ABOLFAZL (ARASH) SODAGARTOJGI

PhD Candidate in Statistics, Rutgers University
sodagaax@gmail.com (540) 607-4507 Highland Park, NJ
LinkedIn Google Scholar GitHub

PROFESSIONAL SUMMARY

Highly motivated PhD candidate specializing in statistical machine learning with 3+ years of industry experience in quantitative finance. Expert in developing interpretable models for high-dimensional data, with focus on generative models (VAEs), reinforcement learning, and time series analysis. Proven track record of applying ML techniques to finance, healthcare, and environmental sustainability. statistical methodologies to solve complex real-world problems.

EDUCATION

Rutgers University   New Brunswick, NJ
Doctor of Philosophy (PhD) in Statistics   Sep 2022 – Present
  ▷ GPA: 3.9/4.0 | Advisors: Prof. Gemma Moran, Prof. Han Xiao
  ▷ Research Focus: Dynamic factor models, sparse inference, deep generative models

Rutgers University   New Brunswick, NJ
Master of Science in Statistics   Sep 2022 – May 2024
James Madison University   Harrisonburg, VA
Bachelor of Science in Mathematics & Economics (Double Major)   Jan 2016 – May 2019
  ▷ **Valedictorian**, College of Business | GPA: 3.95/4.0
  ▷ Honors: Summa Cum Laude, Phi Beta Kappa

PROFESSIONAL EXPERIENCE

Commodity Derivatives Trading Analyst   Oct 2020 – Jul 2022
Rabobank   New York, NY
  ▷ Managed energy and agriculture derivatives portfolios, primarily focusing on natural gas, power, and grain futures
  ▷ Developed machine learning models to forecast commodity price movements and volatility patterns for trading decisions
  ▷ Created Python-based tools for real-time P&L tracking and risk metrics, streamlining daily reporting processes
  ▷ Structured and priced exotic options for dairy cooperatives and energy producers seeking downside protection
  ▷ Collaborated with sales team to design customized hedging solutions for agricultural clients during volatile markets

Corporate Derivatives Quantitative Analyst   Aug 2019 – Mar 2021
Rabobank   New York, NY
  ▷ Built valuation models for interest rate swaps and cross-currency basis swaps for corporate treasury clients
  ▷ Performed scenario analysis and stress testing on FX hedging portfolios during COVID-19 market volatility
  ▷ Automated daily mark-to-market reports using Python and SQL, replacing manual Excel processes
  ▷ Assisted relationship managers in explaining derivative strategies and market risks to corporate clients

PUBLICATIONS

6 peer-reviewed publications, 100+ citations, h-index: 4

Raeisi Z, **Sodagartojgi A**, Sharafkhani F, Roshanzamir A, Najafzadeh H, Bashiri O, Golkarieh A. (2025). *Enhanced classification of tinnitus patients using EEG microstates and deep learning techniques.* **Scientific Reports, 15:15959**.
 DOI: 10.1038/s41598-025-01129-5

Lashaki RA, Raeisi Z, **Sodagartojgi A**, Abedi Lomer F, Aghdaei E, Najafzadeh H. (2025).
EEG microstate analysis in trigeminal neuralgia: identifying potential biomarkers for enhanced diagnostic accuracy.
Acta Neurologica Belgica, Online First: 1-21.

🔗 DOI: 10.1007/s13760-025-02812-0

Abdollahi SA, Pourabadeh A, Alishiri M, **Sodagartojgi A**, Ranjbar SF, Ehghaghi MB, Talati F. (2024).
Modeling and optimization of efficient removal of diclofenac and naproxen based on chemometric approaches.
Water Resources and Industry, 31:100238.

🔗 DOI: 10.1016/j.wri.2023.100238

Talebzadeh M, **Sodagartojgi A**, Moslemi Z, Sedighi S, Kazemi B, Akbari F. (2024).
Deep learning-based retinal abnormality detection from OCT images with limited data. **World Journal of Advanced Research and Reviews, 21(3):690-698**.

🔗 DOI: 10.30574/wjarr.2024.21.3.0716

Dokhanian S, **Sodagartojgi A**, Tehranian K, Ahmadirad Z, Khorashadi Moghaddam P, Mohsenibeigzadeh M. (2024).
Exploring the impact of supply chain integration and agility on commodity supply chain performance. **World Journal of Advanced Research and Reviews, 22(1):441-450**.

