Xing Li

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🎓 EDUCATION

2019.10 – 2020.12	**Visiting Ph.D. student** in **Computer Science**	**Northwestern University (USA)**
	Advisor: Han Liu Area: Security of microservices, service mesh, serverless	
2016.09 – Present	**Ph.D. student** in **Cyber Security**	**Zhejiang University**
	Advisor: Yan Chen Area: Security and reliability of SDN, microservice	
2012.09 – 2016.06	**B.E.** in **Software Engineering**	**Shandong University**

💻 RESEARCHES AND PROJECTS

2020 – Present

❯ **A Survey of the Security Concerns and Solutions in Serverless Computing**
  – 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.

  `Survey` `Serverless Computing` `Security Analysis`
  `Current Status: IEEE Communications Magazine - Under Major Revision`

2019 – Present

❯ **Automatic Inter-Service Access Control Policies Generation for Microservices**
  – 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.

  `Istio` `Kubernetes` `Static Analysis` `Access Control`
  `Related Publication: Paper [3], [1] (Conditionally Accepted)`

2018 – 2019

❯ **Diagnosing Faults in the Control Plane of Software-Defined Networking**
  – 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.

  `SDN` `OpenDaylight` `Java Bytecode Operation` `Fault Localization` `Differential Checking`
  `Related Publication: Paper [4], [7], Patent [1]`

2017 – 2018

❯ **A Survey of Fault Management in Software-Defined Networking**
  – 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.

  `Survey` `SDN` `Fault Management`
  `Related Publication: Paper [6]`

2017 – 2018	**❯ Defeating Middlebox-Bypass Attacks in Software-Defined Networking**
	– Generating unpredictable labels for packets to confine the attacker to random guessing.
	– Performing real-time detection and defense at the packet level.
	SDN Data Plane Active Defense
	Related Publication: Paper [5], IEEE/ACM Transactions on Networking - Under Major Revision
2016	**❯ SDN Controller Development for Cloud Data Center**
	– 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.
	Intern Project SDN Controller Development Cisco Switch CLI
2015	**❯ Shandong University Student Work Management System**
	– 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.
	Project Training Java MVC

📘 PUBLICATIONS

❯ Conference Papers

[1] **Automatic Policy Generation for Inter-Service Access Control of Microservices**   2020
 Xing Li, Yan Chen, Zhiqiang Lin, Xiao Wang, and Jim Hao Chen
 USENIX Security 2021   CCF-A   "big four"   Conditionally Accepted

[2] **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

[3] **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

[4] **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

[5] **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

[6] **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`

[7] **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`

[8] **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**
– International Conference on Applied Cryptography and Network Security (ACNS) 2020
– 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

❯ Excellent Doctoral Scholarship	Zhejiang University	2020
❯ National Scholarship	China	2017
❯ Award of Honor for Graduate	Zhejiang University	2017
❯ Graduate with Honor	Shandong Provence	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 Soccer team of Computer Science at ZJU	2016 – Present
	College Soccer team of Software Engineering at SDU	2012 – 2016