

LUCAS ZHAO

lucas.zhao@yale.edu | (+86) 15137178550 | (+1) 646-320-7589 | lucas-zhao.com | github.com/lucas-zhao6
CS & Stats @ Yale | ML Research @ Meta | 3 Publications | 2 Patents

EDUCATION	Yale University <i>B.S. in Computer Science, B.S. in Statistics & Data Science</i> • Courses: Math of Deep Learning (PhD), AI Foundation Models (Grad), Probabilistic Machine Learning (Grad), Reinforcement Learning (Grad), Trustworthy Deep Learning (Grad), Statistical Inference	New Haven, CT Expected May 2028
EXPERIENCES	Westlake University, WestlakeNLP Lab, Incoming Research Intern <i>Advisor: Prof. Yue Zhang, ACL Fellow</i> • Joining the lab behind DeepScientist —the world’s first system to autonomously surpass human SOTA in scientific discovery—to research next-generation reasoning and agentic systems. • Researching multimodal LLM agents with focus on long-horizon reasoning, planning, and evaluation; exploring foundation model capabilities in agentic settings and scalable tool-use frameworks. Meta AI × Yale Graph and Geometric Learning Lab, Researcher <i>Advisor: Prof. Rex (Zhitao) Ying</i> • Developing edit-based discrete diffusion models with learned, content-aware generation order for variable-length sequence generation at Meta AI; one of two researchers leading model design and implementation.	Summer 2026 Mar 2026 – Present
RESEARCH	Mechanistic Interpretability of Multimodal Diffusion Transformers • Discovered hierarchical & causal feature structure in FLUX.1-dev: early layers encode spatial/layout factors, late layers encode semantic concepts. Feature steering produced reliable, bidirectional edits. • Trained 4x-expansion Top-K SAEs (12,288 features) across 200 generations; top 20 features identified via CLIP scoring mapped to interpretable concepts including object classes and spatial composition. Phase Transitions in Multimodal Diffusion Transformers • Demonstrated that hierarchical phase transitions in diffusion models are architecture-agnostic: FLUX.1-dev (multimodal diffusion transformer) replicates all signatures, matching existing U-Net findings. • Identified a sharp phase transition: class identity remains robust to noise until critical noise level where it abruptly collapses (90% → 10%), while low-level features such as texture and layout decay smoothly.	Yale University, 2025 Yale University, 2026
PROJECTS	Yalie Search, Solo Creator & Developer • Built a multimodal retrieval system for natural-language and vision-based search across 6,000+ Yale students, combining text, image, and structured signals; achieved 3× retrieval accuracy and sub-5s latency. • Engineered a multimodal retrieval pipeline combining CLIP-based vision embeddings, semantic text retrieval, and structured metadata for unified cross-modal search. Neural Instinct (Proactive AI Agent), Founder & Solo Developer • Built a proactive AI agent with persistent cross-session memory, long-horizon task understanding, and LLM-based intent modeling for personalized recommendations and contextual assistance. • Designed a scalable agent framework for tool invocation, task routing, and natural-language-defined multi-step workflows, enabling custom automation without manual rule-writing. • Engineered an autonomous agent system deployed as a Chrome extension with client-side WebGPU inference, reducing cost by 90% versus server-based agents through edge deployment. MIT iQuHack (Quantum Computing Hackathon), Team Leader • Led team to build ML system predicting optimal quantum circuit simulation parameters without running simulations, achieving 85% accuracy & 46-51% performance gains over baseline. • Engineered automated feature extraction pipeline from OpenQASM circuits & developed ensemble prediction system comparing 4 architectures (LightGBM, GPR, curve predictors, baseline).	Nov 2025 – Present Feb 2026 – Present Jan 2026 – Feb 2026
PUBLICATIONS	1. SCI, co-first author: L. Zhao et al. Studies on macrofungi diversity and discovery of new species of <i>Abortiporus</i> from Baotianman World Biosphere Reserve. <i>Open Life Sciences</i> . doi:10.1515/biol-2022-0614 2. L. Zhao. Morphological and DNA Barcode Identification of <i>Delottococcus confusus</i> , an invasive alien species to China. <i>Life Science Journal</i> . doi:10.7537/marslsj200423.02 3. L. Zhao. Identification and Research into a Wild Parasitic Fungus and its Biological Characteristics. <i>2022 LIYSF Science Collection</i> (pp. 38–41).	
PATENTS	1. High-Efficiency Radial Honey Extractor Co-inventor; redesigned centrifugal extraction geometry for higher yield; mass-produced commercially. 2. Multifunctional Pollen Collector Co-inventor; integrated collection and filtration into single mechanism; mass-produced commercially.	CNIPA No. ZL2020 2 2132941.4 CNIPA No. ZL2020 2 2132944.8
AWARDS	Gold Award, Third Place Nationally USABO Global Tied Top 15, National 2nd Prize S.T. Yau High School Science Award National Gold, Regional Top 10 Physics Bowl (Division 2) Silver Award, Closing Speaker London Int’l Youth Science Forum (LIYSF)	2023 2022 2023 2022
SKILLS	Python, C/C++, PyTorch/TensorFlow, Transformers, Foundation Models, Diffusion Models, Multimodal Models, Vision-Language Models, LLM Agents, Reinforcement Learning, CLIP, Evaluation, WebGPU	
LANGUAGES	English (native/bilingual), French (full professional), Mandarin (native/bilingual)	
LEADERSHIP & COMMUNICATION	Yale Computer Society , Catalyst Mentor (2025) —Weekly mentorship for 8+ students in web dev Chinese Undergrads @ Yale , Outreach Chair (2024–25) —Organized 20+ events; co-led XWeek	