Azadeh Tabiban

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Research Interests

Threat detection and investigation, provenance analysis, 5G and RAN security, NFV and network security, machine learning applied to security.

Education

- Ph.D. in Information and Systems Engineering — Graduated: Oct. 2022
  Concordia University (Montreal, Canada)
  Dissertation Topic: "Provenance Analysis in Virtualized Environments"
  Advisors: Dr. Lingyu Wang and Dr. Makan Pourzandi
- Master's in Information Systems Security — Graduated: May 2018
  Concordia University (Montreal, Canada)
- Bachelor's in Computer Engineering — Graduated: Sep. 2013
  Shahid Beheshti University (Tehran, Iran)

Academic Experience

- Assistant Professor — Sep. 2023 - Present
  Department of Computer Science
  University of Manitoba, Winnipeg, Canada
- Postdoctoral Fellow — Jan. 2023 - Sep. 2023
  University of Waterloo (Waterloo, Canada) associated with Ericsson Research
  Research topic: "Signaling Storm Attack Detection at O-RAN"
  Advisor: Dr. Raouf Boutaba
- Research Assistant — June 2017 - Jan. 2023
  NSERC/Ericsson CRD and NSERC/Ericsson IRC projects
  Concordia University, Montreal, Canada

Publications

- Sareh Mohammadi*, Hugo Kermab, **Azadeh Tabiban**, Lingyu Wang, Tomas Navarro Munera, and Yosr Jarraya."CONnecting The EXtra doTS (CONTEXTS): Correlating External Information about Point of Interest for Attack Investigation", Submitted to IEEE Security and Privacy, 2025 (passed the first round for rebuttal) *indicates my student.
- Onur Duman, **Azadeh Tabiban**, Lingyu Wang and Mourad Debbabi, "Measuring and Improving the Security Posture of IEC 61850 Substations against Supply Chain Attacks", IEEE Transactions on Instrumentation and Measurement, May 2024
- **Azadeh Tabiban**, Hyame Assem Alameddine, Mohammad A. Salahuddin and Raouf Boutaba, "Signaling Storm in O-RAN: Challenges and Research Opportunities", Accepted at **IEEE Communications Magazine** (ComMag) (Impact factor: 11.2), Volume: 62, Issue: 6, June 2024
- **Azadeh Tabiban**, Heyang Zhao, Yosr Jarraya, Makan Pourzandi, Mengyuan Zhang and Lingyu Wang, "ProvTalk: Towards Interpretable Multi-level Provenance Analysis in Networking Function Virtualization (NFV)", Proc. the Network and Distributed System Security Symposium (**NDSS** 2022), San Diego, USA, 24 – 28 April, 2022 (Acceptance ratio 16.2%) .
- **Azadeh Tabiban**, Heyang Zhao, Yosr Jarraya, Makan Pourzandi and Lingyu Wang, "VinciDecoder: Automatically Interpreting Provenance Graphs into Textual Forensic Reports with Application to OpenStack", Proc. the 27th Nordic Conference on Secure IT Systems (NordSec 2022), 30 November 2022 - 2 December 2022, Iceland (Acceptance ratio 20/89≈22.47%).
- **Azadeh Tabiban**, Yosr Jarraya, Mengyuan Zhang, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Catching Falling Dominoes: Cloud Management-Level Provenance Analysis with Application to OpenStack", Proc. the 8th IEEE Conference on Communications and Network Security (CNS 2020), Avignon, France, 29 June - 1 July, 2020 (Acceptance ratio 43/151≈28% - Selected as a **best paper candidate**).

