

Guyue (Grace) Liu

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RESEARCH INTERESTS

Networking and Systems

PROFESSIONAL EXPERIENCE

Assistant Professor, Peking University Feb 2024 - present

Assistant Professor, New York University Shanghai July 2021 - present

Member, Shanghai Frontiers Science Center of AI and DL Sept 2023 - present

Postdoctoral Researcher, Carnegie Mellon University Jun 2019 - June 2021

- Advisor: [Vyas Sekar](#)

Research Intern, Microsoft Research Jun 2018 - Sept 2018

- Project: A Real-Time Pipeline for a Large-Scale Machine Learning System
- Mentor: Dany Fabian, Manager: John Winn

Research Intern, Hewlett Packard Labs Jun 2016 - May 2017

- Project: A Scalable and Predicable NFV Platform for Rack-Scale Architecture
- Mentor: Jean Tourrilhes, Manager: Sujata Banerjee

Research Intern, BBN Technologies May 2015 - Aug 2015

- Project: Real Time Network and Application Performance Monitoring Framework
- Mentor: Niky Riga, Manager: Chip Elliott

Research Intern, Chinese Academy of Sciences Sept 2011 - May 2012

- Project: Optimizing Network Performance of Virtual Machine Live Migration
- Mentors: Yuzhong Sun and Ying Song

Summer Intern, Queen Mary, University of London Summer 2011

- Project: Elastic Message-oriented Middleware System on Top of Cloud Platform
- Mentors: Yasir Alfadhil and John Bigham

EDUCATION

George Washington University Sept 2013 - May 2019

Ph.D., Computer Science

Advisor: [Timothy Wood](#)

Thesis: *Novel abstractions for high performance network functions*

Beijing University of Posts and Telecommunications Sept 2008 - July 2012

B.S., Electrical Engineering

Thesis: *Optimizing live migration of virtual machines*

CONFERENCE PUBLICATIONS

Paper citations: 1066 (11/27/2023) from Google Scholar

[NSDI'24] W. Li, X. He, Y. Liu, K. Li, K. Chen, Z. Ge, H. Qi, S. Zhang, **G. Liu**, "Flow Scheduling with Imprecise Knowledge", *USENIX NSDI*, April 2024. (18% acceptance)

[SIGCOMM'23] W. Xu, Z. Zhang, Y. Feng, H. Song, Z. Chen, W. Wu, **G. Liu**, Y. Zhang, S. Liu, Z. Tian, B. Liu, "ClickINC: In-network Computing as a Service in Heterogeneous Programmable Data-center Networks", *ACM SIGCOMM*, August 2023. (21% acceptance)

[NSDI'23] H. Li, Y. Dang, G. Sun, **G. Liu**, D. Shan, P. Zhang, "LemonNFV: Consolidating Heterogeneous Network Functions at Line Speed", *USENIX NSDI*, April 2023. (16% acceptance)

[SIGCOMM'22] S. Ahuja, V. Dangui, K. Patil, M. Somasundaram, V. Gupta, M. Sanchez, G. Yan, M. Noormohammadpour, A. Razmjoo, G. Smith, H. Zhong, A. Triguna, S. Bali, Y. Xiang, Y. Chen, P. Ganesan, M. Fernandez, P. Lapukhov, **G. Liu**, Y. Zhang, "Network entitlement: contract-based network sharing with agility and SLO guarantees", *ACM SIGCOMM*, August 2022. (19% acceptance)

[NSDI'21] **G. Liu**, H. Sadok, A. Kohlbrenner, B. Parno, V. Sekar, J. Sherry, "Don't Yank My Chain: Auditable NF Service Chaining", *USENIX NSDI*, April 2021. (17% acceptance)

[RTCSA'21] M. McCormack, S. Chandrasekaran, **G. Liu**, V. Sekar "Formalizing an Architectural Model of a Trustworthy Edge IoT Security Gateway", *IEEE RTCSA*, Sept 2021. (invited)

