Kevin Urban, PhD http://www.kevin-urban.com kevin.ddu@gmail.com • (973) 464-6833 https://www.linkedin.com/in/drkurban

**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 with an intuition for trends and patterns in complex data, and insight into the underlying mathematical structure. Self-motivated, 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**:

R, Python, MatLab, IDL, UNIX, Bash, JavaScript, SQL, SQLite, Hive, Spark, MongoDB, Java, C/C++, Tableau, Excel, Awk, Sed, LaTeX, Vim

**Analytics**:

**Structured Data** (e.g., uni/multi-variate time series, geospatial, model/simulation output, genomics data)

**Unstructured Data** (e.g., image analysis, text mining / scrubbing web pages)

**Sensor/Instrument Network Data** (e.g., 100’s of globally-distributed geomagnetic sensors)

**Data Pre-Processing** (outliers, data gaps, formatting / restructuring, ETL)

**Probability & Statistics** (e.g., models, inference, hypothesis testing, resampling, conditioning, error analysis)

**Supervised Machine Learning** (e.g., regression, classification, clustering, prediction)

**Unsupervised Machine Learning** (e.g., PCA, SVD, hierarchical clustering, dimensionality reduction)

**Time Series Analysis** (ARMA, prediction, forecasting, spectral analysis, digital signal processing, non-parametric methods)

**Anomaly Detection** (e.g., kernel density methods, event detection, pattern recognition)

**Modeling** (linear, nonlinear, dynamical systems, difference equations, numerical stability, eigenvalues)

**Work and Professional Research Experience**

**Department of Physics, NJIT, Newark, NJ (January 2012 – May 2016)**

*Research Scientist*

* Led multiple data-driven research projects, providing new insights into decades-old problems, and resulting in several first-author research papers
* Devised prediction scheme to forecast the evolution of hydromagnetic energy in the deep polar cap
* Developed remote-sensing technique using ground-based data sets to infer/predict parameters in near-Earth space
* Results and development included: innovative visualizations; robust, non-parametric analysis of time series / geospatial data; data collection and normalization from global-scale networks of instruments/sensors; analysis of linear/nonlinear drivers of complex systems; development of software packages for efficient, streamlined analysis

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

*Research Scientist*

* Modeled, analyzed, and visualized granular fluid systems in MatLab and R, resulting in 4 peer-reviewed publications
* Investigated sources of chaos in dimensionally-reduced, discrete dynamical systems
* Drove project on applications of fractional calculus, resulting in publication
* Determined how to control numerical errors in stiff model
* Explored real-world applications of 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 cross-functional 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

**Department of Physics, NJIT Newark, NJ (August 2008 - August 2011)**

*Independent Research Scientist (2010-2011)*

*Research Assistant (2008-2010)*

* Led project demonstrating feasibility of real-time classification, prediction, and reconstruction of space weather conditions and geomagnetic structures by leveraging multiple, vectorial data streams from a spatially distributed network of instruments (sensors), resulting in a master's thesis and peer-reviewed publication
* Product development included: analysis and visualization of random field (geospatial), multivariate time series data (R, MatLab, IDL); implementation of techniques from time series and spectral analysis, statistics, and regression; hardware-software interfacing; data collection

**NASA Goddard Space Flight Center**, **Greenbelt, MD (June – August 2007)**

*Intern, Observational Cosmology Laboratory*

* Worked with members of the data analysis team for the Absolute Spectrum Polarimeter [ASP], an instrument designed to detect signatures of B-mode gravitational waves (considered to be "smoking gun" evidence for Einstein’s theory of general relativity and cosmological inflationary theory)
* Developed software to model data collection and analysis in preparation for future availability of instrument data
* Worked with several programming languages, including MatLab, Bash, and IDL

**NASA Goddard Space Flight Center, Greenbelt, MD (June – August 2006)**

*Intern, Heliophysics Division*

* Developed web content and gained experience in Python, HTML, CSS, JavaScript, PHP, and working in the UNIX command line environment

**Selected Peer-Reviewed Publications**

* Penetration of solar wind hydromagnetic energy deep into the polar cap: remote detection and forecasting. Geophysical Research Letters, Submitted, 2016.
* Rethinking the polar cap: eccentric-dipole structuring of ULF power at the highest corrected geomagnetic latitudes. Journal of Geophysical Research, 2016.
* [Mission to the Trojan Asteroids: lessons learned during a JPL Planetary Science Summer School mission design exercise [link]](http://www.sciencedirect.com/science/article/pii/S0032063312003741), Planetary and Space Science, Vol. 76, 2013.
* [Quiet-time observations of the open-closed boundary prior to the CIR-induced storm of August 9, 2008 [link]](http://www.agu.org/pubs/crossref/2011/2011SW000688.shtml). Space Weather, Vol. 9, S11001, 2011.

**Education**

**Ph.D., Physics:** New Jersey Institute of Technology & Rutgers University, Newark, NJ. May 2016. **Dissertation:** The Hydromagnetic Structure of the Polar Cap and Its Interaction with the Solar Wind

**M.S., Applied Physics (Minor: Applied Math)**: NJIT & Rutgers University, Newark, NJ. August 2010. **Thesis:** Synoptic Variability of a CIR-Driven Open-Closed Boundary During Solar Minimum

**B.S., Applied Physics (Minor: Applied Math):** NJIT & Rutgers University, Newark, NJ. May 2008.