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Executive Summary

Expert in Complex Engineering & Management specializing in model risk management, algorithmic reliability, and complex adaptive systems in financial markets. Proven track record managing \$350K+ initiatives with direct P&L impact, generating \$98K revenue. Expert in model validation, risk governance (SR 11-7 compliant), and AI reliability frameworks. PhD research on system complexity boundaries is directly applicable to market microstructure, correlation breakdown detection, and systemic risk modeling.g

Technical Skills

AI/ML: Model Risk Management, Back testing, Feature Engineering, Time Series Analysis, Anomaly Detection, LLMs, RAG Architecture, Multi-Agent Systems, Explainable AI, Few-Shot Learning, Chain of Thought, Model Context Protocol (MCP), Agent Orchestration, secure & Trustworthy AI, CI/CT/CD.

Modeling: Monte Carlo VaR, Stress Testing, Portfolio Optimization, Systemic Risk Analysis, Market Microstructure, Regulatory Compliance (SR 11-7, DORA, NIST), Model Validation, A/B Testing.

Tech Stack: Python, SQL, MATLAB, AWS HPC, Power BI, Langchain, Agent-Based Modeling, Bayesian Optimization, Monte Carlo Simulation, AnyLogic, NetLogo, Uncertainty Quantification.

Compliance Architecture: Risk Management, Model Governance, AI Ethics, Process Optimization, Stakeholder Management, ROI Optimization, Digital Transformation.

Recent Experiences

Principal Integration Lead, US Navy (ODU Research Foundation), *Sep 2023 - Present*

- Led \$350K AI transformation program developing pattern recognition systems for 160K+ unstructured documents, directly applicable to regulatory filing analysis, trade documentation, and alternative data processing.
- Architected enterprise RAG + LangChain system achieving 92% classification accuracy and 87% automation, comparable to trade reconciliation and regulatory reporting automation.
- Implemented model risk governance using SR 11-7 standards; validated 100K+ scenarios on AWS HPC, reducing model risk by 21%, directly transferable to trading model validation and stress testing.
- Developed real-time anomaly detection (Adversarial robustness testing) processing 160K+ transactions daily, applicable to micro vs macro surveillance, manipulation detection, and compliance monitoring.
- Created a sentiment analysis framework for extracting signal from unstructured text, relevant for news analytics and alternative data alpha generation.
- Pioneered the Complexity Paradox Boundary framework, detecting when analytical models fail under stress, directly applicable to correlation breakdown and tail risk management.

Senior AI Strategy Lead, Senate of Virginia, Virginia, *Apr 2023 - Aug 2023*

- Built an algorithmic marketplace using OpenAI/Gemini APIs, generating \$98K revenue in 8 weeks with 100+ clients, demonstrating P&L impact and monetization capability
- Developed a predictive analytics system, improving operational accuracy by 14%, applicable to price prediction and alpha generation strategies
- Created executive risk dashboards (Power BI) for compliance reporting, reducing reporting cycles by 19%, transferable to regulatory reporting (CAT, MiFID II)
- Implemented data governance and AI reliability frameworks, ensuring regulatory compliance, relevant for model risk management and audit requirements.
- Collaborated with 3 different governance teams to ensure AI model behavior aligns with ethical and sociocultural frameworks.

Program Director, AATWRI Group, *Jul 2022 - Mar 2023*

- Directed \$100K AI/AR product launch with 12-engineer team; delivered reinforcement learning system 18% ahead of schedule. Funding supported by Meta and the Government of India.
 - Managed end-to-end product lifecycle from concept to manufacturing; implemented digital transformation.
 - Established AIOps practices and continuous deployment pipelines for production autonomous systems.
 - Modeled system-of-systems dynamics in autonomous control loops; applied complexity-driven optimization to enhance coordination, resilience, and performance stability across distributed AI systems.
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Relevant Projects & Research

- **Complexity Paradox Boundary Framework:** Developed a theoretical model identifying when decomposition-based risk models fail during market stress, applied to detecting correlation regime changes and systemic risk buildup.
 - **Multi-Agent Market Simulation:** Created GPT-4/NetLogo simulations modeling collective market behaviors, information cascades, and flash crash dynamics.
 - **Model Validation Suite:** Built an automated testing framework for detecting model drift and performance degradation, applicable to systematic strategy monitoring.
 - **Real-time Risk Analytics:** Developed streaming analytics processing millions of events for anomaly detection, relevant for high-frequency trading surveillance.
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Achievements

- US Dept. of Defense, USA- AI Integration (\$350K Contract)
 - BlackStone Foundation, USA - National AI Healthcare Automation Innovation Award (2021)
 - Micron Technology, USA - Global Innovator, Autonomous Systems (2020)
 - Granted Patents: IPO 570997, IPO 383226
 - Limca Book of Records, Asia Continent (2019).
 - 15+ peer-reviewed published research on complex systems engineering, computational irreducibility, and AI coherence diagnostics; developed frameworks for AI reliability and systemic resilience now applied in enterprise-scale simulations and intelligent infrastructure systems.
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Education

- Ph.D. Candidate, Engineering Management & Systems Engineering, Old Dominion University
- M.S., Space Systems Engineering, Skolkovo Institute of Science & Technology (President's Award, Top 3%)
- Research Exchange, Massachusetts Institute of Technology (Highest Academic Excellence)