Azadeh Tabiban

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Research Interests

Cloud/edge security, provenance analysis, NFV and network security, machine learning applied to security, IoT 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
- Mitacs Accelerate Industrial Postdoctoral Fellow — Jan. 2023 - Sep. 2023
  University of Waterloo (Waterloo, Canada) associated with Ericsson Research
  Research topic: "Signaling Storm Attack Detection at O-RAN"
- Research Assistant — June 2017 - Jan. 2023
  NSERC/Ericsson CRD and NSERC/Ericsson IRC projects
  Concordia University, Montreal, Canada

Publications

1. **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%).
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%).
3. **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**).
4. **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.
5. 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%).
6. 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.
7. 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.

8. 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**

9. **Azadeh Tabiban**, Hyame Assem Alameddine, Mohammad A. Salahuddin and Raouf Boutaba, "Signaling Storm in O-RAN: Challenges and Research Opportunities", Submitted to the IEEE Communication Magazine (ComMag) (Received the second round of review)
10. **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).
11. Onur Duman, **Azadeh Tabiban**, Lingyu Wang, Mourad Debbabi, "Optimal Security Hardening of IEC 61850 Substations against Supply Chain Attacks", Submitted to Computers & Security

Notes on the nature of the field. Unlike other fields, the most competitive venues for security research are refereed conferences, as opposed to refereed journals. Network and Distributed System Security Symposium (NDSS) is one of the **top-tier "Big 4"** conferences for security research and is widely monitored.

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. "VinciDecoder: Automatically Interpreting Provenance Graphs into Textual Forensic Reports with Application to OpenStack", Nordic Conference on Secure IT Systems (NordSec 2022), 30 November 2022 2022.
6. "Provenance Analysis in Virtualized Environments", McGill University, 20 September, 2022.
7. "ProvTalk: Towards Interpretable Multi-level Provenance Analysis in Networking Function Virtualization (NFV)", Network and Distributed System Security Symposium (NDSS 2022), 26 April, 2022.
8. "Cloud Management-Level Provenance Analysis with Application to OpenStack", Cybereco, 5 May, 2021.
9. "Catching Falling Dominoes: Cloud Management-Level Provenance Analysis with Application to OpenStack", Communications and Network Security (CNS 2020), 30 June, 2020.

- **Media**

10. 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
11. 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

Teaching

- **Assistant Professor**
  - COMP 7860 - Computer Security, Winter 2024
- **Guest Lecturer**

  - INSE 6620 - Cloud Computing Security and Privacy: Summer 2023, Summer 2022, Summer 2021 and Summer 2020
  - INSE 6130 - Operating System Security: Fall 2022

- **Teaching Assistant** (programmer on duty, lab demonstrator, tutor and marker)
  1. INSE 6140 - Malware Defenses and Application Security: Winter 2022, Winter 2021
  2. INSE 6130 - Operating System Security: Fall 2021, Fall 2020, Winter 2020, Fall 2018
  3. INSE 6620 - Cloud Computing Security: Summer 2020

Mentorship

- Alumni PhD and Master's students: A S M Asadujjaman and Heyang Zhao (Ericsson/Concordia Mitacs intern)
- Current PhD and Master's students: Onur Duman, Hugo Kermabon-Bobinnec, Mahmood Gholipour and Sima Bagheri

Academic Service

- Conference Organization
  - Publicity Chair, Workshop on Privacy in the Electronic Society, 2022 (in conjunction with ACM CCS)
- Internal Activities
  - Graduate Studies Committee
  - Industrial Relation Committee
- Technical Program Committee
  - 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)
  - **IEEE Transactions on Dependable and Secure Computing (TDSC)**
  - IEEE Access
- Conference External Reviews (Selected)
  - **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)

Awards and Grants

- Mitacs Accelerate Postdoc Fellowship (2023)
- NDSS Student Grant (Awarded ≈34% of applicants) (2022)
- ESORICS Student Travel Grant (2019)