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# David Leather

## Quantitative Researcher / Economist

Portfolio: [daveleather.com](https://daveleather.com)  
[github.com/dleather](https://github.com/dleather)  
[linkedin.com/in/davleather](https://linkedin.com/in/davleather)

Quantitative researcher with expertise in data-driven decision-making, computational modeling, and machine learning. Skilled in designing large-scale pricing models, forecasting risk, and optimizing financial strategies using high-performance numerical methods. Proven ability to apply deep learning and econometric modeling to solve real-world challenges in finance and real estate. Passionate about leveraging data science to drive strategic decision-making in industry.

### SKILLS

<b>Programming Languages</b>	Julia, Python, R, MATLAB, STATA, STAN
<b>Machine Learning</b>	TensorFlow, Scikit-learn, Keras
<b>Statistics</b>	Bayesian Methods, Time Series Analysis, Monte Carlo, MCMC
<b>Scientific Computing</b>	Numerical Optimization, Stochastic Processes, Asset Pricing Models, Simulation-based Inference, Regime-switching Models
<b>Software Development</b>	Git, GitHub Actions, Unit Testing, Documentation Generation, Code Coverage, CI/CD
<b>Data Analysis &amp; Tools</b>	NumPy, Pandas, Polars, data.table, SQL, Git, Unix, HPC Clusters
<b>Languages</b>	English (Fluent), Spanish (Novice)

### EXPERIENCE

**Assistant Professor** **August 2020 — Present**  
*Chapman University, Argyros College of Business and Economics* *Orange, CA*

- Conducted research on real estate market dynamics, including pricing, risk management, and the impact of monetary policy on commercial real estate values; housing affordability; the link between zoning uncertainty and the real option value to redevelop; and the effect of height limitations on construction costs. [\[Research Portfolio\]](#)
- Designed and implemented a large-scale Monte Carlo deep learning experiment on a high-performance computing cluster to estimate likelihood surfaces in a 55-dimensional parameter space, simulating over 1.5 million targets using TensorFlow and optimized Julia code.
- Developed novel econometric methods to measure urban development costs, quantifying both regulatory compliance expenses for exceeding height limits and opportunity costs of foregone space. Published in the Journal of Urban Economics (top field journal), providing actionable insights for urban planning policy and real estate investment decisions. [\[Paper\]](#)
- Constructed a comprehensive NYC real estate panel dataset with 48M+ quarterly observations across 118 variables from five sources, tracking property characteristics, redevelopments, transactions, zoning changes, and demographic data to support multiple research projects. [\[Paper\]](#)
- Presented research at prestigious institutions such as the Massachusetts Institute of Technology, the University of California Los Angeles, the University of California Irvine, and the Federal Reserve Board of Governors.
- Teaching graduate and undergraduate courses in Real Estate Economics and Macroeconomics to graduate and undergraduate students.

**Research Affiliate** **August 2020 — Present**  
*Kenan Flagler Business School, University of North Carolina at Chapel Hill* *Chapel Hill, NC*

**Dissertation Fellow** **Summer 2019**  
*Federal Reserve Board of Governors - Research & Statistics Division* *Washington, DC*

- Presented research findings to senior economists, contributing to discussions on policy implications for financial stability related to commercial real estate markets.

**Visiting Researcher** **Summer 2018**  
*NYU Center for Urban Science + Progress* *New York, NY*

### PROJECTS

**QuadraticKalman.jl - Open Source Scientific Computing Package**  
*Julia Package for Quadratic State-Space Models* [\[Github\]](#)

- Developed and maintain a high-performance Julia package for Kalman filtering with quadratic measurement equations, achieving a **10x-60x speedup** over existing implementations.
- Implemented automatic differentiation for **gradient and Hessian** computation, enabling efficient likelihood estimation.
- Built a comprehensive **CI/CD pipeline** with unit testing, documentation generation, and code coverage using GitHub Actions.
- Designed numerically stable algorithms for parameter estimation in high-dimensional state spaces.

### EDUCATION

**Doctorate of Philosophy in Economics**, *University of North Carolina at Chapel Hill* 2020  
**Master of Science in Economics**, *University of North Carolina at Chapel Hill* 2018  
**Bachelor of Business Administration in Finance**, *University of Massachusetts at Amherst* 2013