# Mingming Chen

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## Research Interest

- **SDN Control Plane Security**
- **AI-Adversary-Resilient Network Defense**
- **Network Slicing Security and Privacy**
- **AI Infrastructure Network Security**

## Education

- **The Pennsylvania State University** **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

- Rethinking Software-Defined Networking Link Discovery With Dynamic Randomization - Under submission.
- Efficient Lightweight Coordinated Sampling for Dynamic Flows: Theory and Implementation.
  **Mingming Chen**, Thomas La Porta, Trent Jaeger, Srikanth Krishnamurthy.
  In IEEE Transactions on Networking, vol. 34, pp. 2287-2302, 2026, doi: 10.1109/TON.2025.3644238.
- 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.

## Teaching

- Security of SDN — *Lecturer, Spring 2026*
- Introduction to Computer Science — *Guest Lecturer, Nov. 2025*
- Computer and Information Security — *Guest Lecturer, Nov. 2025*

## Advising

- Undergraduate Students (Kansas State University, Spring 2026)
  - Calvin Beechner
  - Jesus Castro-Garcia
  - Jose Varela
  - Noe Rosales
  - Sebastian Alturck-Carlos

## Service & Activity

- **Reviews**
  - IEEE/ACM Transactions on Networking (ToN), 2025, 2026
  - IEEE Security & Privacy (IEEE S&P), 2025
  - IEEE Transactions on Dependable and Secure Computing (TDSC), 2025, 2026
  - IEEE Conference on Computer Communications (INFOCOM), 2025
  - IEEE Transactions on Network and Service Management (TNSM), 2024
- **Program Committee**
  - IEEE Symposium on Security and Privacy 2026 Posters Committee
  - USENIX Security 2025 Artifact Evaluation Committee
  - IEEE/ACM Workshop on the Internet of Safe Things 2025 Program Committee
- **Presentations**
  - Evolving Network Security in the Era of Network Programmability (MINK-WIC'25, Oct. 4, Lenexa, KS, US)
  - 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)

- **Event**
  - Co-hosting "Parenting in AI" session of K-8 Coding Contest at K-State *Mar. 7, 2026*
  - Invited online guest talk at the AI & Cybersecurity Reading Group at UTEP *Jan. 30, 2026*
  - Missouri Iowa Nebraska Kansas - Women in Computing *Oct. 3-4, 2025*
    - Research Presentation
    - Panelist of Cybersecurity
    - Poster Judge
  - Posters Presentation at Penn State Industry Day *Oct. 9, 2024*
  - Penn State CSE Summer Camp Counselor *Jun. 10 - 14, 2024*
  - Penn State Girls Who Code Instructor *Mar. 14 - April 25, 2021*
- **OpenDaylight Community**
  - Invited Speaker of OpenDaylight (ODL) Summit 2016 *Sept.26 - 29, 2016 - Jul. 2015*
  - 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

- **Assistant Professor**, Computer Science, Kansas State University *Aug. 2025–present*
  - Recruit and advise Ph.D. students; lead independent research in cybersecurity with emphasis on secure/resilient SDN and programmable data planes, extending to NextG, IoT, and CPS.
  - Develop and teach cybersecurity coursework with associated lab work.
  - Serve as a paper and artifact reviewer for leading cybersecurity venues and actively support Women in Computing initiatives and outreach activities.
- **Research Assistant**, The Pennsylvania State University *Sep. 2018 – May. 2025*

  Army Research Lab CRA Program
  - Control Plane Topology Poisoning
    - 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.
  - 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 constraints to model the non-linearity.
  - 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.

- **Senior Engineer**, 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**, 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**, 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

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| **Programming** | Python, P4, Java, Yang Model, C(C++), MATLAB |
| **Operating System** | Linux, MacOS, Hardware (P4-programmable, OpenFlow) Switch Architecture |
| **Software & Library** | SDN controllers (OpenDaylight, 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 (Committee Member): terylt@ibm.com — Staff Research Scientist, IBM Research
- Fred Araujo (Committee Member): frederico.araujo@ibm.com — Senior Research Scientist & Manager, IBM Research
- Ting He (Committee Member): tinghe@psu.edu — Professor of CSE, Penn State University