YUNWEI ZHAO

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EDUCATION

Ph.D. in Computer Science, New York University — Sep 2024 - May 2028 (Expected)
Status: 2nd-year PhD Student | **Advisor:** Lakshminarayanan Subramanian
Research Theme: Human-AI Reasoning in Large-Scale Networks and Systems

Master of Computer Science, Cornell University — Sep 2023 - May 2024

Bachelor of Computer Science, University of Washington — Sep 2019 - May 2023

SELECTED PUBLICATIONS & RESEARCH

[1] The Privacy Quagmire: Where Computer Scientists and Lawyers May Disagree *Yunwei Zhao, Varun Chandrasekaran, Thomas Wies, Lakshmi Subramanian*

Accepted to ACM Workshop on Hot Topics in Networks (HotNets), 2025 (Oral Presentation)

- **System Experience & Scalability:** Designed an end-to-end, scalable reasoning system that converts natural language into formal logic to verify compliance at scale.
- **Performance Optimization:** Engineered a hybrid neural-symbolic architecture that achieved **sub-linear scaling behavior**, enabling the system to process massive policy documents (40k+ words) with zero timeouts, where traditional solvers failed.
- **Architecture:** Built a robust pipeline utilizing LLMs for semantic extraction and SMT solvers (CVC5) for logic verification, optimizing for both computational efficiency and logical precision.

[2] BEACON: Bayesian Contrastive Learning for Single-Cell Gene Regulatory Inference *Yunwei Zhao, Ankit Bhardwaj, Lakshmi Subramanian*

Accepted at NeurIPS 2025 Workshop on Virtual Cells and Instruments: A New Era in Drug Discovery and Development

- **Network Analysis:** Developed a novel graph inference system for reconstructing regulatory networks from extremely sparse, noisy single-cell data.
- **Algorithms & Statistics:** Implemented **Bayesian inference** to generate calibrated probability scores for network edges, effectively modeling uncertainty in data.
- **Robustness to Noise:** Designed a contrastive learning objective that successfully disentangled true signal from biological noise, achieving state-of-the-art performance (10.95% AUROC improvement) on benchmarks with extreme class imbalance.

[3] eKichabi v2: Designing and Scaling a Dual-Platform Agricultural Technology in Rural Tanzania *Anandith a Raghunath, Alexander Metzger, Hans Easton, XunMei Liu*, Fanchong Wang*, Yunqi Wang*, Yunwei Zhao*, Hosea Mpogole, Richard Anderson**

Accepted to CHI 2024

- **Human Research & QoE**: Conducted mixed-methods user research to define and improve Quality of Experience (QoE) for users in resource-constrained network environments.
- **System Latency Optimization**: Engineered a backend system that reduced request latency by 7000x (from 5+ minutes to <800ms) via database indexing, caching (Redis), and connection pooling, directly impacting user retention and satisfaction.
- **Controlled Field Experiments**: Deployed the system to 1,000+ households, implementing logging infrastructure to run controlled field experiments (A/B testing with control arms) to validate system improvements and user engagement metrics.

INDUSTRY EXPERIENCE

Founding Software Engineer Intern @Leibniz AI (Yale University Spinout) — July 2025 - Sep 2025

- **Systems Architecture:** Engineered the core metadata propagation pipeline for an AI compliance tool; implemented algorithms to reconstruct and merge SMT metadata, ensuring logic consistency across automated reasoning workflows.
- **Infrastructure & Optimization:** Architected the project's Docker environment to resolve critical offline dependencies and optimized the data extraction engine by implementing multi-line parsing algorithms, significantly improving pipeline reliability.

Software Engineering Intern @Ketogenic.com — Dec 2023 - May 2024

- **Mobile Development:** Led frontend architecture for a cross-platform app using Flutter; collaborated with cross-functional teams to implement features driven by user engagement metrics.

TECHNICAL SKILLS

Languages & Tools: Python, C++, Atlas.ti, ML Platforms (PyTorch, Tensorflow, Spark, DeepSpeed, FAISS), DevOps & Systems (Docker, KV Caches, Redis), LLMs (Flash Attention, LoRA, DDP/TP/FSDP, RLHF, RAG), SMT Solvers (CVC5)