

EDUCATION

2019.10 – Present	Visiting Ph.D. student in Computer Science	Northwestern University (USA)
	<i>Advisor: Han Liu Area: Security of microservices, service mesh, serverless</i>	
2016.09 – Present	Ph.D. student in Cyber Security	Zhejiang University
	<i>Advisor: Yan Chen Area: Security and reliability of SDN, microservice</i>	
2012.09 – 2016.06	B.E. in Software Engineering	Shandong University

RESEARCHES AND PROJECTS

2020 – Present	<p>➤ A Survey of the Security Concerns and Solutions in Serverless Computing</p> <ul style="list-style-type: none"> – Introducing the security concerns of serverless computing – Illuminating the academic security research and the security measures adopted in commercial/open source serverless platforms. – Providing potential research opportunities and gap analysis. <p>Survey Serverless Computing Security Analysis</p>
2019 – Present	<p>➤ Automatic Inter-Service Access Control Policies Generation for Microservices</p> <ul style="list-style-type: none"> – Extracting the invocation logic among microservices from their code by static analysis. – Generating access control policies with least privileges automatically and keep them updated as microservices evolve. – Seamless integrating with current CI/CD pipeline and microservice infrastructures. – Minimizing redundant strategies to optimize policy enforcement at runtime. – Supporting microservices developed in multiple programming languages. <p>Istio Kubernetes Static Analysis Access Control</p>
2018 – 2019	<p>➤ Diagnosing Faults in the Control Plane of Software-Defined Networking</p> <ul style="list-style-type: none"> – Using bytecode instrumentation to record the invocations in control plane and the interactions between planes. – Building system behavior model in real time. – When a fault occurs, localizing the root cause via conducting differential checking with the normal system behavior model obtained by training. <p>SDN OpenDaylight Java Bytecode Operation Fault Localization Differential Checking</p>
2017 – 2018	<p>➤ A Survey of Fault Management in Software-Defined Networking</p> <ul style="list-style-type: none"> – Investigating SDN reliability issues and corresponding solutions. – Conducting the survey in multiple dimensions such as fault analysis, fault detection, fault diagnosis, fault repair, and fault tolerance. <p>Survey SDN Fault Management</p>
2017 – 2018	<p>➤ Defeating Middlebox-Bypass Attacks in Software-Defined Networking</p> <ul style="list-style-type: none"> – Generating unpredictable labels for packets to confine the attacker to random guessing. – Performing real-time detection and defense at the packet level. <p>SDN Data Plane Active Defense</p>

2016	<p>➤ SDN Controller Development for Cloud Data Center</p> <ul style="list-style-type: none"> – Based on Cisco Open SDN Controller (a commercial version of OpenDaylight). – Conducted network configuration test in Tencent Cloud data center. – Responsible for the design and implementation of southbound interface. <p>Intern Project SDN Controller Development Cisco Switch CLI</p>
2015	<p>➤ Shandong University Student Work Management System</p> <ul style="list-style-type: none"> – B/S architecture; MVC pattern; I am the leader of a 14-person development team. – Involving functionalities such as student performance assessment, scholarship application, loan application, and moral education. <p>Project Training Java MVC</p>

PUBLICATIONS

➤ Conference Papers

- [1] **MeshScope: A Bottom-Up Approach for Configuration Inspection in Service Mesh** 2020
Xing Li, Xiao Wang, and Yan Chen
ACM SIGCOMM 2020 Conference Posters and Demos CCF-A
- [2] **Towards Automated Inter-Service Authorization for Microservice Applications** 2019
Xing Li, Yan Chen, and Zhiqiang Lin
ACM SIGCOMM 2019 Conference Posters and Demos CCF-A
- [3] **Thinking inside the Box: Differential Fault Localization for SDN Control Plane** 2019
Xing Li, Yinbo Yu, Kai Bu, Yan Chen, Jianfeng Yang, and Ruijie Quan
2019 IFIP/IEEE Symposium on Integrated Network and Service Management (IM) CCF-C
- [4] **Flowcloak: Defeating Middlebox-Bypass Attacks in Software-Defined Networking** 2018
Kai Bu, Yutian Yang, Zixuan Guo, Yuanyuan Yang, Xing Li, and Shigeng Zhang
IEEE INFOCOM 2018 CCF-A

