drive Failure At A Central Processing Facility Using An Evolving Disk Drive Failure Prediction Algorithm

Binning Disk Drives By Evaluating Quality Metrics Prior To A Final Quality Audit

Methods And Systems For Optimizing Engine Selection Using Machine Learning Modeling.

Methods And Systems For Optimizing Engine Selection

# Steve Rivkin

Chief Data Scientist | Inventor | Consultant | NASA Rocket Scientist  
Aliso Viejo, California

## Summary

I am a former NASA Rocket Scientist with extensive experience in predictive modeling, artificial intelligence, machine learning, stochastic optimization, algorithm development, and rocket propulsion analysis at major aerospace and national defense firms. Passionate about creating innovative solutions to complex real-world problems using scientific programming. Proven ability to combine a multitude of state-of-the-art algorithms into customized hybrid algorithms. Expertise developed by creating programs from "scratch". Diligent worker, independent, passionate, and innovative. Managed up to 35 employees. High Level DoD Clearance. (5) U.S. patents, (3) publications, (2) Employee-of-the-Year awards. Perfect 1000/1000 test scores in half of the Northwestern University MSc. Data Science courses, Summa Cum Laude.

## Experience

### Preston Ventures

#### Senior Data Scientist

April 2019 - Present (1 year)

Orange County, California Area

Artificial Intelligence, Machine Learning, and optimization algorithms.

Develop AI and ML algorithms. Deep Learning Neural Networks (DLNN), Deep Autoencoders, XGBoost, etc.

Created a Life Expectancy ML model that is 3 times as accurate as the existing model. Invented 20 concepts that are potentially patentable.

### Computational Profit Modeling

#### Chief Data Scientist

July 1998 - April 2019 (20 years 10 months)

Orange County, California

Machine Learning algorithm, Optimization algorithm, and Data Science subject matter expert.

- Developed state-of-the-art industrial-strength data mining predictive analytics software; CPM Enterprise Predictive Analytics. The software is 64-bit,

operating on clusters of computers, capable of processing millions of records with up to 4,000 dimensions (variables).

- Created programs from “scratch” including the following algorithms: Deep Learning Neural Networks (DLNN), Genetic Algorithms (GA), Artificial Neural Networks (ANN), NeuroGenetic Modeling (NGM), Particle Swarm Optimization (PSO), Differential Evolution (DE), Simulated Annealing (SA), Genetic Binary Decision Trees (GBDT), Ensemble Methods, k-nearest neighbors (KNN), systems of nonlinear Partial Differential Equations (PDE), systems of dozens of nonlinear Ordinary Differential Equations (ODE); and options models: Black-Scholes, GJR-GARCH Monte Carlo, Heston Monte Carlo, Heston semi-closed form in the complex domain, Variance-Gamma, CGMY, Value-at-Risk (VaR), Chaos Theory, and Technical Analysis TA).
- Developed programs using the IMSL library optimization algorithms including: Marquardt, Powell, Conjugate-gradient, and clustering algorithms, principal component analysis (PCA), logistic regression, linear regression, etc.
- Fortran 2015 with OpenMP / MPI for High Performance Computing (HPC) distributed parallel processing advanced statistical modeling and Machine Learning (faster than Hadoop).
- Machine learning consulting.

Veritone, Inc.

Chief Data Scientist

August 2016 - September 2017 (1 year 2 months)

Orange County, California Area

Artificial Intelligence, Machine Learning algorithm, and Stochastic Optimization algorithm expert.

- Artificial Intelligence (AI) algorithms: Deep Learning Neural Networks (DLNN), Deep Learning Recurrent Neural Networks (DLRNN), LSTM cells, Deep Convolutional Neural Networks (CNN), Deep Autoencoders, NeuroGenetic Modeling (NGM), Natural Language Processing (NLP), topic modeling (LSI, LDA, HDP), etc.
- AI Frameworks: Keras, theano, Tensorflow, MXnet, h2o, etc.
- Machine Learning algorithms: Artificial Neural Networks (ANN), Gradient Boosted Machines, Random Forests, Support Vector Machines (SVM), Multivariate Multidimensional Logistic Regression, Partial Least Squares Regression, etc. Ensemble Methods including Bagging, Boosting, and Stacking. Also various clustering algorithms.
- Stochastic Optimization algorithms: Genetic Algorithms, Particle Swarm Optimization, Differential Evolution, Simulated Annealing, Stochastic Gradient

Descent. Also classical optimization algorithms including Marquardt, Powell, Conjugate-gradient, Nelder-Mead, etc.

- Created and coded the entire core Artificial Intelligence (AI) project which is in production today. This AI controls all other AI algorithms company-wide.
- Invented nine concepts that are potentially patentable.

## Western Digital

### Senior Staff Data Scientist

April 2003 - September 2013 (10 years 6 months)

Irvine, CA

Serve as Data Mining subject matter expert, leading groups of software developers in the creation of complex data mining software systems.

