
EDUCATION

Lincoln, NE, USA **University of Nebraska—Lincoln** **Aug. 2019 — Est. May 2023**

- Bachelor of Science, double major in Computer Science and Mathematics (Discrete Math and Cryptography).
- *Current GPA*: 4.0/4.0 (56/120 credit hours, 13 A+ courses, 3 A courses).

Ho Chi Minh City, Vietnam **High School for the Gifted** **Aug. 2016 — May. 2019**

- Computer Science honor class. Coursework: Data Structures and Algorithms. *GPA*: 9.7/10.0.

EMPLOYMENT

Software Engineer, Part-time **Zalo Group, Vietnam** **Aug 2018 – Aug 2019**

Team Core Backend / R&D

- *Zalo* is the most popular messaging application in Vietnam with more than 100 million users. I got an internship offer from Zalo Group as a high school junior. After becoming a high school senior, they gave me an official employment offer. I was the youngest employee in the company's history.
- My team owned in-house core software powering all company products: key-value database, proxy, load balancer (C++), service framework, and core libraries (Java). Specifically, I optimized, maintained, and implemented new features for
 1. An in-house key/value database storing the data for 100 million users. I implemented a transparent encryption layer for the database and new observability features, optimized key scanning (upto 50% faster on NVMe drives). Other optimizations reduced 1% to 15% CPU/memory usage in specific use cases.
 2. An in-house HTTP long polling edge server, which held TCP connections and pushed chat messages to users. The typical load was a million concurrent connections per physical server. One of my fixes reduced CPU usage by 30%.
 3. Worked on a cross-functional virtual team to redesign and implement an encryption layer between mobile clients and edge servers spanning across the globe, serving tens of millions of devices, and handling billions of messages per hour.

Undergraduate Research **UnSAT Group, UNL** **Mar 2020 – now**

- Working on software testing and verification techniques:
 1. Interaction generation: use a dynamic analysis (decision tree and iterative refinement) to learn interactions for configurable software.
 2. Invariant generation: use a hybrid dynamic/static analysis to learn program invariants under various numerical forms (e.g., nonlinear equalities, octagonal inequalities, etc.).

Production Engineer Intern **Facebook** **Jun 2020 – Aug 2020**

- Implemented automatic resources allocation adjustment based on historical usage for a distributed batch job scheduler (in C++ and Java).
 1. Used cgroup2 memory usage throttle limit and pressure to accurately measure memory usage for each container (i.e., measure memory usage without unused/cold page cache).
 2. Built a data pipeline to analyze past resources usage trend and make prediction for future usage.
 3. Designed and implemented a new API endpoint to do daily batch ingest of new resources allocation settings.

PUBLICATIONS

1. KimHao Nguyen and ThanhVu Nguyen. *GenTree: Using Decision Trees to Learn Interactions for Configurable Software*, International Conference on Software Engineering (ICSE), accepted, 2021.
2. ThanhVu Nguyen and KimHao Nguyen. *Using Symbolic Execution to Analyze Linux KBuild Makefiles*. International Conference on Software Maintenance and Evolution, New Ideas and Emerging Results (ICSME NIER), pages 712–716, 2020.

LANGUAGES AND TECHNOLOGIES

- Proficient: C/C++ (5 years), **Java** (2 years).
- Intermediate: C#, Node.JS, MongoDB, HTML5, JS, CSS, SQL, Embedded systems (C/C++/Assembly).
- Exposure: Go, Rust, PHP, Python, VB.NET, ASP.NET.
- Other: Linux, Data structures and algorithms, Key-value database internals, Large-scale systems, High performance services, Event-driven/Network programming.

PERSONAL PROJECTS

- **Gomoku AI Engine** (2018). Plays Gomoku game with a strong artificial intelligence algorithm (alpha-beta search, heuristic evaluation, threat-based search, transposition table). C++ (AI, HTTP+WebSocket Server), *HTML/CSS/JS* (Web UI).
- **Energy Mesh** (2016). Monitors the electric energy consumption of each device in a house in real-time by using a mesh network of sensors. C++ (embedded firmware), *NodeJS* (back-end), *AngularJS* (front-end).
- **Smart Home** (2013). Controls home appliances using a RF remote, a smartphone, or any computer with an internet connection. *Assembly (8051)*, C (AVR), *VB.NET* (Windows, Windows Mobile).
- **Laser Bot** (2015). Engraves images or vector graphics onto wood, cloth or any burnable materials using a laser beam. C++ (embedded firmware), *Java* (PC Software).

AWARDS/ACTIVITIES

INTERNATIONAL

- **First rank** (2018), Asia-Pacific Informatics Olympiad — Online Contest.
- **Best Young Inventor Award** (2014), by World Intellectual Property Organization (WIPO).
- **2 × Gold Medal** (2013 & 2014), at Asian Young Inventors Exhibition 2013 and 2014.
- **Special Award** (2013), by Korea Invention Academy (KIA), for Smart Control Panel project.

PRIME MINISTER'S AWARD

- **Certificate of Achievement** (2014), by Vietnam's Prime Minister Nguyen Tan Dung — for having many achievements in technological contests.
- **Certificate of Achievement** (2016), by Vietnam's Prime Minister Nguyen Xuan Phuc.

DOMESTIC

- **Second Prize, Vietnam National Olympiad in Informatics** (2018 and 2019): competitive programming contest for high school students. The national round had around 500 contestants.
- **Special Prize, Intel Young Makers Challenge** (2014): I was the only middle school student who was accepted to participate in the contest, which was designed for high school teams. I worked solo and won the Special Prize, higher than First Prize with a Laser Bot project.
- **5 × First prize, STEM Nationwide Contest** (2012 to 2015): an annual STEM contest for middle and high school students. The national round had around 250 contestants selected from thousands of students participated in provincial rounds.