

# Mingming Chen

<https://sites.google.com/view/mingming-chen-phd/> (+1) 814-954-2210 [mzc796@psu.edu](mailto:mzc796@psu.edu)

## RESEARCH INTEREST

- **Software-Defined Networking Security**
- **Optimization for Security**
- **P4 Programming**
- **Machine Learning-Assisted Security**

## EDUCATION

- **The Pennsylvania State University, University Park** **Ph.D.**  
*Department of Computer Science and Engineering* *Sep. 2018 - May 2025*  
Evolving Network Security in the Era of Network Programmability Advisors: [Tom La Porta](#), [Trent Jaeger](#)
- **Beijing University of Posts and Telecommunications** **M.E.**  
*School of Information and Communication Engineering (Outstanding Graduate)* *Sept. 2013 - Apr. 2016*  
*School of Ethnic Minority Education* *Sept. 2012 - Jun. 2013*
- **North China Institute of Science and Technology** **B.E.**  
*Department of Communication Engineering* *Sept. 2008 - Jun. 2012*

## PUBLICATIONS

- Evolving Network Security in the Era of Network Programmability.  
**Mingming Chen.**  
In Proceedings of the ACM SIGSAC Conference on Computer and Communications Security (CCS) Doctoral Symposium, 2024
- Manipulating OpenFlow Link Discovery Packet Forwarding for Topology Poisoning.  
**Mingming Chen**, Thomas La Porta, Teryl Taylor, Frederico Araujo, Trent Jaeger.  
In Proceedings of the ACM SIGSAC Conference on Computer and Communications Security (CCS), 2024  
[Artifact Badges: Available, Functional, Results Reproduced](#)
- OPTISAN: Using Multiple Spatial Error Defenses to Optimize Stack Memory Protection within a Budget.  
Rahul George, **Mingming Chen**, Kaiming Huang, Zhiyun Qian, Thomas La Porta, Trent Jaeger.  
In 33rd USENIX Security Symposium (USENIX Security), 2024
- Lightweight Coordinated Sampling for Dynamic Flows under Budget Constraints.  
**Mingming Chen**, Thomas La Porta, Trent Jaeger, Srikanth Krishnamurthy.  
In 33rd international conference on computer communication and networks (ICCCN), 2024
- Enabling Software Defined Optical Networks based on OpenFlow Extension.  
**Mingming Chen**, Guochu Shou, Yihong Hu, Zhigang Guo, Guoying Zhang, Hui Ding.  
In Opto-Electronics and Communications Conference (OECC), 2015

## VULNERABILITY DISCLOSURES

- **CVE-2024-37018**  
The flow entries designed for traffic routing can alter the topology view of the controllers, including OpenDaylight, ONOS, floodlight, ONOS, and Pox.
- **CVE-2024-46942**  
A follower controller can configure flow entries in an OpenDaylight/ONOS clustering deployment due to privilege neglect in cluster datastore synchronization.

- **CVE-2024-46943**

A rogue controller can join a cluster to impersonate an offline peer, even if this rogue controller does not possess the complete cluster configuration information.

## SERVICE & ACTIVITY

- **Reviews**

- IEEE Transactions on Dependable and Secure Computing 2025 (TDSC)
- IEEE Conference on Computer Communications 2025 (INFOCOM)
- IEEE Transactions on Network and Service Management 2024 (TNSM)

- **Program Committee**

- USENIX Security 2025 Artifact Evaluation Committee
- IEEE/ACM Workshop on the Internet of Safe Things (SafeThings 2025)

- **Presentations**

- Manipulating OpenFlow Link Discovery Packet Forwarding for Topology Poisoning (CCS'24, Oct. 17, Salt Lake City, UT, US)
- Evolving Network Security in the Era of Network Programmability (Travel Grant; CCS'24, Oct. 14, Salt Lake City, UT, US)
- Lightweight Coordinated Sampling for Dynamic Flows under Budget Constraints (ICCCN'24, Jul. 29, Big Island, HI, US)

