(301) 910 - 7618
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Aaron M. Stahl

Web:// astahl3.github.io
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Adaptable, reliable, and collaborative computational research scientist with over ten years of professional experience, including four years in the investment management sector and six years advancing two cutting-edge research fields in physics. Skilled in analytical modeling, programming, machine learning, parallel & distributed computer (HPC), and finance. Excels at developing systematic, quantitative approaches to making sense of information and presenting results to technical and non-technical audiences alike.

EXPERIENCE

RESEARCH AFFILIATE   APR 2024 — PRESENT
Georgia Institute of Technology | Atlanta, GA

- Create NLP-based market sentiment classification tools for large social media datasets using fine-tuned fin-BERT and OpenAI endpoint completion models (GPT-3.5 Turbo, Davinci) to characterize behavioral trends in retail investing; programmed in Python with Hugging Face transformer libraries.
- Build AI-driven investment "idea classification" models which generate trade signals from a network that evaluates the merit of a trade idea; trained on social media word embeddings, market sentiment classifications, network metrics and cluster analysis, and time-series of underlying market securities.
- Conduct original research in computational space physics in collaboration with the *Magentospheres in the Outer Solar System* research group and Professor Sven Simon using highly-parallelized C++ plasma simulation codes.

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)

Plasma Physics

- Programmed highly-parallelized, 3-D computational models in C++ to study plasma dynamics and magnetospheric physics; authored original, peer-reviewed research on results in leading space physics journal.
- 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)
- 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.
- Collaborated with other team members to complete a collective research project, resulting in *Geophysical Review Letters* cover story article; presented results at an international scientific conference (AGU 2023).
- Regularly developed software and analyzed data both independently and in collaborative environments.
- Built data processing, analytics, and visualization pipeline using Python and NASA's SPICE API for spacecraft and ephemeris data.

Quantum Physics

- Created novel deep learning model of stacked convolutional neural networks to accurately reconstruct sparsely sampled low-energy quantum states via supervised learning with Python and TensorFlow.
- Programmed original algorithms for matrix and tensor completion from scratch using tensor network methods in Matlab and Python; demonstrated optimal convergence properties on ground state wavefunctions and cross-application functionality for image correction.
- Presented scientific results to both highly specialized and general audiences alike at several invited talks, including corporate (Google Quantum AI) and student groups (Georgia Tech Quantum Alliance).
- Utilized original tensor algorithms to extract new properties about how information density of wavefunctions scales with system size in locally interacting quantum systems on finite 1-D and 2-D lattices.

UNDERGRADUATE RESEARCH ASSISTANT   AUG 2016 — MAY 2018
School of Physics, Joint Quantum Institute, *University of Maryland* | College Park, MD

- Generated quantitative models to perform circuit simulations in LTSPICE and built novel apparatuses for a laboratory experiment studying controllable disorder in ultracold quasi-2D Bose gasses.
- Designed and constructed original, bespoke circuitry to levitate quantum condensates during imaging procedures; device facilitated high-resolution data acquisition for several peer-reviewed publications.
- Programmed numerical implementation of the Gross-Pitaevskii equation for disordered systems in Matlab.

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Co-Founder   Oct 2012 — Aug 2014
Steelfire Investments, LLC | Bethesda, MD
- Founded investment firm anchored in cutting-edge academic research on the optimal implementation and management of ultra low-cost, equal-weighted, index-oriented portfolios.
- Implemented portfolio construction protocols, data pipeline using industry tools & APIs (e.g., Datastream).

Analyst   Oct 2008 — Sep 2011
Strategic Investment Group, LLC | Rosslyn, VA
- Collaborated with asset class managers and head portfolio manager to select optimal invsetments for large institutional client portfolios ($> \$1$ bln), fulfilling a diverse spectrum of long-term investment objectives using both active and passive solutions.
- Managed performance, risk, and benchmarking calculations for several client portfolios; interfaced directly with clients to present reports, address manager-related questions, and answer analytical inquiries.
- Designed and managed development of award-winning data analytics pipeline for informing daily futures trading and rebalancing activity; resulting product was adopted across all client portfolios, awarded annual, company-wide *Brilliant Alpha* prize.
- Developed and integrated new private equity benchmarking system for all clients via Excel with VBA; each client's private equity benchmark was customized according to a vintage-year weighting scheme.

Co-Founder, Director of Risk Management   Nov 2007 — May 2008
Undergraduate Student Investment Fund, *University of Southern California* | Los Angeles, CA
- Co-founded inaugural Undergraduate Student Investment Fund at USC, contributed to initial capital campaign, and designed the fund's portfolio management framework and fund manager roles.
- Programmed quantitative model for the fund's completion portfolio: used regression techniques with the Fama-French 3-Factor model to the minimize fund's tracking error with respect to benchmark S&P 500.

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++ • Matlab • SQL • LaTeX
Software: SciPy • Pandas • Matplotlib • MPI • OpenMP • OpenAI API • TensorFlow | Keras
Environment: Git • Conda • Jupyter • Spyder • Linux • Bash • GPT 3.5 | 4
Math: Vector calculus • ODEs | PDEs • Linear algebra • Tensor methods • Probability • Statistics
Finance: Time series analysis • Optimization • Monte Carlo • Bloomberg • Derivatives pricing
Other: Excel | VBA • PowerPoint • Teams • SharePoint • Bloomberg | Datastream | FactSet

RECENT PUBLICATIONS

[1] **Aaron Stahl**, Peter Addison, Simon Sven, and Lucas Liuzzo. "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] Peter Addison, C. Michael Haynes, **Aaron Stahl**, Lucas Liuzzo, and Sven Simon. "Magnetic Signatures of the Interaction Between Europa and Jupiter's Magnetosphere During the Juno Flyby". In: *Geophysical Research Letters* 51.2 (2024), e2023GL106810.

[3] Lucas Liuzzo, Quentin Nénon, Andrew Poppe, **Aaron Stahl**, Sven Simon, and Shahab Fatemi. "On the Formation of Trapped Electron Radiation Belts at Ganymede". In: *Geophysical Research Letters* 52.2 (2024), 2024GL109058.

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