

seanfuhrman.com

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Sean Fuhrman

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908-285-3692

Master's graduate in Electrical Engineering (UC San Diego) specializing in Data Science and Machine Learning, with an undergraduate degree in Computer Engineering. 10+ years of programming experience, including 4+ years in Python/PyTorch. Expertise in deep learning, reinforcement learning, and continual learning. Experienced in many coding projects, working in both a team and individually.

EDUCATION

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- **University of California, San Diego** San Diego, CA
M.S. Electrical Engineering. Focus: Data Science and Machine Learning; GPA: 3.6
Sept. 2024 – Dec. 2025
 - **University of California, San Diego** San Diego, CA
B.S. Computer Engineering; Major GPA: 3.94; GPA: 3.81
◦ **Awards:** Henry G. Booker Memorial Honors; Provost Honors
Sept. 2020 – June 2024

PUBLICATIONS

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- **S. Fuhrman**, et al., "ACORN-IDS: Continual Novelty Detection under Evolving Network Conditions," *Under review at IEEE Transactions on Information Forensics and Security (TIFS)*.
 - **S. Fuhrman**, et al., "CND-IDS: Continual Novelty Detection for Intrusion Detection Systems," *Proceedings of the 62nd Annual ACM/IEEE Design Automation Conference (DAC)*, 2025.
 - W. Xu, **S. Fuhrman**, K. Fan, S. Ping, W. Chen and T. Rosing, "HyperMetric: Efficient Hyperdimensional Computing With Metric Learning for Robust Edge Intelligence," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, 2025
 - W. Xu, V. Swaminathan, S. Ping, **S. Fuhrman** and T. Rosing, "HyperMetric: Robust Hyperdimensional Computing on Error-prone Memories using Metric Learning," *IEEE 41st International Conference on Computer Design (ICCD)*, 2023

WORK EXPERIENCE

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- **Venator Solutions LLC** San Diego, CA
Software Engineer / Algorithm Developer
◦ Led research initiative in deep reinforcement learning for a custom C++ simulation environment.
◦ Architected C++ server to communicate between environment and Python RL algorithm.
◦ Progressively refined reinforcement learning algorithm across increasingly complex environments, converging on a multi-agent DQN-based algorithm with multiple state-of-the-art extensions.
◦ Integrated self-play with progressive opponent generation to train agents under increasing difficulty.
◦ Implemented a distributed training framework across multiple Linux machines, coordinating over 200 concurrent simulations to accelerate multi-agent RL experimentation.
◦ **Languages/Tools:** Python; C++; PyTorch; Pandas; Matplotlib; CMake; Protobuf; Docker/Podman; Bash;
◦ **Techniques:** Deep Reinforcement Learning; Multi-agent Value Decomposition; Self-play; Distributed Training;
 - **System Energy Efficiency Lab - University of California, San Diego** San Diego, CA
Graduate Researcher (2024-2025); Undergraduate Researcher (2022-2024)
July 2022 - December 2025
◦ Conducted research on continual novelty detection for intrusion detection systems.
◦ Published a first-author DAC paper introducing a PCA-based novelty detector integrated with deep feature learning, and extended this work into a dual-memory continual learning framework (under review at *IEEE TIFS*).
◦ Collaborated on research for hyperdimensional computing for analog resistive RAM (ReRAM).
◦ Co-authored two publications on metric-learning-enhanced hyperdimensional computing for energy-efficient and error-robust edge ML, including PyTorch simulation of error-prone analog memory behavior.
◦ Presented research at academic conference, research symposia, and internal reviews.
◦ **Languages/Tools:** Python; PyTorch; Pandas; Matplotlib;
◦ **Techniques:** Continual Learning; Novelty Detection; Metric Learning; Hyperdimensional Computing;

- **Art of Problem Solving** San Diego, CA

Software Engineering Intern

June 2023 - August 2023

- Developed 50+ printable engines using React with a Node.js backend, automating printable math problem format.
◦ Led a comprehensive study on prompt engineering for automatic language translation.
◦ **Languages/Tools:** Javascript; HTML/CSS;

PROJECTS

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- **WikiRace Agent:** Developed an Large Language Model-guided WikiRace algorithm. [arXiv:2511.10585](https://arxiv.org/abs/2511.10585)
 - **Music Generator:** Trained Variation Auto-encoder to generate piano sheet music.
 - **FogBot:** Created a Deep Q-Learning chess bot for fog-of-war chess, learning through self-play.
 - **Shazam 2.0:** Built a CNN for music genre classification; showcased in a [poster](#).