

# JONATHAN T. FARLAND

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## EXPERIENCE

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### **TROVE Predictive Data Science**

*Data Scientist*

Oct 2017 - Present

*San Francisco Bay Area, CA*

- Client-facing consulting and project management of demand response, distributed energy resources, and advanced grid forecasting data science projects.
- Developed large-scale, near real-time predictive modeling systems currently in production across numerous North American utility companies.
- Lead demand response data scientist and product manager.

### **DNV GL Energy**

*Senior Consultant, Data Scientist*

Aug 2012 - Oct 2017

*Boston, MA*

- Responsible for client facing reporting and advisory services as lead technical consultant for the predictive analytics team.
- Developed hierarchical load forecasting approaches to address growth in emerging technologies and distributed generation using machine learning and statistical procedures.
- Proposed and managed technical studies related to the evaluation of energy programs both across the US and abroad. These include demand response, behavioral programs, distributed generation, renewables, and electric vehicle penetration.

### **Independent System Operator New England**

*Resource Adequacy*

Dec 2009 - Oct 2010

*Holyoke, MA*

- Designed heuristic algorithms that calculate dispatchable (real-time) availability of resources during system peak using empirical distributional fitting that employ nonparametric tests such as Kolmogorov-Smirnov and Jacques-Berra.

## EDUCATION

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### **University of Massachusetts, Amherst, USA**

Masters of Science - Applied Econometrics: Deans List, Cum Laude  
Bachelors of Business Admin - Operations Research & Finance  
Minor in Resource Economics

*Aug 2012*

### **University of Naples Federico, Portici, Italy**

Certificate of Course Completion - Advanced Micro-Econometrics

*Aug 2011*

## TECHNICAL STRENGTHS

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### **Languages**

R, Python, SQL, SAS, Matlab, Mathematica, VBA, AMPL

### **Computing**

Unix-based Systems, git, Spark, Hadoop, Databricks, AWS, Digital Ocean

### **Database**

Postgresql, MongoDB, Cassandra

### **Top R Packages**

tidyverse, shiny, forecast, mgcv, quantreg, hts, h2o, sparkR, sparklyr

### **Top Python Packages**

pandas, numpy, scikit-learn, PySpark, beautifulsoup

### **Applications**

Tableau, SAS Forecast Studio, SAS Visual Analytics, Advanced Microsoft Office

## SELECTED PROJECT WORK

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### **Predictive Analytics for Utility DR Operations**

*Project Manager*

*San Francisco, California*

Managed day to day client interactions and support while also tracking and developing the longer term product roadmap.

Designed and built a large-scale Demand Response forecasting system across all 7+ million meters of the Pacific Gas and Electric service territory and across the entire suite of demand response programs. Demand response programs modeled include both residential and commercial/industrial sectors, and cover various designs ranging from behavioural to direct load control and dispatch.

Research and Development of novel hierarchal load impact forecasting algorithms using machine learning and statistical models.

### **Advanced Electric Distribution Grid Forecasting**

*Data Scientist*

*San Francisco, California*

Developed advanced forecasting system to provide short-term hourly forecasts of energy demand across two large utility operating areas in California. Forecasts accounted for emerging technologies as well distributed generation such as solar and storage.

Smart meter and other telemetry data (e.g., SCADA) were paired with weather data and ingested into our proprietary data model on an ongoing basis across millions of sensors in near real-time.

Linking down-stream sensors across the complex electrical distribution network enabled the software to forecast by aggregation for grid nodes that did not have any historical telemetry. This provided significant cost savings to the customer from not having to install expensive sensors across all grid nodes.

### **Transformer Asset Risk Modeling**

*Data Scientist*

*Kansas City, Kansas*

Worked with in-house subject matter experts to codify institutional knowledge and include as a compliment to machine learning and AI-based predictive models

Used data from Dissolved Gas Analysis (DGA) testing to predict the risk of various failure modes as well as the anticipated time-to-failure across electrical transformers.

Time series of key gases such as Acetylene, Hydrogen, Ethane, Methane, Ethylene and Nitrogen were used to classify transformers based on their perceived risk level.

### **Real-time Customer Baseline and Incentive Modeling**

*Data Scientist*

*Portland, Oregon*

Consulted for a medium sized utility company in the Pacific Northwest to launch their first Peak Time Rebates program across the service territory.

Counterfactual customer-level baselines were generated for each customer using an ensemble of approaches including similar-day, regression, control groups and gradient boosting machine approaches.

Method selection was the result of an optimization model based on performance data in the most recent cross-validation period.

### **Hierarchical Forecasting of Energy and Peak Demand in the Kingdom of Saudi Arabia**

*Senior Data Scientist*

*Riyadh, Saudia Arabia*

Data analytics and modeling for the largest end-use metering project in the world. Developed and delivered a three-day course on predictive analytics to subsequently train analytical staff at client site in Riyadh, Saudi Arabia. Seminar participants included staff from Saudi Aramco, Saudi Electricity Company, and the Electricity and Cogeneration Regulatory Authority.

