

Matt McManus

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Research Interests: LLM-Driven Macro Forecasting, Scientific Machine Learning, Physics-Informed Neural Networks

EDUCATION

Massachusetts Institute of Technology <i>Master of Engineering, Computer Science; GPA: 5.0/5.0</i>	Cambridge, MA Aug. 2023 - Jun. 2024
Thesis: "Inertial Navigation System Drift Reduction Using Scientific Machine Learning"	
Research Focus: LLM-Driven Macro Forecasting, Reinforcement Learning for LLMs, Scientific ML	

Massachusetts Institute of Technology <i>Bachelor of Science, Mathematics & Computer Science</i>	Cambridge, MA Sep. 2019 - Feb. 2024
Activities: Phi Kappa Theta, MIT Pokerbots President, MITHack, MIT Squash Team	

RESEARCH EXPERIENCE

Research Assistant <i>MIT Julia Lab</i>	2022 – 2024 Cambridge, MA
• Developed physics-informed neural-ODE framework reducing inertial navigation drift by 60% in GPS-denied environments	
• Implemented scientific ML algorithms using Julia and PyTorch for real-time navigation systems	
• Published master's thesis on novel approaches to sensor fusion using neural differential equations	
Quantitative Analyst <i>Delphi Digital</i>	May 2022 – Aug. 2022 New York, NY
• Conducted quantitative analysis of cryptocurrency markets and DeFi protocols using Python and SQL	
Quantitative Research Intern (Part-time) <i>Two Sigma</i>	2023 – 2024 New York, NY
• Conducted fast-cycle experiments on factor discovery and regime detection for systematic trading strategies	
• Researched ML applications to alternative data analysis and signal generation	
• Developed automated backtesting framework for evaluating quantitative investment strategies	

PUBLICATIONS

- McManus, M.** (2024). "Inertial Navigation System Drift Reduction Using Scientific Machine Learning." *Master's Thesis*, Massachusetts Institute of Technology.
- McManus, M.** (2023). "Evaluating the Performance of GPT-3 in Simulated Cybersecurity Scenarios: A Focus on Graph-Based Problems." *Computers & Security*, 128, 103–118.
- Chowdhuri, R., **McManus, M.**, & Vogelbaum, E. H. (2022). "Low Complexity Solutions for Interpolating Deep Neural Networks." *Journal of Machine Learning Research*, 23(47), 1–28.

PROJECTS & RESEARCH

- Physics-Informed Navigation System:** Neural-ODE framework achieving 60% reduction in inertial navigation drift using PyTorch and JAX
- LLM-Driven Macro Forecasting:** Research applying LLMs to economic forecasting, achieving 25% improvement in prediction accuracy
- GPT-3 Cybersecurity Evaluation:** Single-authored research on LLM performance in cybersecurity scenarios (Published in Computers & Security)

INDUSTRY EXPERIENCE

Bridgewater Associates <i>ML Engineer / Research Scientist - AIA Labs</i>	New York, NY Sept. 2024 - Present
• Lead development of proprietary AI models for macro investing using LLMs and reinforcement learning	
• Research novel applications of LLMs to economic forecasting and market regime detection	
• Promoted within 6 months due to exceptional research contributions and AI/ML expertise	
<i>Investment Engineer Intern</i>	<i>Jun. 2023 - Aug. 2023</i>
• Developed quantitative models for systematic investment strategies using ML techniques	

TECHNICAL SKILLS

- Programming:** Python, Julia, C++, SQL, JavaScript, R, Scala, Java, Go
- ML/AI:** PyTorch, TensorFlow, JAX, Transformers, Scientific ML, RL, Hugging Face, XGBoost
- Research Tools:** Jupyter, Git, Docker, Scientific Computing, Neural ODEs, Physics-Informed NNs
- Specialized:** LLM-Driven Forecasting, Navigation Systems, Quantitative Finance

LEADERSHIP & ACHIEVEMENTS

- Leadership:** MIT Pokerbots President (2023-2024), organized competition for 250+ students
- Athletics:** MIT Varsity Squash Team member, competed in NESCAC tournaments
- Honors:** MIT Pokerbots Competition 1st Place, HackMIT Award Winner, Phi Kappa Theta