- **Azadeh Tabiban**, Suryadipta Majumdar, Lingyu Wang and Mourad Debbabi, "PERMON: An OpenStack Middleware for Runtime Security Policy Enforcement in Clouds", Proc. the 4th IEEE Workshop on Security and Privacy in the Cloud (SPC 2018), Beijing, China, May 30-June 1, 2018.
- Suryadipta Majumdar, **Azadeh Tabiban**, Meisam Mohammady, Alaa Oqaily, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Proactivizer: Transforming Existing Verification Tools into Efficient Solutions for Runtime Security Enforcement", Proc. the 24th European Symposium on Research in Computer Security (ESORICS 2019), Luxembourg, September 23-27, 2019 (Acceptance ratio 67/344≈19.5%).
- Suryadipta Majumdar, **Azadeh Tabiban**, Meisam Mohammady, Alaa Oqaily, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Multi-Level Proactive Security Auditing for Cloud", Proc. the IEEE Conference on Dependable and Secure Computing (DSC 2019), Hangzhou, China, November 18-20, 2019.
- Suryadipta Majumdar, **Azadeh Tabiban**, Yosr Jarraya, Momen Oqaily, Amir Alimohammadifar, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Learning Probabilistic Dependencies among Events for Proactive Security Auditing in Clouds", Journal of Computer Security (JCS), Vol. 27, No. 2, March 2019, pages 165-202.
- Suryadipta Majumdar, Taous Madi, Yushun Wang, **Azadeh Tabiban**, Momen Oqaily, Amir Alimohammadifar, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Cloud Security Auditing", Springer, 2019, ISBN 978-3-030-23127-9.
- **Under Review**
- **Azadeh Tabiban**, Mohammad Ekramul Kabir, Makan Pourzandi, Yosr Jarraya, Mengyuan Zhang, Lingyu Wang and Mourad Debbabi, "DominoBlocker: Preventing Recurring Security Incidents in Clouds via Management-level Provenance Analysis", Submitted to the IEEE Transactions on Dependable and Secure Computing (TDSC) (Revision requested).

Evidence of Impact

- **Industrial Demonstrations (Selected)**

1. "PoC on ML-driven Provenance Analysis", Presented at Ericsson Research Day, 2020
2. "PoC on Provenance-based Root Cause Analysis", Ericsson Security Research Labs, 2019
3. "PoC on Proactive Compliance Verification in NFV", Presented to a major North American telecommunication company, 2019
4. "PoC on Proactive Compliance Verification", Presented at Ericsson Research Day, 2017

- **Talks and Seminars (Selected)**

5. "Department of Computer Science Alumni and Industry Symposium", University of Manitoba, 2024
6. "Seminar on Securing Virtualized Environments Through Scalable and AI-Enabled Provenance Analysis", University of Manitoba, 2024
7. "Workshop on Signaling Storm in O-RAN", Ericsson Research Labs, 2023.
8. "VinciDecoder: Automatically Interpreting Provenance Graphs into Textual Forensic Reports with Application to OpenStack", Nordic Conference on Secure IT Systems (NordSec 2022), 30 November 2022.
9. "Provenance Analysis in Virtualized Environments", McGill University, 20 September, 2022.
10. "ProvTalk: Towards Interpretable Multi-level Provenance Analysis in Networking Function Virtualization (NFV)", Network and Distributed System Security Symposium (NDSS 2022), 26 April, 2022.
11. "Cloud Management-Level Provenance Analysis with Application to OpenStack", Cybereco, 5 May, 2021.
12. "Catching Falling Dominoes: Cloud Management-Level Provenance Analysis with Application to OpenStack", Communications and Network Security (CNS 2020), 30 June, 2020.

- **Media**

13. UM News: "How to ensure 5G network security with AI" - 4 December, 2023
    - Link: https://news.umanitoba.ca/how-to-ensure-5g-network-security-with-ai/
14. Ericsson Blog: "Can AI speed up the root cause analysis of network security incidents?" - Based on ProvTalk (our NDSS paper), 27 September, 2022
    - Link: https://www.ericsson.com/en/blog/2022/9/ai-root-cause-analysis

15. Concordia News: “Concordia researcher looks to create an added layer of protection for cloud-based technologies" - 6 December, 2019.
    - Link: https://www.concordia.ca/news/stories/2019/12/06/concordia-researcher-looks-to-create-an-added-layer-of-protection-for-cloud-based-technologies.html

Awards and Grants

- Accurate AI-based Intrusion Detection against AI-equipped Attackers
  - Funding source: University Research Grants Program (URGP), University of Manitoba
  - Amount: $10,000
  - My role: PI
- Scalable, Reliable and Robust Provenance in the New Era of Interconnected Intelligent Systems
  - Funding source: NSERC Discovery Grant with a Launch Supplement
  - Amount: $125,000 + $12,000
  - My role: PI
- Building Cyber Resilient and Secure 5G Networks through Automation and AI
  - Funding sources: National Cybersecurity Consortium (NCC) and Ericsson
  - My role: Collaborator
  - PI: Chadi Assi; co-PIs and collaborators: Lingyu Wang, Mourad Debbabi, Raouf Boutaba, Suryadipta Majumdar
- Signalling Storm Attack Detection at the Open Radio Access Network (O-RAN)
  - Funding sources: Mitacs Accelerate Postdoc Fellowship and Ericsson
  - My role: Postdoc applicant
- NDSS Student Grant (Awarded ≈34% of applicants)
- ESORICS Student Travel Grant