[ATC'20] Y. Ren, **G. Liu**, V. Nitu, W. Shao, R. Kennedy, G. Parmer, T. Wood, A. Tchana, "Fine-Grained Isolation for Scalable, Dynamic, Multi-tenant Edge Clouds", *USENIX ATC*, July 2020. (18% acceptance)

[SIGCOMM'18] **G. Liu**, Y. Ren, M. Yurchenko, K.K. Ramakrishnan, T. Wood, "Microboxes: High Performance NFV with Customizable, Asynchronous TCP Stacks and Dynamic Subscriptions", *ACM SIGCOMM*, August 2018. (18% acceptance)

[CoNext'18] S. Kulkarni, **G. Liu**, K.K. Ramakrishnan, M. Arumathurai, T. Wood, X. Fu, "REINFORCE: Achieving Efficient Failure Resiliency for Network Function Virtualization based Services", *ACM CoNEXT*, December 2018. (17% acceptance)

[RTAS'18] Y. Ren, **G. Liu**, G. Parmer, B. Brandenburg, "Scalable Memory Reclamation for Multi-Core, Real-Time Systems", *IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, April 2018. **Best Student Paper Award and Outstanding Paper**

[Middleware'16] **G. Liu**, M. Trotter, Y. Ren, T. Wood, "NetAlytics: Cloud-Scale Application Performance Monitoring with SDN and NFV", *ACM/IFIP/USENIX Middleware*, Dec 2016. (19% acceptance)

[Middleware'16] W. Zhang, **G. Liu**, A. Mohammadkhan, J. Hwang, K.K. Ramakrishnan, T. Wood. "SDNFV: Flexible and Dynamic Software Defined Control of an Application- and Flow-Aware Data Plane", *ACM/IFIP/USENIX Middleware*, Dec 2016. (19% acceptance)

[NFV-SDN'15] A. Mohammadkhan, **G. Liu**, W. Zhang, K.K. Ramakrishnan, T. Wood, "Protocols to Support Autonomy and Control for NFV in Software Defined Networks", *IEEE Network Function Virtualization & Software Defined Networks (NFV-SDN)*, Nov 2015.

WORKSHOP PUBLICATIONS & POSTERS

[SOSP'23 SRC] ConfMask: Enabling Privacy-Preserving Configuration Sharing via Anonymization, Y. Wang, **G. Liu**, *ACM SOSP SRC*, November 2023.

[SOSP'23 SRC] FTMesh: Efficient Fault Tolerance for Interactive Applications on Service Mesh, Q. Men, **G. Liu**, A. Panda, *ACM SOSP SRC*, November 2023.

[NSDI'23 Poster] Generating Flow-based Network Traffic with Realistic Temporal Properties, R. Lu, X. Li, **G. Liu**, *USENIX NSDI Poster*, April 2023.

[HotNets'21] **G. Liu**, A. Li, C. Canel, V. Sekar, "Watching the watchmen: Least privilege for managed network services", *ACM HotNets*, November 2021.

[**SPIN'20**] M. Hall, **G. Liu**, R. Durairajan, V. Sekar "Fighting Fire with Light: Tackling Extreme Terabit DDoS Using Programmable Optics", *ACM SPIN Workshop (co-located with SIGCOMM'20)*, August 2020.

[**HotEdge'20**] M. McCormack, A. Vasudevan, **G. Liu**, S. Echeverria, K. O'Meara, G. Lewis, V. Sekar "Towards an Architecture for Trusted Edge IoT Security Gateways", *USENIX Hot-Edge*, July 2020.

[**SafeThings'20**] M. McCormack, S. Chandrasekaran, **G. Liu**, T. Yu, S. Wolf, V. Sekar "Security Analysis of Networked 3D Printers", *IEEE SafeThings (co-located with S&P'20)*, May 2020.

