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Aaron M. Stahl

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Github:// astahl3

Computational research scientist with over ten years of professional experience, including six years advancing two pioneering research domains within the field of physics. Skilled in programming, analytical modeling, machine learning, and parallel & distributed computer (HPC). Excels at developing comprehensive models for harvesting dynamical systems and large datasets.

SELECTED EXPERIENCE

Research Affiliate — Apr 2024 — Present

Georgia Institute of Technology | Atlanta, GA

- Created market sentiment classification NLP model for large social media datasets using (1) a fine-tuned finBERT model, and (2) OpenAI API endpoint completion (GPT-3.5 Turbo) in Python.
- Built AI-driven investment classification model, generating trade signals from a network trained on vectorized social media passages, concatenated network metrics, and time-series data of underlying securities.

Graduate Research Scientist — Aug 2018 — May 2024

School of Physics, *Georgia Institute of Technology* **| Atlanta, GA**

Selected Awards: Herbert P. Haley Fellowship, Georgia Tech Quantum Alliance Fellowship (x2)

Computational Plasma Physics

- Programmed highly-parallelized, 3-D computational models in C++ to study plasma dynamics and magnetospheric physics; authored original, peer-reviewed research articles in leading space physics journal.
- Applied advanced statistical techniques (e.g., minimum variance analysis, multivariate regression) to large, multi-dimensional datasets to extract key features of moon-plasma interaction dynamics using Python.
- Translated broad scientific research goals into quantitative questions that could be answered by combining computational model results with empirical data (e.g., *in situ* spacecraft time-series measurements).

Computational Quantum Physics

- Created novel deep learning model of stacked convolutional neural networks to accurately reconstruct sparsely sampled low-energy quantum states using supervised learning with Python and TensorFlow
- Programmed several novel algorithms using tensor network methods (e.g., matrix product states, stochastically structured tensor trees) to solve other wavefunction reconstruction problems in Matlab and Python.
- Employed original tensor algorithms to extract new properties about the scaling behavior of entanglement entropy and information density in locally interacting quantum systems on finite 1-D and 2-D lattices.

Analyst — Oct 2008 — Sep 2011

Strategic Investment Group, LLC | Rosslyn, VA

- Modeled performance and risk metrics for institutional client portfolios (e.g., CVaR, regression-based metrics).
- Created an automated, real-time data analytics pipeline for informing daily futures trading activity. Product was adopted across all client portfolios and given annual company-wide "Brilliant Alpha" award.

EDUCATION

PhD in Physics, Georgia Institute of Technology — est. May 2024
BS in Physics, University of Maryland - College Park — May 2018
BA in Business, University of Southern California — May 2008

SKILLS

Programming Languages: Python • C • C++ • Matlab • SQL
Software Tools: NumPy • SciPy • Matplotlib • MPI • OpenMP • OpenAI API • TensorFlow | Keras
Development: Git • Conda • Jupyter • Spyder • Linux | MacOS | Windows • Bash • GPT 3.5 | 4
Math: Vector calculus • ODEs | PDEs • Linear algebra • Tensor methods • Probability • Statistics

SELECTED PUBLICATIONS

[1] Aaron Stahl et al. "A Model of Ganymede's Magnetic and Plasma Environment During the Juno PJ34 Flyby". In: *Journal of Geophysical Research: Space Physics* 128.12 (2023), e2023JA032113.

[2] Aaron Stahl and Glen Evenbly. "Reconstruction of Randomly Sampled Quantum Wavefunctions using Tensor Methods". In: *arXiv preprint arXiv:2310.01628* (2023).