

XIAOSU, LYU

PhD Researcher & Systems Engineer | High-Performance Networking & Cloud Infrastructure

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Summary

Systems Researcher & Senior Engineer with 13 years of expertise in **high-performance C++ and low-level system architecture**, including 7 years of **industrial networking** and 6 years of **doctoral research**. PhD candidate specializing in **WebAssembly, kernel-bypass networking (RDMA/DPDK), and multi-core performance scalability**. Proven track record in architecting sub-millisecond execution environments and optimizing **Linux kernel data paths**. Seeking to leverage deep systems knowledge to drive innovations in high-performance architectures, efficient runtime systems, and scalable data infrastructure for next-generation computing platforms.

SKILLS

Languages: C, C++, Go, Java, Python, Perl, Shell

Systems & High-Performance: Operating System, WebAssembly (Wasm) Runtimes, Linux Kernel, Real-time Scheduling, RDMA, DPDK, Multithreading/Concurrency, Kernel-bypass.

Cloud & Infrastructure: Kubernetes (K8s), KNative, FaaS (OpenFaaS/OpenWhisk), Istio, Microservices, AWS (Nitro Enclaves), CDN, Prometheus, Grafana.

Networking: TCP/IP, UDP, IPv4/v6, Congestion Control, SDN, UDT, ethernet

Tools: Git, CMake, LLVM, clang, CI/CD, Docker, Perf, GDB, Valgrind, TensorFlow.

EDUCATION

The George Washington University	Washington, D.C., U.S.
Ph.D. Computer Science (Computer Architecture Networks and Distributed Computing, GPA:3.87/4.0)	May 2026

The George Washington University	Washington, D.C., U.S.
M.S. Computer Science (Distributed System and Machine Learning, GPA:3.86/4.0)	May 2019

Shenyang Jianzhu University	Shenyang, China
B.E. Computer Science and Technology (Overall GPA: 86/100 Rank: 6th/175)	July 2006

RESEARCH PROJECT

The George Washington University	Washington, D.C., U.S.
<i>Research Assistant - Cloud Systems Lab</i>	May 2019 to present

- Architected a scalable Wasm FaaS platform, achieving strong **isolation** and high **density** for **sub-millisecond** functions.
- Developed **kernel-bypass RDMA/DPDK communication layers** for ultra-low latency inter-function calls.
- Developed user-space interrupt-driven schedulers to schedule concurrent tasks and minimize deadline violations.

<i>Independent study - Lab for Intelligent Networking and Computing</i>	October 2017 to September 2018
Predicted task execution times with deep learning to optimize Hadoop task scheduling and minimize total execution cost.	

WORK EXPERIENCE

ARM	Austin, U.S.
Systems Research Engineer - <i>Recurring PhD Intern</i>	May 2021 to August 2023

- Architected a secure Wasm FaaS within **AWS Nitro Enclaves**, cutting cold-start latency by **17x** while maintaining hardware-level isolation.
- Integrated Wasm with **RDMA-based** Remote Function Calls, enabling robust isolation with marginal overhead.
- Built pluggable **real-time schedulers (EDF,SRSF)** for **DAG-based** functions, ensuring **deadline compliance** for concurrent tasks.

Bukahudong Technologies Co., Ltd (Early-stage startup)	Beijing, China
<i>Core Software Engineer - Streaming Server R&D</i>	July 2015 to February 2016

- Architected and managed full-lifecycle **streaming clusters** for video publishing, playback, and recording.

ChinaCache	Beijing, China
<i>Senior Network Engineer - North American R&D</i>	April 2013 to July 2015

- Optimized **TCP/IP congestion control**, reducing packet loss and boosting throughput by **20%** under 3G networks.
- Designed a **real-time TCP bandwidth estimation** module in Squid, improving content delivery on handheld devices.
- Ported UDT (reliable UDP) into Squid, accelerating **large-scale LAN/WAN data transfer**.
- Developed and maintained **large-scale live streaming clusters** for publishing, playback, time-shift, and recording.
- Built a **Nginx module** for real-time FLV live streaming, enabling low-latency video publishing and playback.

- Beijing QuanShi Co., Ltd** Beijing, China
Senior Network Engineer - Base Platform R&D October 2011 to April 2013
 • Implemented **UDP congestion control** for a video conferencing system, improving throughput by 30%.
- Beijing FastWeb Technology Co., Ltd** Beijing, China
R&D Engineer - Network Planning R&D March 2011 to September 2011
 • Designed a distributed system to monitor CDN node availability and aggregate client results.
- Tianjin National Cybernet Security, Ltd** Beijing, China
R&D Engineer - Information Security R&D February 2009 to March 2011
 • Developed proxy servers (HTTP, HTTPS, SOCKS) and engaged in network security R&D.
- Watchdata Technologies, Ltd** Beijing, China
Intern - Security technology R&D May 2008 to January 2009
 • Researched and implemented data encryption, authentication, and digital signatures with OpenSSL.

PUBLICATIONS

- **Lyu, Xiaosu**, Emil Abbasov, Sean McBride, Gabriel Parmer, and Timothy Wood. "SledgeScale: Load-Aware Dispatch and Deadline-Driven Scheduling for Scalable, Dense Serverless Computing in Edge Data Centers." In *Proceedings of the Tenth ACM/IEEE Symposium on Edge Computing*, pp. 1-17. 2025.
- **Lyu, Xiaosu**, Emil Abbasov, Gabriel Parmer, and Timothy Wood. "A High-Density, Deadline-Aware, and Scalable Serverless Platform for Sub-Millisecond Functions at the Edge." In *2025 IEEE Cloud Summit*, pp. 35-38. IEEE, 2025.
- **Xiaosu Lyu**, "Balancing Three Important Goals for Runtimes - Isolation, High Performance, and Resource Efficiency," 2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C), 2022, pp. 60-62, doi: 10.1109/ACSOSC56246.2022.00031.
- **Xiaosu Lyu**, Ludmila Cherkasova, Robert Aitken, Gabriel Parmer, and Timothy Wood. 2022. Towards efficient processing of latency-sensitive serverless DAGs at the edge. In *Proceedings of the 5th International Workshop on Edge Systems, Analytics and Networking (EdgeSys '22)*. Association for Computing Machinery, New York, NY, USA, 49–54. <https://doi.org/10.1145/3517206.3526274>
- Viyom Mittal, Shixiong Qi, Ratnadeep Bhattacharya, **Xiaosu Lyu**, Junfeng Li, Sameer G. Kulkarni, Dan Li, Jinho Hwang, K. K. Ramakrishnan, and Timothy Wood. 2021. Mu: An Efficient, Fair and Responsive Serverless Framework for Resource-Constrained Edge Clouds. In *Proceedings of the ACM Symposium on Cloud Computing (SoCC '21)*. Association for Computing Machinery, New York, NY, USA, 168–181. <https://doi.org/10.1145/3472883.3487014>
- **Xiaosu Lyu**, Gaojun Liu. Research the application of Visual Database technology in telecom transmission network management, The Thirteenth National Conference on Youth Communication Proceedings, volume one, 60:259-262, Oct. 2008