[**LANMAN'19**] Z. Ni, **G. Liu**, D. Afanasev, T. Wood, J. Hwang, "Advancing Network Function Virtualization with Programmable NICs", *IEEE LANMAN Workshop*, April 2019.

[**LANMAN'19**] S. Kulkarni, **G. Liu**, K.K. Ramakrishnan, T. Wood, "Living on the Edge: Serverless Computing and the Cost of Failure Resiliency", *IEEE LANMAN Workshop*, April 2019.

[**KBNets'17**] **G. Liu**, K.K. Ramakrishnan, M. Schlansker, J. Tourrilhes, T. Wood, "Design Challenges for High Performance, Scalable NFV Interconnects", *ACM KBNets Workshop (co-located with SIGCOMM'17)*, August 2017.

[**HotMiddlebox'16**] W. Zhang, **G. Liu**, W. Zhang, N. Shah, P. Lopreiato, G. Todeschi, K.K. Ramakrishnan, T. Wood, "OpenNetVM: A Platform for High Performance Network Service Chains", *ACM HotMiddlebox (co-located with SIGCOMM'16)*, August 2016.

[**Diversity'15**] **G. Liu**, T. Wood, "NetDefense: Scalable, Flexible and Efficient DDoS Prevention with SDN and NFV", *Workshop on Supporting Diversity in Systems Researches (co-located with SOSR'15)*, Oct 2015.

[**LANMAN'15**] A. Mohammadkhan, S. Ghapani, **G. Liu**, W. Zhang, K.K. Ramakrishnan, T. Wood, "Virtual Function Placement and Traffic Steering in Flexible and Dynamic Software Defined Networks", *IEEE LANMAN Workshop*, April 2015.

[**IWCA'15**] **G. Liu**, T. Wood, "Cloud-Scale Application Performance Monitoring with SDN and NFV", *IEEE IWCA (co-located with IC2E'15)*, March 2015.

[**IWCA'14**] J. Hwang, **G. Liu**, S. Zeng, F. Wu, T. Wood, "Topology Discovery & Service Classification for Distributed-Aware Clouds", *IEEE IWCA (co-located with IC2E'14)*, March 2014.

JOURNAL ARTICLES

[**ToN'20**] S. Kulkarni, **G. Liu**, K.K. Ramakrishnan, M. Arumathurai, T. Wood, X. Fu, "REINFORCE: Achieving Efficient Failure Resiliency for Network Function Virtualization-Based Services", *IEEE/ACM Transactions on Networking*, April 2020.

[**ToN'15**] T. Wood, K.K. Ramakrishnan, P. Shenoy, J. Merwe, J. Hwang, **G. Liu**, L. Chaufourrier, "CloudNet: Dynamic Pooling of Cloud Resources by Live WAN Migration of Virtual Machines", *IEEE/ACM Transactions on Networking*, Oct 2015.

[**Network'15**] T. Wood, K.K. Ramakrishnan, J. Hwang, **G. Liu**, W. Zhang, "Towards a Software-Based Network: Integrating Software Defined Networking and Network Function

Virtualization", *IEEE Network*, May 2015.

[CJC'13] S. Liu, Y. Sun, G. Liu, "An Adaptive Bandwidth Allocation Algorithm for Live Migration Based on Service Features", *Chinese Journal of Computers*, Sept 2013.

