Avinash N. Madavan

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PERSONAL SUMMARY

Optimization and ML specialist building scalable systems grounded in rigorous mathematical foundations. Combines theoretical depth with production expertise, and excels at communicating complex technical concepts to diverse audiences.

PROFESSIONAL EXPERIENCE

Terminal49 April 2025 — Present

Independent Consultant *Machine Learning Consultant*

- Analyzed large shipping datasets to extract high-value features, improving the accuracy of container ETA predictions.
- Designed and deployed Terminal49's first ETA model, introducing predictive logistics capability that improved shipment tracking and customer reliability.
- Built and validated statistical and machine learning models for ETA estimation, enabling more reliable logistics planning.

Equinor January 2024 — April 2025

Danske Commodities *Senior FTR Analyst*

- Designed a risk-aware portfolio optimization algorithm, reducing risk and improving market efficiency.
- Developed statistical validation frameworks, increasing the robustness and reliability of forecasting models.
- Integrated model updates into production workflows, improving decision-making accuracy with historical and forecast data.
- Enhanced trading decisions and reduced portfolio risk exposure in day-ahead and real-time power markets.

University of Illinois at Urbana-Champaign August 2016 — December 2022

Electrical and Computer Engineering, Power and Energy Group *Graduate Research Assistant*

- Researched online optimization methods for risk-sensitive convex problems with provable convergence guarantees.
- Established formal guarantees for pricing mechanisms in power networks under uncertainty, proving conjectured properties.
- Implemented efficient open-source large-scale optimization algorithms (Benders' decomposition, critical region exploration).
- Research contributions formed basis of advisor's NSF CAREER award; collaborated across disciplines and presented to diverse technical audiences.

PROJECTS

games-rs Developed a Rust library for classic board games with AI agents, such as Monte Carlo Tree Search and Minimax, enabling self-improving decision-making through iterative play and persistent learning.

Stuka Developed open-source linear programming algorithms, including Benders' decomposition and critical region exploration, reducing solve time and improving scalability in large-scale optimization.

TECHNICAL SKILLS AND LEADERSHIP EXPERIENCE

Leadership Roles	UIUC IEEE PES/PELS/IAS Chapter President	May 2019 — August 2020
	IEEE PECI Conference Co-Director	May 2019 — May 2020
Technical Expertise	Convex & Stochastic Optimization, Risk-Sensitive Modeling, Statistical Inference, Uncertainty Quantification, Machine Learning, Time Series Analysis, Distributed Systems, Algorithm Design	
Programming	C/C++, Python, Rust, Java, MATLAB, Bash, SQL	
Tools & Libraries	Gurobi, MOSEK, CPLEX, IPOPT, LaTeX, NumPy, Pandas, scikit-learn, TensorFlow, AWS, Git	

EDUCATION

University of Illinois at Urbana-Champaign Ph.D. in Electrical and Computer Engineering 2016 — 2022

University of California - San Diego B.S. in Mechanical Engineering, Minor in Mathematics 2012 — 2016

Honors: Graduated *cum laude*, Phi Beta Kappa

SELECTED PUBLICATIONS

- Madavan, A. N., & Bose, S. (2021). A Stochastic Primal-Dual Method for Optimization with Conditional Value at Risk Constraints. *Journal of Optimization Theory and Applications*, *190*, 428–460.
- Madavan, A. N., Dahlin, N., Bose, S., & Tong, L. (2023). Risk-Based Hosting Capacity Analysis in Distribution Systems. *IEEE Transactions on Power Systems*.