- Successfully developed new method for scoring / ranking high-volume electronic devices into different levels of quality groups, revolutionary in its industry using predictive analytics (CPM Enterprise Predictive Analytics).
- Played a core role in adding approximately \$5,000,000 to annual bottom-line profits by driving launch of new scoring method deployed on 2,000 factory computers worldwide.
- Strategically led development of Data Deep Dive (D3) internal-Cloud system, a worldwide data mining system performing many types of advanced analyses running on a high powered computer in the corporate datacenter, with user requests available from any computer with Internet access.
- As team leader, managed developers of: web user interface, database processing, preprocessing data, advanced nonlinear statistics, classical statistical modeling, exploratory data analysis, data visualization, and automation of all the pieces written in different programming languages.
- The Data Deep Dive performs Failure Prediction Analyses and Classification Modeling and was developed in-house (for which main competitor SAS bid \$1,000,000) saving Western Digital a significant amount of money.
- Successfully developed a very accurate warranty analysis computer program in SAS that models over one billion data points (over \$50 billion of hard drives). Performs multidimensional nonlinear optimization.

## Hi-Shear Technology

### Chief Ballistician / Senior Staff Scientist

March 1998 - April 2003 (5 years 2 months)

Torrance, CA

Served as Interior Ballistic Analysis subject matter expert, helping other in-house ordnance engineers solve propellant and explosive load sizing and design optimization problems.

- Developed many Pyrotechnic, Explosive, and Propellant Actuated Devices (Mortars, Rocket Motor Initiators, Cable Cutters, Linear Actuators, Separation Bolts, Explosive Bolts, Explosive Nuts, etc.)
- Created interior ballistic analysis computer programs to predict the performance of various Propellant Actuated Devices. Consisted of a large system of differential equations, partial differential equations, and multidimensional optimizations to reach results. Written in Fortran-95, the programs utilize numerical libraries from IMSL. In conjunction with analysis, designed many thick-walled high-pressure test fixtures (workhorse test models) to calibrate and validate the computer models.
- Used theoretical thermo-chemical computer programs to calculate rocket propellant thermodynamic properties.
- Used finite element hydrodynamic computer programs to predict the elastic-plastic deformation of an explosive bolt used in the stage separation of the Atlas V rocket.

## U. S. Sales Corporation

### Senior Data Scientist

January 1996 - March 1998 (2 years 3 months)

Developed the best Marketing Research “House” model in 40-year history of U. S. Sales Corporation, generating a phenomenal \$4,000,000 per year in profits beyond existing SAS state-of-the-art “House” model.

- Surpassed independent European analysis company consisting of 36 statistical analysts by \$12,000,000 with introduction of Model, utilizing NeuroGenetic Modeling.
- Created custom model variables to maximize useable informational content of data, performed exploratory data analysis (EDA), model validation, and wrote preprocessing algorithms. Model output displayed in Statistica, Excel, and SAS.
- Employee of the Year, 1998.

## Computational Investment Corporation

### Senior Data Scientist

January 1993 - January 1996 (3 years 1 month)

Tarzana, CA

Developed statistical models using genetic algorithms, neural networks, k-nearest neighbors, clustering algorithms, principal component analysis, and other data mining algorithms. Developed tools for preprocessing and modeling stock market data using Fortran90 and Visual Basic.

## Jet Propulsion Laboratory

### Senior Solid Rocket Propulsion R&D Scientist

May 1988 - January 1993 (4 years 9 months)

Pasadena, CA

Created an Interior Ballistic Analysis (IBA) computer model to predict pressure and other parameters versus time in closed vessels for propellant combustion. Team member of the ASRM (next generation Space Shuttle) solid rocket motor propellant formulation project.

- Developed large system of differential equations, partial differential equations, and multidimensional optimizations utilizing numerical libraries from IMSL that ran on the Cray XMP supercomputer to reach results.
- Created computer model for analyzing and displaying solid propellant rocket motor static test firings, resulting in model usage at other NASA centers.
- Created Computational Fluid Dynamics (CFD) software to simulate solid propellant casting during the slurry phase, solving viscous, incompressible flow problems with free surfaces at very low Reynolds numbers.
- Used a finite element hydrocode to predict the elastic-plastic deformation of an explosive linear separation charge used in the release of the billion dollar NASA CRAF / Cassini satellites from their launch vehicles.
- Ported several mainframe rocket motor software programs to the PC including the SPP consisting of over 50,000 lines of Fortran and 500 subprograms (first in nation to do so) and CET 89.

## Space Ordnance Systems

### Senior R&D Ordnance Project Engineer

July 1980 - May 1988 (7 years 11 months)

Canyon Country, CA

Developed Interior Ballistic Analysis (IBA) models for use in pyrophoric infrared countermeasures (IR decoy flares) for F-15 and B-52 aircraft. Organized and managed special task force consisting of 35 employees for hazardous waste cleanup project.

- Employee of the Year, 1985.

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## Education

### Northwestern University

Master of Science (MSc), Data Science (Machine Learning)

### University of California, Los Angeles

Bachelor of Science (BS), Physical Chemistry

