

DAVID KARAPETYAN

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<http://davidkarapetyan.com>

EXPERIENCE

Head Data Scientist

Prescriptive Data
New York City, NY

June 2015–Present

- Leading team that is designing and implementing a **machine learning forecasting and analytics engine** for energy usage in commercial and non-commercial buildings for Rudin Management, a leading real estate developer in NYC.
- Using weather and other proprietary covariates, engine forecasts: optimal building start-up-time, ramp-down-time, daily building steam usage, daily electricity usage, occupancy, and more.
- Base implementation uses **parallel programming in Python**, with modules **scikit-learn**, **pandas**, **matplotlib**, **statsmodels**, **numpy**, and others. Data is stored in and read from **MongoDB** and **HDF5** dataframes.
- Models used for the forecasting include **ARIMA(X)**, **SARIMA(X)**, and **SVM**.

Quantitative Analyst

Ernst & Young
New York City, NY

June 2014–June 2015

- Developed Class Model forecasting module in **R**. Used **ARIMA regression on macroeconomic scenarios** (base, adverse, or severely adverse) and position data to forecast and plot any input banks PPNR, Provision, Capital and other variables with respect to time.
- Provide valuation and advanced financial modeling expertise to institutional clients in regards to complex securities including equity and foreign exchange options, rates swaptions, and related embedded derivative instruments.
- Analyzed **Monte Carlo and Finite Difference models** to determine fair value of client instruments for accounting purposes.
- Designed and performed **stress-tests** for investment bank clients pricing models for **CCAR** purposes. Evaluated the impact on **PV and option Greeks** of clients portfolio of equity and foreign exchange exotic instruments under severely adverse market scenarios.
- Provide data analysis of trade desk definitions and descriptions, and report anomalies to client. Trades included **forex USD and G10 pairs**, **G10 and emerging market pairs**, **trades with long and short expiry**, **Asian options**, **barriers**, and a variety of others.

Visiting Assistant Professor

University of Rochester
Rochester, NY

July 2012–July 2014

- Researcher of partial differential equations, in particular nonlinear evolution equations.
- Publications list with doctoral thesis at <http://davidkarapetyan.com/pdfs/publications.pdf>
- Developed **numerical simulations in C++** to gain intuition about whether certain equations are well-posed or ill-posed for rough initial data.
- Code included Doolittle factorizations and **finite difference schemes with spline interpolation**.
- Taught courses on Numerical Analysis, Calculus, Topology, Applied Mathematics, Linear Algebra, Differential Equations, and Financial Mathematics.

Research Associate

Institute for Defense Analyses
Alexandria, VA

Aug 2004–Aug 2005

- Conducted research for Pentagon sponsored and privately sponsored projects.
- Applied **k-Nearest Neighbor regression** to analyze existing data on high occupancy toll lanes in the Los Angeles, San Diego, and Chicago metro areas.

EDUCATION

University of Notre Dame

- **Ph.D.**, Mathematics

Aug 2007–May 2012

Thesis: *On the well-posedness of the hyperelastic rod equation*

- Awarded the **Schmitt Presidential Fellowship**. Full scholarship.

University of California, Berkeley

- **B.S.**, Mathematics and **B.A.**, English Literature.

Aug 2000–May 2004

- Awarded the **Regents Scholarship**. Full scholarship.

- Nominee for ND Shaheen Graduate School Award for top student.

TECHNICAL SKILLS

- Languages: Python (full SciPy stack, Flask), Ruby (Rails), R, C, C++ (STL), HTML5, Bash, L^AT_EX.
- Public code at <https://github.com/dkarapetyan>
- Operating Systems: Unix (Debian/Ubuntu, FreeBSD, OS X) , Windows (XP, Vista, 7)

HONORS, AWARDS, AND EXTRACURRICULAR ACTIVITIES

- Coded personal website <http://davidkarapetyan.com> using Ruby on Rails, HTML5, and the Twitter bootstrap. Later migrated the website to the Python Flask microframework
- Chess Expert http://www.chessdryad.com/articles/mi/article_165.htm