TALKS

Watching the Watchmen: Trustworthy Network Tasks Outsourcing

- University of Waterloo (Virtual), April 2021
- Max Planck Institute for Software Systems (Virtual), April 2021
- NYU Shanghai (Virtual), April 2021
- Purdue University (Virtual), March 2021

Auditable NF Service Chaining

- Conference talk NSDI (Virtual), April 2021
- CyLab Partners Conference (Virtual), Sept 2020
- NSF/VMware SDI-CSCS Annual PI Meeting (Virtual), July 2020

Novel Abstractions for High Performance Network Functions

- University of California, Berkeley (Berkeley, CA), Feb 2019
- College of William & Mary (Williamsburg, VA), Feb 2019
- North Carolina State University (Raleigh, NC), Feb 2019
- Carnegie Mellon University (Pittsburgh, PA), Dec 2018

Microboxes: High Performance NFV with Customizable, Asynchronous TCP Stacks and Dynamic Subscriptions

- Conference talk at SIGCOMM (Budapest, Hungary), August 2018
- QMUL Networks Research Seminar (London, UK), August 2018

OpenNetVM: A Platform for High Performance Network Service Chains

- Conference talk at HotMiddlebox Workshop (Florianopolis, Brazil), August 2016
- Hewlett Packard Labs, Networking and Mobility Lab (Palo Alto, CA), April 2016

NetAlytics: Cloud-Scale Application Performance Monitoring with SDN and NFV

- Conference talk at Middleware (Trento, Italy), December 2016
- BBN Technologies (Boston, MA), August 2015

How SDN and NFV are Changing Networks

- GWU Women in CS (Washington DC), October 2014

TEACHING

Instructor, New York University Shanghai

- CSCI-SHU 361 Computer Security
- CSCI-SHU 308 Computer Networking

Spring 2022-2023
Fall 2021-2023

PROFESSIONAL SERVICE

Technical Program Committee:

- 2025: NSDI
- 2024: SIGCOMM, NSDI, ICNP, ASPLOS
- 2023: NSDI, ICNP, SIGCOMM Poster
- 2022: USENIX Security, IEEE S&P Poster, EdgeSys
- 2021: ICDCS, EdgeSys
- 2020: SIGCOMM Poster, OSDI AEC, ACSOS
- 2019: IEEE S&P Shadow & Poster

Organizing Committee:

- Publicity Chair, APNet 2024
- Awards Co-Chair, N2Women 2021-2023
- AEC Co-Chair, OSDI 2021
- Publication Chair, IEEE LANMAN 2021
- N2Women Mentor, ACM SIGCOMM 2020
- Web Chair, IEEE LANMAN 2018
- Travel Grant Coordinator, ACM/IFIP/USENIX Middleware 2017, 2018
- Web Chair, IEEE IWCA 2015

Journal Reviewer:

- IEEE Transactions on Cloud Computing, 2020
- IEEE Transactions on Network and Service Management, 2018, 2019, 2020
- SIGCOMM Computer Communication Review, 2019
- IEEE/ACM Transactions on Networking, 2019
- IEEE Journal on Selected Areas in Communications, 2019
- IEEE Transactions on Parallel and Distributed Systems, 2019

AWARDS & HONORS

2019 Rising Stars in EECS	Oct 2019
N2Women Rising Stars	July 2019
Best Student Paper Award and Outstanding Paper, IEEE RTAS	Apr 2018
First Place in 22nd GENI Engineering Conference Competition	Mar 2015
HP Helion OpenStack Scholarship (4 / 200)	Dec 2014

MENTORING**Current PhD Students:**

- Yuejie Wang (NYU Shanghai, 2022-)
- Runwei Lu (NYU Shanghai, 2022-)
- Jiajin Liu (NYU Shanghai, 2022-)

Current Undergraduate & Master Researchers:

- Qitong Men (NYU Shanghai BS, 2021-)
- Yao Xiao (NYU Shanghai BS, 2022-)
- Xinyu Li (NYU Shanghai BS, 2022-)
- Yongting Chen (CUHK MS, 2022-)

Alumni:

- 2023: Yumeng Lu (Stanford MS), Panyu Chen (Duke MS), Ruochen Miao (NYU MS), Siyan Li (Northwestern MS)
- 2022: Gengyu Chen (CMU MS), Qiaowei Li (Berkeley MS), Zhao Yang (NYU MS), Liyu Chen (UCL MS)