Hao Lin

everhao.me 💛 | hao@cs.wisc.edu | luckyhlin For casual purpose, July 2024

Master student in *CS @ UW–Madison* with:

- Interests in theoretical computer science, math, programming languages & computer systems
- 1 year *full-time* experience as a software engineer @ ByteDance
- 2 years research experience in AI (during undergrads) with Honors Research Program
- 4 years competitive programming experience (prior to college) with top awards

Education

University of Wisconsin-Madison Sep. 2023 – May 2025 (expected)
M.S. Computer Science *Madison, WI, USA*

- Interests & Courses: Theory of Computation & PL; Computer Systems; HPC; Network; Arch & VLSI

Shanghai Jiao Tong University Sep. 2017 – Aug. 2021
B.Eng. Electrical and Computer Engineering*, minor in Data Science* *Shanghai, China*

- Graduated with Honors Research Program
- Related Courses: Honors Mathematics (A+), Big Data System (A+), AI, OS, Statistics
- Professional English Fluency: TOEFL scored 109/120 with speaking 27/30

Professional Experience (Intern)

NVIDIA June – Aug. 2024 (expected)
Software Engineer *(Tools Infrastructure)* | ***Compiler, C++20*** *Santa Clara, CA, USA*

Professional Experience (Full Time)

ByteDance July 2021 – July 2022
Software Engineer *(Backend & Algo Engineering)* | ***Go, MySQL, Redis, Kafka, Linux*** *Shanghai, China*

- **Spot Bonus Award**: received for outstanding outcome in building **a robust core strategy recommendation service**, a Bayesian and complex strategy-based recommender system to adaptively provide students with exercises most suitable to their current abilities
- Refactored codes of 11 strategies for a **large-scale** million-line-code microsystem to enhance maintainability
- Created a **distributed** service with eventual consistency and multiple sources within limited 2 weeks
- Invented a JSON-like data interchange format and its parser to transfer specific graph relational data
- Improved the quality of service monitoring by customizing alarm scripts to every service and tuning parameters, reducing half of the false alarm rate for a team of near 50 backend & QA members

Selected Projects

EverHao.me | ***Javascript, Sass, Next.js*** Feb. 2023 – now

- Designed and implemented a personal website using JAMstack architecture to create a self-contained study flow

From Design to Post-APR: A Specialized GNN Accelerator | ***Verilog, VLSI*** Jan. – May 2024

- Designed, synthesized, placed-n-routed integrated circuits for the accelerator of GNN, using Intel 7nm open tech
- Optimized the RTL and constraints to speed up clock frequency from 781.5 MHz to 1.19 GHz with only 11% sacrifice for EDAP metric

Introduction to Just-In-Time GPU Acceleration | ***CUDA, NVPTX, JIT, C++*** Dec. 2023

- Measured performance on basic vector additions implemented with vanilla CUDA and just-in-time compiled NVPTX ISA with the help of LLVM and Numba

COOL Compiler | ***C++11, Flex, Bison*** Feb. – Mar. 2023

- Self-studied & implemented the front-end and partial back-end of a COOL compiler, a toy with modern features

Food 3D Printing Machine | ***C++, Python, Flask, Cura*** May – Aug. 2021

*Team Leader, an **interdisciplinary** project* *advisor: Dr. Mingjian Li* *SJTU, Shanghai, China*

- Designed and assembled a 3D printer to make food with peanut sauce to "print" food in customized shape
- Automated the production process by writing a web application to both transfer the data and improve usability

Selected Awards

GMTK Game Jam | ***C#, Unity*** July 2022

*Ranked **11 out of 6000+** games in public ranking, Technical Leader* *Worldwide, Online*

- Led the technical team by actively communicating with art & design members; implemented the user interface
- Managed working progress and split works evenly to ensure the accomplishment of the game within 48 hours

VEX Robotics China Final | ***C++, Control Theory*** June – Nov. 2018

Top 4 (National), Amazing Prize, Top 2 in autonomous track *Shanghai, China*

- Designed autonomous driving algorithms based on the PID algorithm; tuned the robot's parameters and tested its robustness to ensure its stability in 45-second-long self-driving races through a two-day intense match

National Olympiad in Informatics | ***C++, Data Structure & Algorithm*** Nov. 2015 - Nov. 2016

First Prize, won Twice (Province Level); Bronze Medal (National Winter Camp) *Shanghai & Mianyang, China*

Undergraduate Research in AI

On Sample Efficiency Improvement for Deep Reinforcement Learning | ***TF*** Oct. – Dec. 2020

Honors Research Program *advisor: Prof. Paul Weng* *SJTU, Shanghai, China*

- Designed an innovative algorithm by expanding artificial trajectories in Invariant Transform Experience Replay (data augmentation for DRL), achieving successful training result with fewer samples: in contracted 120 epochs

Model Based Deep Reinforcement Learning for Autonomous Driving | ***TF*** June 2019 – Sep. 2020

Team Leader *advisor: Prof. Paul Weng* *SJTU, Shanghai, China*

- Explored feasibility of a self-designed model-based deep reinforcement learning algorithm; used it to successfully train an agent completely offline to move safely on the obstacle-free road, over a 140GB pre-collected dataset

Movie Recommender System for Groups using Hybrid Metrics | ***TF*** Jan. – Feb. 2020

*Team Leader, **Best Project** in the Winter School* *advisor: Prof. Arnav Jhala* *NCSU, Raleigh, NC, USA*

- Gained 42% decrease in error by applying Neural Collaborative Filtering with hybrid metrics to CAMRa2011

Term Project Reports in Math

Hardness vs Randomness: Review and Beyond Apr. – May 2024

- Reviewed the seminal paper authored by Nisan and Wigderson
- Discussed vast connections among multiple topics in complexity theory and concentration theory

Introductory Analysis on Boundary Element Method for PDE Apr. – May 2020

- Compared numerical results implemented with Mathematica, and analytical results on solving 2D-laplace equation with Dirichlet and Neumann boundary conditions; developed heuristic insights for adaptive BEM

Randomness Tests on Random Number Generator June – July 2019

- Checked the randomness of pseudo-random sequences generated by Mathematica with the frequency test, the Wald-Wolfowitz runs test, and our own methods: 2-bit & n-bit frequency test

Efficient Approximation to π with Arithmetic-Geometric Mean & Elliptic Integrals July – Aug. 2018

- Reformulated the proof of an algorithm which can calculate π whose precision is increased quadratically, by evaluating the connection between AGM and elliptic integrals

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Casual Talks/Events for CS Education

Workshops on Web Development Feb. – Mar. 2024

- Held two internal workshops individually on the basics of site construction, specific for audience of CS master

Coding Girls Aug. 2022 – May 2023

- Imparted graphical programming and frontier CS applications weekly to kids suffering from leukemia

On the Evolution and Details of Golang Scheduler Oct. 2021

- Delivered a comprehensive talk on important features of Golang, with audience from a ByteDance backend team

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CS Skills

- coding experiences in $\sim$ **15 languages** (familiar with modern C++, Golang and Python)
- operating system (Linux as routine system for 3 yrs)
- HPC & comp. arch. (GPU & CUDA)
- device physics, VLSI (accelerator & pipelined CPU)
- database (MySQL, Redis, InfluxDB for 1 year)
- AI, Tensorflow (hands-on experience for 2 years)
- algo & complexity (proofs & applications)
- full-stack web development
- compiler