Kevin Urban, PhD

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https://www.linkedin.com/in/drkrbn
https://github.com/krbnite
https://krbnite.github.io/

Computing Skills

Programming / Tools: Proficient in Python (Jupyter, TensorFlow-GPU, Keras, SciKit-Learn, Pandas, NumPy, Requests, BeautifulSoup, Selenium), R (dplyr, tidyr, ggplot2, magrittr, RStudio, R Markdown, etc), SQL (PostgreSQL, SQLite), Amazon Web Services (Redshift, S3, EC2, EBS), Tableau, MatLab, Octave, IDL, UNIX (OS X) and Linux (Ubuntu) Shell Scripting (e.g., bash, awk, sed, grep, wget, ssh, sftp, etc), Git, Github, LaTeX, Vim, HTML, CSS, javascript, MarkDown, Excel, Google Sheets; Limited Experience and/or Classroom exposure to Spark, Hive, Java, C/C++, Fortran

Analytics:

- **Structured & Unstructured Data** (e.g., sensors, scientific instrumentation, spacecraft, images, text, time series, geospatial, simulation, genomics, marketing, viewership, commerce, webpages, social media)
- **Data Pre-Processing** (e.g., table joins, up/down sampling, outlier detection, imputation, aggregation, feature selection / engineering / extraction, regex and rules-based scrubbing / transformations)
- **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, decision trees, random forests, sentiment analysis, natural language processing)
- **Time Series Analysis** (e.g., parametric, nonparametric, spectral analysis, digital signal processing, digital filtering, forecasting, wavelets)
- **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

- Lead on numerous business-driven analytics research and predictive modeling projects for WWE Network – an over-the-top (OTT) content distribution network that can be described as "Netflix for Wrestling" and currently supports nearly 2 million active users, generating 1-3 million new rows of viewership/behavioral data in Redshift database every day
- Experimentation and development of machine learning pipelines in Python / Scikit-Learn (preprocessing, feature selection, dimensionality reduction) and deep neural network models in Keras and TensorFlow on AWS EC2 x2.2xlarge (GPU instance) for a handful of projects related customer segmentation, churn, and lifetime value (multilayer perceptrons, autoencoders, recurrent neural networks)
- Development of wrestler image recognition algorithm (transfer learning, convolutional neural networks)
- Spectral analyses of customer churn/winback behaviors to enhance customer segmentation efforts, help advise email campaigns, and improve churn/winback forecasting
- Development of ensemble approach to revenue attribution models for WWE Network content driven by viewership behaviour at the customer level (analysis of over a billion rows of data in Redshift)
- Fusion 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
- Natural language processing (sentiment analysis) of customer cancellation surveys and social media content to uncover resolvable issues and inform on how to better serve our customer base
- Automation of report generation and analytic work flows through the development of project-agnostic and project-specific R packages and python scripts (data extraction, cleansing, transformation, analysis, reporting, website scraping)
- 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

- Fusion and harmonization of data sets from a ground-based, globally-distributed network of instruments; high-altitude satellites, such as NOAA's DMSP fleet and NASA's Van Allen Probes; and interplanetary spacecraft (NASA's ACE)
- 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 intensity and spatial-temporal distribution the magnetic weather in Earth's deep polar cap region using spacecraft upstream of Earth in the solar wind (NASA's ACE)

- Inverted the prediction scheme to leverage it as a remote-sensing technique such that data from ground-based magnetometers in Antarctica can be used to infer space weather parameters in near-Earth space and, if necessary, could essentially replace in-situ spacecraft for certain measurements
- Created innovative visualization and analysis techniques to better understand and transform our understanding of the Earth magnetic geography and its dynamic response to varying space weather conditions
- Supported myriad data analysis efforts and projects as a member of the RBSPICE instrument team for NASA's Van Allen Probes mission, which has been essential in understanding and forecasting hazardous conditions of Earth's radiation belt environment
- Developed software packages in Bash, R, MatLab, and IDL to enable efficient, streamlined analyses and reporting for a range of ongoing projects
- Published first-author publication, PhD dissertation, and currently have several papers in development

NJIT Department of Mathematical Sciences **Newark, NJ • 2008 – 2012**

Research Scientist, Mathematical Modeling

- Developed dynamical system models for granular fluid systems
- Simulated and visualized the dynamical models in MatLab and R
- Investigated sources of chaos and instability in such systems by projecting them into a dimensionally-reduced parameter space and coding simulations of their Poincare maps in R
- 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 on potential engineering 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 - January 2012**

- 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

Continuing & Extracurricular Education

Self-Driving Car Nanodegree — Udacity (Currently Enrolled)
Deep Learning Nanodegree Foundation — Udacity