

Profile

Highly-motivated, innovative individual with extensive experience in empirical research, data product development, and transparent visualization of varied, high-dimensional data sets. Creative, analytic problem solver equipped with the intuition and tools necessary for identifying trends and patterns in complex data sets. Self-driven, collaborative personality with the understanding that a cross-functional, open-minded work environment and combined skill sets result in efficient delivery of high-value, dependable data products. Effective written and verbal communicator.

Computing Skills

Programming / Tools: Proficient in Python (TensorFlow, Keras, scikit-learn, pandas, NumPy, etc), R (dplyr, tidyr, ggplot2, magrittr, etc), SQL (postgres, sqlite), Amazon Web Services (Redshift, S3, EC2, EBS), Tableau, MatLab, IDL, UNIX (bash, awk, sed, grep, wget, etc), LaTeX, Vim, HTML, CSS, Markdown; Limited / Classroom exposure to Fortran, Spark, Hive, Java, C/C++, JavaScript

Analytics:

- **Structured Unstructured Data** (sensors, scientific instrumentation, spacecraft, images, text, time series, geospatial, simulation, genomics, marketing, viewership, commerce)
- **Data Pre-Processing** (table joins, up/down sampling, outlier detection, imputation, aggregation, feature selection, engineering, and/or extraction)
- **Probability & Statistics** (e.g., inference, hypothesis testing, resampling, conditioning, error analysis)
- **Machine Learning** (e.g., neural networks, deep learning, CNNs, RNNs, reinforcement learning, statistical models, regression, classification, clustering, prediction, PCA, LDA, feature selection/extraction/engineering, decision trees, random forests)
- **Time Series Analysis** (parametric, nonparametric, spectral analysis, signal processing, forecasting)
- **Numerical Modeling** (e.g., difference equations, numerical derivatives, numerical integration, linear/nonlinear models, dynamical systems, numerical stability, eigenvalue estimation)

Work and Professional Research Experience

WWE, Advanced Analytics Team

Stamford, CT • October 2016 – Present

Data Scientist, Manager

- Design and deployment of deep neural network models in Keras and TensorFlow on cloud GPUs for a handful of projects, including those related customer segmentation, churn, and lifetime value (multilayer perceptrons, autoencoders, recurrent neural networks)
- Development of wrestler image recognition algorithm (transfer learning, convolutional neural networks)
- Lead on numerous business-driven analytics research and predictive modeling projects for WWE Network, including:
- Spectral analyses of customer churn/winback behaviors to enhance customer segmentation efforts, help advise email campaigns, and improve churn/winback forecasting
- Development of multiple revenue attribution models for WWE Network content driven by viewership behaviour at the customer level
- Harmonization of fan panel / survey response data with customer accounts on the WWE Network to better quantify the relationship between subjective responses and objective viewership data
- Sentiment analysis of customer cancellation surveys and social media content to uncover resolvable issues and inform on how to better serve our customer base
- Development of project-agnostic and project-specific R packages to facilitate or fully automate data capture, cleansing, transformation, analysis, and reporting
- Decision tree analyses to help understand and segment customers by WWE content and character preferences
- Design of interactive dashboards in Tableau to help interested parties explore our data assets

NJIT Center for Solar-Terrestrial Research

Newark, NJ • January 2012 – May 2016

Research Scientist

- Led multiple data-driven research projects resulting in a first-author publication, PhD dissertation, and several papers currently in development
- Provided new, empirical insights and interpretation of decades-old problem concerning the geomagnetic field's complex structure in Earth's polar regions
- Developed prediction scheme to forecast the magnetic weather in the deep polar cap
- Developed remote-sensing technique using ground-based sensors to infer/predict parameters in near-Earth space

- Created innovative visualization and analysis techniques
- Implemented robust, non-parametric methods to characterize empirical distributions
- Conducted the collection, harmonization, and normalization of 100's of time series data streams from instruments/sensors distributed across the Earth and solar system to model and understand the linear/nonlinear drivers of a complex systems
- Developed software packages to enable efficient, streamlined analysis

NJIT Department of Mathematical Sciences

Newark, NJ • 2008 – 2012

Research Scientist, Mathematical Modeling

- Extensively modeled, analyzed, and visualized several representations of granular fluid systems in MatLab and R
- Investigated sources of chaos in a dimensionally-reduced parameter space of a discrete-dynamical system (e.g., via Poincare map simulations in R ^[link])
- Led effort in understanding and controlling the propagation of numerical errors, which otherwise prevent proper quantitative analysis and visualization of the underlying dynamical system
- Co-authored four peer-reviewed papers numerically modeling, visualizing, and analyzing granular fluid systems
- Led research project on applications of fractional calculus and co-authored peer-reviewed publication
- Explored real-world applications of advanced mathematical disciplines such as dynamical systems, topological analysis, manifold theory, abstract algebra, stochastic calculus