- **Volunteer**

- Posters Presentation at Penn State Industry Day *Oct. 9, 2024*
- CSE Summer Camp Counselor *Jun. 10 - 14, 2024*
- Girls Who Code Instructor *Mar. 14 - April 25, 2021*

- **OpenDaylight Community**

- Invited Speaker of OpenDaylight (ODL) Summit 2016 *Sept.26 - 29, 2016*
- Invited Speaker of ODL meetup in Shenzhen/Shanghai *Jun. 16, 2016*
- Invited Speaker of Online SDN Technical Sharing *Nov.18, 2015*
- Student Representative of SDN Training-cum-Expert Symposium *Oct.18 - 20, 2015*
  - \* ODL Chinese Community Contribution Award in 2015
- Invited Speaker of SDN Technical Conference in Nanjing *Jul. 11, 2015*

## EXPERIENCE

- **Army Research Lab CRA Program - Deception**

*Jan. 2021 – Sep. 2023*

- Discovered an overlooked vulnerability (CVE-2024-37018) of SDN discovery protocol such that the flow entries can precisely influence link discovery results.
- Designed a Reinforcement Learning method to compute a stealthy deceptive topology to mislead legitimate controllers, demonstrating the severity of this vulnerability.
- Demonstrated the experiments at yearly PI meetings and the Capstone Event.

- **Army Research Lab CRA Program - Defense**

*Sep. 2018 – Sep. 2023*

- P4-enabled Coordinated Sampling
  - \* Completed Intel P4 Programming Online Course with hands-on lab homework.

- \* Proposed and deployed a Coordinated Sampling Algorithm on real P4 switches (Arista 7170-34CD).
- \* Demonstrate the NP-complete Budgeted maximum k-coverage problem on practical networks is pseudo-polynomial solvable with experiments and theoretical analysis.
- \* Demonstrated the experiments at yearly PI meetings and the Capstone Event.
- Optimizing Stack Memory Protection With a Budget
  - \* Developed a mixed-integer non-linear programming (MINLP) formulation to calculate an optimal placement utilizing multiple defenses.
  - \* Implemented the MINLP formulation in Gurobi with indicator constraint to model the non-linearity.
- Engineer of Tongji-Yale Joint Laboratory (Y. Richard Yang) *Apr. 2016 – Nov. 2016*
  - Implemented the latest rate-limiting function in physical SDN switches branded Pic8 and Dell.
  - Proposed Maple-based Service Function Chain to facilitate the integration between Maple and NFV.
- Intern of Cisco System (Beijing) / ODL contributor *Jun. 2015 – Dec. 2015*
  - Contributed code to bgpcep "labeled-unicast" project and it was released to ODL Lithium.
  - Verified labeled-unicast project with physical BGP device “ASR9K” and ODL Lithium, and configured ASR9K to establish ibgp and ebgp connection to generalize the testbed situation.
- Intern of China Academy of Information and Communication Technology *Jun. 2014 – Jun. 2015*
  - Build Software Defined Optical Networking (SDON) project based on ODL Hydrogen.
  - Configured physical SDN switch “Centec v350” to connect with ODL.

## SKILLS

<b>Programming</b>	Python, P4, Java, Yang Model, C(C++), MATLAB
<b>Operating System</b>	Linux, MacOS, Hardware (P4-programmable, OpenFlow) Switch Architecture
<b>Software &amp; Library</b>	SDN controllers (ODL, ONOS, Floodlight, RYU, Pox), Mininet, Wireshark, Snort, Stable-Baselines3 (Reinforcement Learning)

## REFERENCES

- Thomas La Porta (Advisor): tfl12@psu.edu Director of EECS, Penn State University
- Trent Jaeger (Co-advisor): trentj@ucr.edu Professor of CSE, UC Riverside
- Teryl Taylor: terylt@ibm.com Staff Research Scientist, IBM Research
- Fred Araujo: frederico.araujo@ibm.com Senior Research Scientist & Manager, IBM Research