## **Global Energy Transition Outlook**

*Technical Advisor*

*Oslo, Norway*

Technical advisor for DNV GL's Energy Transition Outlook (ETO). This annual report seeks to identify and measure the major industry implications of the ongoing global energy transition for each of the OECD's regions. Developed bottom-up and top-down predictions of energy demand for each region of the globe until 2040.

## **Caltrack Beta Test**

*Lead Data Scientist*

*San Francisco, California*

Primary code base developer for rapid measurement of site-level, weather normalized energy savings. Process and predictive results benchmarked across open-source implementations from Open EE Meter. Algorithms implemented using R, Python and the Spark distributed computing framework on compute-optimized instances in the Amazon cloud.

## **Behavioural Demand Response Evaluation**

*Project Manager*

*Ottawa, Canada*

Project Manager and Lead Data Scientist for an impact evaluation pertaining to a hybrid energy program targeting both ongoing behavioural impacts as well as event-based hourly demand reductions. Analytics and reporting were generated using the Spark (1.5) distributed computing framework, Amazon Web Service S3 and EC2 instances, and the Databricks browser based platform.

## **Electric Vehicle Pilot Evaluation**

*Lead Data Scientist*

*State of Virginia*

Lead Data Scientist for a pilot involving time-of-use charging rates for electric vehicle owner's in Virginia. The project focused on whole house impacts for EV owners, as well as vehicle-charging only impacts. Statistical methods were used to enumerate differences between control and treatment average load shapes for the vehicle-charging only members. A synthetic control group was generated for the whole house treatment members.

## **Macroeconomic Modeling of State Commercial and Industrial Energy Sectors**

*Lead Data Scientist*

*State of Massachusetts*

Lead Data Scientist for a macroeconomic consumption modeling project of Massachusetts' Commercial and Industrial sectors. Our team developed a database of billing data pertaining to commercial and industrial premises for all energy efficiency program administrators in Massachusetts for three years. Along with NOAA weather data and economic data from the US Census Bureau and other sources, macroeconomic consumption models were used to estimate the impact of energy efficiency programs at the county and town level.

## **Mathematical Programming Approach Towards Risk Mitigation in Sports Betting**

*Graduate Researcher*

*University of Massachusetts*

Developed a modeling technique to maximize profit subject to a zero probability of loss from sports betting. Solved using the Simplex Algorithm, with the CPLEX solver in AMPL.

## PUBLICATIONS AND RESEARCH

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**Utility Load Research: The Future of Load Research is Now**, C. Puckett, C. Williamson, C. Godin, W. Gifford, J. Farland, T. Laing, T. Hong, IEEE Power and Energy Magazine, May/June, 2020

**Model Based Matching and Other Benefits of High Frequency Interval Data**, L. Getachew, J. Farland, K. Agnew, P. Franzese, V. Richardson, G. Sadhasivan, International Energy Program Evaluation Conference, Baltimore, USA, 2017

**Electricity End Use Forecasting Using Non-Intrusive Load Metering Technology**, J. Farland, C. Puckett, F. Coito, International Symposium on Forecasting, Cairns, Australia, 2017

**High Resolution Energy Modeling that Scales with Apache Spark 2.0**, J. Farland, Spark Summit Boston, USA, 2017

**Load Forecasting with Distributed Energy Resources**, J. Farland, F. Farzan, R.J. Hyndman, International Symposium on Forecasting, Santander, Spain, 2016

**Breaking Down Analytical and Computational Barriers in Energy Data Analytics**, J. Farland, Spark Summit San Francisco, USA, 2016

**Zonal and Regional Load Forecasting in The New England Wholesale Electricity Market: Semi-parametric Regression Approach**, Masters Thesis, University of Massachusetts, 2012

## PROFESSIONAL ORGANIZATIONS AND DISTINCTIONS

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Board of Directors, Peak Load Management Alliance, 2020

Member, International Institute of Forecasting

Speaker, 39th International Symposium on Forecasting, Thessaloniki, Greece, 2019

Invited Speaker, 38th International Symposium on Forecasting, Boulder, Colorado, 2018

Speaker, 37th International Symposium on Forecasting, Cairns, Australia, 2017

Speaker, Spark Summit East, Boston, USA, 2017

Session Chair, 36th International Symposium on Forecasting, Santander, Spain, 2016

Speaker, AEIC Advanced Load Research Applications, Nashville, Tennessee, USA, 2016

Speaker, Spark Advisory Forum, San Francisco, USA, 2016

Speaker, Spark Summit West, San Francisco, USA, 2016

Speaker, 34th International Symposium on Forecasting, Rotterdam, Netherlands, 2014

Vijay Bhagavan Distinguished Teaching Award, University of Massachusetts Amherst, 2012

International Advanced Econometrics Scholarship from Italian Ministry of Agriculture, 2011