NASA/CalTech Jet Propulsion Laboratory

Pasadena, CA • Summer 2011

Intern, Trajectory Optimization / Design

- Collaborated with a team of engineers and scientists to develop a full-fledged spacecraft mission to the Trojan asteroids of Jupiter (from establishing and prioritizing science goals, to optimizing the science-engineering-financial parameter space, to the written proposal and presenting our mission design to the NASA review board)
- Gained an appreciation of rapid product development via concurrent engineering, and an understanding of the intricate interplay between the various engineering system designs, science goals, timeline requirements, and budget constraints.
- Published peer-reviewed paper documenting lessons learned

Independent Research Consultant

Clifton, NJ • August 2010 - August 2011

- Procured contracts from NJIT's Physics Department and Siena College's Department of Physics and Astronomy to continue the development of automated, real-time prediction of geomagnetic parameters using geospatially-distributed network of magnetometers
- Published peer-reviewed paper documenting proof-of-concept and lessons learned proof-of-concept ^[link]

NJIT Department of Physics

Newark, NJ • August 2008 - August 2010

Research Assistant

- Led project demonstrating the feasibility of a real-time surveillance, detection, classification, and prediction of local, regional, and global-scale geomagnetic events of interest
- Analyzed multi-channel instrument data from a spatially-distributed network of automated observatories in Antarctica.
- Developed data metrics and associated classification scheme for events of interest in the data sets.
- In-depth experience visualizing and analyzing data in R, MatLab, and IDL
- In-depth experience in various data analysis techniques, such as digital signal processing, time series analysis, spectral analysis, statistical methods, modeling, and regression.
- Hardware-software interfacing of instrumentation for data collection
- Published Master's thesis

NASA Goddard Space Flight Center

Greenbelt, MD • June – August 2007

Intern, Observational Cosmology Laboratory

- Developed software implementing a Stokes parameter analysis to run on simulation data for the proposed Absolute Spectrum Polarimeter [ASP] — an instrument designed to detect B-mode gravitational waves, which would provide evidence for Einstein's theory of general relativity and cosmological inflationary theory
- Worked with multiple programming languages, including MatLab, Bash (shell scripting), and IDL

NASA Goddard Space Flight Center

Greenbelt, MD • June – August 2006

Intern, Heliophysics Division

- Worked extensively in the UNIX programming environment, learning and developing Python, HTML, CSS, JavaScript, and PHP code
- Developed web content

Selected Peer-Reviewed Publications

- Rethinking the polar cap: Eccentric-dipole structuring of ULF power at the highest corrected geomagnetic latitudes, *Journal of Geophysical Research, Space Physics*, Vol. 121, 2016.

- Analysis, simulation, and visualization of 1D tapping via reduced dynamical models, *Physica D: Nonlinear Phenomena*, Vol. 273, 2014.
- Mission to the Trojan Asteroids: Lessons learned during a JPL Planetary Science Summer School mission design exercise, *Planetary and Space Science*, Vol. 76, 2013.
- Dynamical systems model and discrete element simulations of a tapped granular column, *Powders and Grains 2013: Proceedings of the 7th International Conference on Micromechanics of Granular Media*. Vol. 1542. No. 1. AIP Publishing, 2013.
- Quiet-time observations of the open-closed boundary prior to the CIR-induced storm of August 9, 2008, *Space Weather*, Vol. 9, S11001, 2011.
- Tapping dynamics for a column of particles and beyond, *Journal of Mechanics of Materials and Structures*, Vol. 6, No. 1-4, 2011.
- Integrability analysis of regular and fractional Blackmore-Samulyak-Rosato fields, *Condensed Matter Physics*, Vol. 13, No. 4, 2010.

Education

Ph.D., Applied Physics

New Jersey Institute of Technology & Rutgers University, Newark, NJ

Dissertation: The Hydromagnetic Structure of the Polar Cap and Its Interaction with the Solar Wind

M.S., Applied Physics (Minor: Applied Mathematics)

New Jersey Institute of Technology & Rutgers

University, Newark, NJ

Thesis: Synoptic Variability of a CIR-Driven Open-Closed Boundary During Solar Minimum

B.S., Applied Physics (Minor: Applied Mathematics)

New Jersey Institute of Technology & Rutgers

University, Newark, NJ