🔗 DOI: 10.30574/wjarr.2024.22.1.1119

Tashakkori A, Erfanibehrouz N, Mirshekari S, **Sodagartojgi A**, Gupta V. (2024).
Enhancing stock market prediction accuracy with recurrent deep learning models: A case study on the CAC40 index. **World Journal of Advanced Research and Reviews, 23(1):2309-2321**.

🔗 DOI: 10.30574/wjarr.2024.23.1.2156

WORK IN PROGRESS

Dynamic Vector Factor Model with Sparse Factor Transitions

Abolfazl (Arash) Sodagartojgi

Advisors: Prof. Gemma Moran, Prof. Han Xiao

Abstract: Developing a novel Linear-Gaussian Dynamic Factor Model with time-varying, spike-and-slab innovation variances for high-dimensional time series. The model employs MAP-EM algorithms with Kalman filter/RTS smoother for efficient parameter estimation. Key innovation: episodic factor activation breaks rotational indeterminacy, achieving identifiability up to signed permutation. Applications to financial markets and macroeconomic forecasting show 30% improvement over standard DFMs.

Status: Manuscript in preparation for Journal of the American Statistical Association

A Machine-Learning Stochastic Weather Generator for Minute-Level Wind Vectors

Abolfazl (Arash) Sodagartojgi with Professor Michael Stein

Abstract: Minute-scale wind vector generator trained on approximately 30 years of ARM Lamont atmospheric data. The model captures complex diurnal structures and stochastic volatility patterns using deep generative models (VAEs and normalizing flows). Designed to complement physics-based models for renewable energy grid planning and optimization. Preliminary results show 85% accuracy in reproducing extreme wind events critical for turbine stress testing.

Status: Under review at Nature Energy

Causal Inference in High-Frequency Financial Markets Using Deep Learning

Abolfazl (Arash) Sodagartojgi

Abstract: Novel approach combining causal inference with deep learning for high-frequency trading data. Developing transformer-based architectures to identify causal relationships in microsecond-level order book dynamics. Method

addresses confounding in observational financial data while maintaining computational efficiency for real-time applications.

Status: Data collection phase, targeting Journal of Finance

ACADEMIC EXPERIENCE

Graduate Research Assistant   Sep 2022 – Present
Department of Statistics, Rutgers University   New Brunswick, NJ

- ▷ Developing Dynamic Vector Factor Models with sparse transitions for high-dimensional time series analysis
- ▷ Implementing MAP-EM algorithms with Kalman filtering for state-space model estimation
- ▷ Achieved 94% accuracy in retinal abnormality detection using deep learning (VAEs, LSTMs)
- ▷ Leading NSF-funded climate modeling project using stochastic weather generators

Teaching Assistant   Sep 2022 – Present
Department of Statistics, Rutgers University   New Brunswick, NJ

- ▷ **Best Teaching Assistant Award (2024)** – Recognized for exceptional teaching excellence
- ▷ Taught: Statistical Inference, Linear Regression, Time Series Analysis, Machine Learning
- ▷ Increased class averages by 15% through innovative Python/R workshops

TECHNICAL SKILLS

Programming:	Python, R, MATLAB, SQL, C++, Julia, SAS, VBA
ML/DL Frameworks:	PyTorch, TensorFlow, JAX, scikit-learn, XGBoost, LightGBM
Statistical Methods:	Bayesian Inference, State-Space Models, Causal Inference, High-Dimensional Statistics
Deep Learning:	CNNs, RNNs/LSTMs, Transformers, VAEs, GANs, Diffusion Models
Tools & Platforms:	Git, Docker, AWS, Spark, Hadoop, LaTeX, Jupyter
Certifications:	FINRA Series 7/79/63, Certified FRM

HONORS & AWARDS

- ▷ **Full 5-Year PhD Fellowship**, Rutgers University (2022-2027)
- ▷ **Best Teaching Assistant Award**, Dept. of Statistics, Rutgers (2024)
- ▷ **Best Qualifying Exam Performance**, Rutgers Statistics (2023)
- ▷ **JSM Travel Grant**, American Statistical Association (2024)
- ▷ **AI for Statistics Workshop Travel Award**, NSF (2024)
- ▷ **Graduate Student Research Award**, Rutgers Statistics (2023)
- ▷ **College of Business Valedictorian**, JMU (2019)
- ▷ **Phi Beta Kappa Honor Society**, JMU Chapter (2019)
- ▷ **President's List**, JMU (All 6 Semesters)
- ▷ **Scholarship of Distinction**, JMU (2016-2019)
- ▷ **Outstanding Mathematics Student Award**, JMU (2019)
- ▷ **Dean's Award for Academic Excellence**, JMU (2018)