

# Xuhao Luo

201 N Goodwin Ave, Urbana, IL, 61801  
(217) 377-2021 ◊ xuhaol2@illinois.edu ◊ LinkedIn

## Education

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### University of Illinois Urbana-Champaign

Aug, 2021 - Now

Ph.D. Student in Computer Science

### University of California San Diego

Sep. 2019 - Mar. 2021

M.S. in Computer Science, *GPA: 3.82/4.00*

### University of Science and Technology of China

Sep. 2015 - Jun. 2019

B.S. in Applied Physics

## Research Publication

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- Zhiyuan Guo\*, Yizhou Shan\*(co-first author), **Xuhao Luo**, Yutong Huang, Yiyang Zhang, **Clio: A Hardware-Software Co-Designed Disaggregated Memory System** (*Preprint*) In-submission

## Experience

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### University of Illinois Urbana-Champaign

May. 2021 - Now

*Research Assistant, advised by Prof. Tianyin Xu*

*Urbana, IL*

- Building a framework to implement and reason about fail-slow tolerant distributed systems in an easy and effective way.
- Implementing a light-weight user-space thread library with cooperative task scheduling using **C++ Coroutine**.
- Introducing **event** abstraction and **wait()** API for better management of waiting points globally.

### Microsoft Research

Jun. 2020 - Sep. 2020

*Research Intern*

*Beijing, China*

- Designed and implemented task scheduling and dispatching system for distributed machine learning using **C++**.
- Designed and implemented **CUDA**-based high-performance inter-GPU communication channel for distributed ML within a large-scale GPU cluster.
- Multi-GPU collective operation(AllReduce, AllGather, Broadcast) throughput outperforms Nvidia NCCL by at most 18.4% under the same system setting.

### University of California San Diego

Sep. 2019 - Dec. 2020

*Research Assistant, advised by Prof. Yiyang Zhang*

*La Jolla, CA*

- Worked on building FPGA-based disaggregated memory system.
- Designed and implemented a *go-back-N* based reliable network stack on both FPGA and host Linux server to support high-performance reliable network communication. Using kernel-bypass to achieve high-throughput and low-latency.
- Designed and implemented an RPC-semantic connectionless network stack to improve scalability, with a delay-based congestion control.
- Achieved  $\mu$ s-level latency and 10Gbps(limited by hardware interface) throughput at rack scale.

### Agora.io

Jul. 2019 - Sep. 2019

*Software Engineer Intern*

*Shanghai, China*

- Participated in the development of CapSync, a distributed capability negotiation system for synchronizing media capability info between users, implemented with **C++** and **libevent**.

## Projects

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### Distributed Messaging System

Apr. 2020 - Jun. 2020

*Project for CSE223, Distributed System*

- Built a distributed messaging system patterned on Kafka using **Go**. Provided messaging service via **Append()** and **Get()** APIs. Implemented *Topic* and *Partition* abstraction for replication management with **Zookeeper**.

### Fault-tolerant Distributed Storage System

Sep. 2019 - Dec. 2019

*Project for CSE224, Networked System*

- Implemented a cloud-based file storage system patterned on Dropbox. Used multiple servers for duplicated file storage. Achieved consistence and fault-tolerance mechanism using **Raft** consensus algorithm.

## Skills

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### Language

C/C++, Python, Go, Rust, Haskell, OpenCL, Verilog

### Tools/Framework

TensorFlow, Docker, Zookeeper, LLVM, Google Test