

# WENQING LUO

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## EDUCATION

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**University of Illinois at Urbana–Champaign, Illinois** 2021 – Present

*M.S. in Computer Science, advisor: Tianyin Xu, expected June 2023*

**University of Illinois at Urbana–Champaign, Illinois** 2017 – 2021

*B.S. in Computer Engineering*

**Zhejiang University, Hangzhou, China** 2017 – 2021

*B.E. in Electrical & Computer Engineering*

## EXPERIENCE

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**Research Assistant UIUC** August. 2021 – Present

*Golang, Kubernetes* Advised by Prof. Tianyin Xu

- Working on a project called Sieve, which uses partial histories to automatically detect and replay bugs in Kubernetes operators.
- So far, the project has successfully detected more than 20 bugs (with 3 major types) in several popular used Kubernetes operators.

**Bytedance Inc. Shanghai, China** February. 2021 – July. 2021

*Kernel, DPDK, Service Mesh* Intern at *Infrastructure - Virtualization Team*

- Optimize service mesh performance in the cloud network through kernel bypass strategy and user-level TCP stack.
- Implement zerocopy for the TCP offload engine (TOE) to reduce the latency and also improve CPU utilization rate.
- Build a glue socket kernel module to allow user use socket API (but under a different protocol family) to access the TCP offload engine (TOE) without modifying their current code.

**Alibaba Group. Hangzhou, China** June. 2020 – December. 2020

*C++, LLVM, Tensorflow, Machine Learning System* Intern at *Search and Recommendation Business Unit*

- Built and optimized a large-scale distributed machine learning system in support of Alibaba's ecommerce websites, including Taobao (more than 300 million DAU), TMall, AliExpress, etc., with over 100K QPS.
- Build up an automated JIT compilation system for the online rank service, which uses Clang/LLVM based toolchain to rewrite dynamic part of the origin code and generate equivalent high performance static representation, and finally boosted more than 10% performance of entire real-time ML inference engine.

**Bytedance Inc. Beijing, China** April. 2020 – June. 2020

*Golang, Thrift, Protobuf* Intern at *Lark Core Services Team*

Building the core backend service for a collaboration suite. Refactor the user profile model and device control module. Improve overall performance by resolving SQL slow queries case by case.

**Tencent Inc. Shenzhen, China** June. 2019 – August. 2019

*Golang, Kubernetes, Python, Protobuf* Intern at *Cloud & Smart Industries Business Group (CSIG)*

- Implement a distributed performance testing tool for an inner RPC framework by providing a JavaScript Runtime (ES6+) and realtime serialization, which popularized as an internal open-source project in Tencent.
- Build several medical diagnosis services with Golang as a built-in module for the social app WeChat covering more than 30 million target users, which take requests into batches and schedule& distribute them to machine learning engines by message queue.
- Build up a unified log collecting platform by logstash, Elasticsearch and Kibana, implement a Golang SDK.

- Adapt Protobuf+RPC pattern into message queue, and orchestrate auto-scalable ML engines on Kubernetes.

## WeirdOS

October. 2019 – December. 2019

*Pure C, Assemble(x86), Qemu* Course Project [Link]

WeirdOS is a Linux like operating system under x86-32 instruction set, which is derived from final project of ECE391@UIUC. The project won 2nd place in ECE391 final competition sponsored by Microsoft. The following features were implemented in the OS,

- Course required features: memory paging, read-only filesystem, context switch, Round-robin scheduler, interrupt handlers, system calls.
- Extra features: dynamic memory allocator, GUI and **layer1-5 network stack** (from NIC driver to HTTP).
- A Internet browser by combining GUI and network stack.

## Open-Source Contribution for VSCode and FireFox

August. 2018 – June. 2019

*TypeScript, Electron.js, React.js* Fixed several bugs as well as adding features

Later 2018, I participated development of the open-source project – VSCode, help the team fix several bugs related to git module and search widget. This experience brought me a strong interest in contributing for open-source project. In 2019, I joined the Mozilla Developer community, making contribution for FireFox DevTools, which is challenging and also interesting.

## Recruit Open Platform

May. 2018 – September. 2019

*Golang, Vue, NodeJS, Docker Swarm, gRPC, Prometheus* Major Developer

The project is aimed at providing a platform for student associations to manage their recruitment which supports form edit, interview and association management.

- Divide the large system into several micro-services by using gRPC and Traefik(service discovery + load balancing).
- Implement server side rendering for the form submit page (running Vue.js on server side).
- Manage the deployment on clusters by Docker Swarm, supporting realtime monitor and alert with Prometheus, Grafana.

## TEACHING EXPERIENCE

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### Teaching Assistant of ECE220 - Computer Systems Programming

August. 2020 – December. 2020

*C, LC3, Golang, Webassembly* Instructor: Prof. Steve Lumetta

- Hold regular discussion sessions and office hour.
- Implement an autograder which supports symbolic execution of students' machine problems and give them real-time feedback.
- Compile C version of LC3 simulation tool into JavaScript through Webassembly, build a corresponding web interface for LC3 simulator which can be run in browser.

## HONORS AND AWARDS

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- Zhejiang University, 3<sup>rd</sup> Prize Scholarship, 2019-20
- ZJU-UIUC Institute, 3<sup>rd</sup> Prize Scholarship, 2018-19, 2019-20
- ZJU-UIUC Institute, Dean's List, 2018-19, 2019-20
- Interdisciplinary Contest in Modeling 2020, Finalist Award (Top 1% among 13,749 teams)

## SKILLS

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- Programming Languages: Golang = C/C++ > TypeScript = JavaScript = Python
- Platform: MacOS, \*nix
- Development: Web Application(Full Stack) (React, Vue, Electron.js, Node.js, Golang), Cloud & Micro Service(RPC, Docker Swarm, Kubernetes), Database(MySQL, MongoDB, ElasticSearch), Middleware(Redis, Nats), Unix Network Programming

- Relative Courses: Algorithm and Data Structure, Operating System, Computer Security, Computer Network, Computer Organization and Design