Teaching

- Computer Security (COMP 4580) (Undergraduate Course), University of Manitoba
  - Instructor: Winter 2025
- Cyber Threat Intelligence and Response (COMP 4062/7860) (Undergraduate/Graduate Course), University of Manitoba
  - Instructor: Fall 2024
- Computer Security (COMP 7860) (Graduate Course), University of Manitoba
  - Instructor: Winter 2024
- Cloud Computing Security and Privacy (INSE 6620) (Graduate Course), Concordia University
  - Guest Lecturer: Summer 2023, Summer 2022, Summer 2021 and Summer 2020
  - Teaching Assistant: Summer 2020
- Operating System Security (INSE 6130) (Graduate Course), Concordia University
  - Guest Lecturer: Fall 2022
  - Teaching Assistant: Fall 2021, Fall 2020, Winter 2020, Fall 2018
- Malware Defenses and Application Security (INSE 6140) (Graduate Course), Concordia University
  - Teaching Assistatnt: Winter 2022, Winter 2021

Supervision

- PhD students:
  - Sareh Mohammadi (Co-advised with Dr. Lingyu Wang)
- MSc students:
  - Magdy Nasr (BSc at Cairo University → MSc at UofM): Fall 2024 - Present
  - Yousef Adham (BSc at Cairo University → MSc at UofM): Winter 2025 - Present
- Undergrad students:
  - Hrutil Patel (UofM), Spring 2024 - Present
- Former students:
  - Hayley Kirkup (Undergrad at UofM), Fall 2024

Academic Service

- Conference and Workshop Organization
  - Organizer: Workshop on Intent-based Networking, 2024 (in conjunction with DRCN 2024)
  - Publicity Chair: Workshop on Privacy in the Electronic Society, 2022 (in conjunction with ACM CCS)
- Internal Activities
  - Faculty Search Committee Computer Science Department (2024-present)
  - Faculty Search Committee Math Department (2024)
  - Seminar Committee (2024-present)
  - Graduate Students Committee (2023)
  - Industrial Relation Committee (2023-2024)
- Thesis Committee at University of Manitoba
  - Current: Khalid Hassan (MSc)
  - Current: Fatima Jahan Sarmin (PhD)
  - Graduated in 2024: Azmain Kabir (MSc)
- Technical Program Committee
  - The Annual Computer Security Applications Conference (ACSAC 2025) (Rank A)
  - IEEE Annual Congress on Artificial Intelligence of Things (IEEE AIoT 2025)
  - The 21th EAI International Conference on Security and Privacy in Communication Networks (EAI SecureComm 2025)
  - International Conference on Information and Communications Security (ICICS 2025)
  - The Annual Computer Security Applications Conference (ACSAC 2024) (5 assignments) (Rank A)
  - The 18th International Conference on Network and System Security (NSS 2024) (1 assignment)
  - The 20th EAI International Conference on Security and Privacy in Communication Networks (EAI SecureComm 2024) (6 assignments)
  - The 26th International Conference on Information and Communications Security (ICICS 2024) (3 assignments)
  - The 19th EAI International Conference on Security and Privacy in Communication Networks (EAI SecureComm 2023)
  - Workshop on Privacy in the Electronic Society (WPES 2023)
  - International Conference on Security and Privacy (ICSP 2024)
- Journal Reviews (Selected)
  - ACM Computing Surveys (Rank A*) (2024)

  - IEEE Transactions on Network and Service Management (TNSM) (2024)
  - IET Information Security (2024)
  - Cluster Computing Springer Nature (2024)
  - IEEE Transactions on Dependable and Secure Computing (TDSC) (Rank A) (2022-2024)
  - IEEE Access
- Conference Reviews and External Reviews (Selected)
  - The Network and Distributed System Security Symposium (NDSS 2025) (Rank A*)
  - The 31th ACM Conference on Computer and Communications Security (CCS 2024) (Rank A*)
  - Web Conference - Security, Privacy, and Trust track (WWW 2023)
  - European Symposium on Research in Computer Security (ESORICS 2018-2022)
  - Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec 2020-2022)
  - IEEE Conference on Communications and Network Security (CNS 2020)
  - International Conference on Applied Cryptography and Network Security (ACNS 2020)
  - The 21st International Conference on Information and Communications Security (ICICS 2019)

Ranks are based on CORE rankings.