➤ Journal Articles

- [5] **Fault Management in Software-Defined Networking: A Survey** 2018
Yinbo Yu, Xing Li, Xue Leng, Libin Song, Kai Bu, Yan Chen, Jianfeng Yang, Liang Zhang, Kang Cheng, and Xin Xiao
IEEE Communications Surveys & Tutorials SCI Q1 IF = 23.7
- [6] **Falcon: Differential Fault Localization for SDN Control Plane** 2019
Yinbo Yu, Xing Li, Kai Bu, Yan Chen, and Jianfeng Yang
Computer Networks CCF-B SCI Q1 IF = 3.111
- [7] **State of the Art and Research Challenges in the Security Technologies of Network Function Virtualization** 2019
Xiaochun Wu, Kaiyu Hou, Xue Leng, Xing Li, YinBo Yu, Bo Wu, and Yan Chen
IEEE Internet Computing SCI Q1 IF = 4.231

➤ Patents

- [1] **A Differential Checking Based Fault Diagnosis System and Implementation for SDN Control Plane (201910204272.6)** Granted 2019
Yan Chen, Yinbo Yu, **Xing Li**, Kai Bu, Jianfeng Yang, Xue Leng
- [2] **A Policy Based Cloud Network Resource Management and Control System for Software-Defined Networking (201810159706.0)** Granted 2018
Xue Leng, Yan Chen, Kaiyu Hou, Kai Bu, **Xing Li**

EXPERIENCES

› Reviewer/Sub-reviewer of

- ACM Conference on Computer and Communications Security (CCS) 2018, 2019
- IEEE Communication Surveys & Tutorials (COMST) 2019
- IEEE International Conference on Distributed Computing Systems (ICDCS) 2018
- IEEE/ACM Transactions on Networking (ToN) 2018

› Conference Attendance

- ACM SIGCOMM 2020 Virtual Event, USA 2020.08
Poster Presentation: MeshScope: A Bottom-Up Approach for Configuration Inspection in Service Mesh
- ACM SIGCOMM 2019 Beijing, China 2019.08
Poster Presentation: Towards Automated Inter-Service Authorization for Microservice Applications
- IFIP/IEEE IM 2019 Washington DC, USA 2019.04
Paper Presentation: Thinking inside the Box: Differential Fault Localization for SDN Control Plane

› Internship

- Cisco (China) Hangzhou R&D Center 2016.04 - 2016.09
Developed an OpenDaylight-based SDN Controller for Tencent Cloud Data Center; was responsible for the design and implementation of southbound interface.

› Programs

- National Key R&D Program of China: Cyberspace Security Project 2017.06 - 2021.06
Responsible for SDN control plane fault diagnosis research, as well as project application and report.
- Key Research and Development Program of Zhejiang Province 2017.06 - 2021.06
Responsible for SDN control plane fault diagnosis research, as well as project application and report.

HONOR AND AWARDS

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| › National Scholarship | China | 2017 |
| › Award of Honor for Graduate | Zhejiang University | 2017 |
| › Graduate with Honor | Shandong Province | 2016 |
| › Graduate with Honor | Shandong University | 2016 |
| › Excellent Student Leader Award | Shandong University | 2014, 2015 |
| › Excellent Student Scholarship | Shandong University | 2014, 2015 |
| › 8th Place in the Sanhao Cup (Soccer) | Zhejiang University | 2019 |
| › Big 4 in the CC98 Cup (Soccer) | Zhejiang University | 2018 |
| › 1st Place in the Campus Cup (Soccer) | Shandong University | 2015 |
| › 5th Place in the Shanda Cup (Soccer) | Shandong University | 2014 |
| › 7th Place in the "Dreamer of Shanda" Soccer League | Shandong University | 2013 |

SKILLS

Second Language	English CET6: 507
Programming Ability	PAT Advanced level: 100
Programming Languages	Python: ★★★ Java: ★★★ Go: ★★ C/C++: ★
Platforms	Kubernetes, Istio, Docker, OpenDaylight, Mininet

HOBBY

Soccer	College team of CS.ZJU	2016 – Present
	College team of SE.SDU	2012 – 2016