Makan Arastuie

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Experience

Brightwave · ***Founding Machine Learning Engineer*** · Boulder, CO Oct 2023 – Jul 2026

An agentic research workspace for private-market finance teams · raised $21M from Decibel, OMERS Ventures, and Point72

Joined the two founders as the first hire, bringing the product from idea to production on a team that never exceeded seven engineers. Worked across the stack and built many of the platform's core systems as it grew into a workspace where teams collaborate in shared projects spanning 10,000+ sources each and run long-horizon agentic workflows through sandboxed agents to produce citation-backed work products.

- **Built a synthetic private-equity deal-room generation engine in Rust** to evaluate and benchmark the platform's agents. Each run generates a distinct, coherent deal room with thousands of documents and tasks graded deterministically, yielding verifiable rewards. Designed the harness to iteratively modify tasks to raise their difficulty, evaluated against frontier LLMs in the loop, with guardrails to minimize reward hacking.
- **Distilled a calibrated GPT-4 Turbo web-result relevance judge** into a small 197K-parameter PyTorch query-document interaction model over frozen embeddings, using learned projections and attention pooling. The model served in production for 7.5 months and cut LLM ranking volume by 34%.
- **Owned the retrieval stack**: built document segmentation for exact, bounding-box-level citations and a hybrid dense+BM25 search pipeline with reranking; optimized the stack for cost-efficient operation at scale through quantized vectors and on-disk payload storage, serving 85M+ vectors in production.
- **Designed and built the agent-to-agent broker**: a durable message-passing system that owns each request's lifecycle with exactly-once effects, powering subsystems including internal agent dispatch and scheduled tasks.
- **Created the platform-wide memory system**: one long-lived background agent per user reviews new interactions from the platform's event log and curates memories, holding weak signals in a tracking state until repeated evidence justifies a write.
- **Jointly architected and shipped the platform's durable task engine**: checkpointed state enables recovery across broker outages, crashes, and deploys, while stateless worker pools scale horizontally and scheduled retries consume no worker capacity during backoff.

Seagate · ***Senior Machine Learning Engineer*** · Longmont, CO Jan 2020 – Oct 2023

MLE Intern → MLE II (Aug 2020) → Senior MLE (Jan 2022)

Applied ML research across hard-drive design and manufacturing; started on the internal ML team, building factory-test models and domain NLP systems for teams across the company. Later joined the Seagate Research Group to work on ML-accelerated design of recording media.

- **Designed and trained a transformer surrogate for micromagnetic simulation**: modeled media stacks as sequences of material layers and used a deep-ensemble active-learning loop to search billions of candidate designs, discovering novel designs that improved the target magnetic property by 9%.
- **Built self-supervised generative models of factory calibration**: trained masked autoregressive density estimators on millions of unlabeled records to replace exhaustive per-drive calibration sweeps with sampled candidates; factory certification tests showed a 33% test-time reduction (about 2 hours) without accuracy loss.
- **Trained storage-domain language models and embeddings** on a 41 GB internal corpus to power an internally deployed system for sentiment analysis and for retrieving and summarizing quarterly customer reviews.

Selected Publications

M. Arastuie, S. Paul, K. Xu. "CHIP: A Hawkes Process Model for Continuous-time Networks with Scalable and Consistent Estimation." **NeurIPS, 2020**.

Selected Publications *(continued)*

M. Arastuie, K. Xu. "Personalized Degrees: Effects on Link Formation in Dynamic Networks from an Egocentric Perspective." **The Web Conference (WWW) Companion, 2019**.

Program committee: SocInfo (2020, 2022)

Reviewer: The Web Conference (2019–2021), Journal of Complex Networks (2019), IEEE TCSS (2021)

Open source: founding contributor of DyNetworkX, a Python dynamic-network analysis library; co-authored its companion paper (Applied Network Science, 2022)

Earlier Experience

Research Assistant, IDEAS Lab, University of Toledo (publications above) May 2016 – Dec 2019

Student Software Developer, University of Toledo Simulation & Gaming Studio Aug 2015 – Dec 2017

Software Developer Intern, Diebold Nixdorf Jan 2015 – May 2015

Education

M.S.E., Computer Science & Engineering · University of Toledo Jan 2018 – Aug 2020

GPA 4.0/4.0 · Thesis: Generative Models of Link Formation and Community Detection in Continuous-time Dynamic Networks

B.S., Computer Science & Engineering · University of Toledo Aug 2013 – Dec 2017

GPA 3.91/4.0 · minor in mathematics · summa cum laude