

# Suryadipta Majumdar

Assistant Professor

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## RESEARCH INTERESTS

- Internet of Things (IoT) Security • Cloud Security • Security Auditing • Software Defined Network (SDN) Security

## EDUCATION

- 2015-2018                      Ph.D. in Information & Systems Engineering  
Concordia University, Canada  
Advisor: Dr. Lingyu Wang  
Dissertation Topic: "Proactive Security Auditing for Clouds"  
CGPA: 4.3/4.3
- 2012-2014                      Master's in Information Systems Security  
Concordia University, Canada  
Advisor: Dr. Mohammad Mannan  
Dissertation Topic: "On End-to-End Encryption for Cloud-Based Services"  
CGPA: 4.3/4.3
- 2004-2009                      Bachelor's in Computer Science & Engineering  
Bangladesh University of Engineering & Technology (BUET), Bangladesh

## BOOK

1. 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

## REFEREED PUBLICATIONS

2. Suryadipta Majumdar, Gagandeep Singh Chawla, Amir Alimohammadifar, Taous Madi, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "ProSAS: Proactive Security Auditing System for Clouds", IEEE Transactions on Dependable and Secure Computing (TDSC), Accepted
3. Suryadipta Majumdar, Daniel Bastos and Anoop Singhal, "From High-Level Security Recommendations to Low-Level Actionable Rules to Enable Security Auditing of Smart Home Devices", Proc. the 17th IFIP WG 11.9 International Conference on Digital Forensics, Virtual, February 1 - 2, 2021.
4. Lin Zhu, Suryadipta Majumdar and Chinwe Ekenna, "An Invisible Warfare with the Internet of Battlefield Things (IoBT): A Literature Review", Human Behavior and Emerging Technologies, Accepted.
5. Suryadipta Majumdar, "A Multi-Level Proactive Security Auditing Framework for Clouds through Automated Dependency Building", CCF Transactions on Networking, Vol. 3, No. 2, October 2020, pages 112-127.
6. Alaa Oqaily, Sudershan Lakshmanan, Yosr Jarraya, Suryadipta Majumdar, Mengyuan Zhang, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "NFVGuard: Verifying the Security of Multilevel Network Functions Virtualization (NFV) Stack", Proc. the 12th IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2020), Bangkok, Thailand, December 14 - 17, 2020.
7. Gagandeep Singh Chawla, Mengyuan Zhang, Suryadipta Majumdar, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "VMGuard: State-based Proactive Verification of Virtual Network Isolation", IEEE Transactions on Dependable and Secure Computing (TDSC) in December 2019

8. Andy Dolan, Indrakshi Ray and Suryadipta Majumdar, "Proactively Extracting IoT Device Capabilities: An Application to Smart Homes", 34th Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec 2020) in February 2020
9. Kayla E Ibrahim, Suryadipta Majumdar, Daniel Bastos and Anoop Singhal, "Poster: Defining Actionable Rules for Verifying IoT Safety and Security", 41st IEEE Symposium on Security and Privacy (S&P 2020)
10. Momen Oqaily, Yosr Jarraya, Meisam Mohammady, Suryadipta Majumdar, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "SegGuard: Segmentation-based Anonymization of Network Data in Clouds for Privacy-Preserving Security Auditing", IEEE Transactions on Dependable and Secure Computing (TDSC), Accepted (Impact factor: 6.4)
11. Suryadipta Majumdar, Azadeh Tabiban, Meisam Mohammady, Alaa Oqaily, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Multi-Level Proactive Security Auditing for Cloud", INVITED PAPER, Proc. the IEEE Conference on Dependable and Secure Computing (DSC 2019), Hangzhou, China, November 18-20, 2019
12. 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 rate: 19.5%)
13. 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
14. Suryadipta Majumdar, Taous Madi, Yosr Jarraya, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "Cloud Security Auditing: Major Approaches and Existing Challenges", Proc. the 11th International Symposium on Foundations & Practice of Security (FPS 2018), Montreal, Canada, November 13-15, 2018
15. Taous Madi, Amir Alimohammadifar, Yosr Jarraya, Suryadipta Majumdar, Yushun Wang, Makan Pourzandi, Lingyu Wang and Mourad Debbabi, "ISOTOP: Auditing Virtual Networks Isolation Across Cloud Layers in OpenStack", ACM Transactions on Privacy and Security (TOPS), Vol. 22, No. 1, December 2018, pages 1:1-1:35
16. Amir Alimohammadifar, Suryadipta Majumdar, Taous Madi, Yosr Jarraya, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "Stealthy Probing-based Verification (SPV): An Active Approach to Defending Software Defined Networks against Topology Poisoning Attacks", 23<sup>rd</sup> European Symposium on Research in Computer Security (ESORICS 2018) (Acceptance rate: 20%)
17. 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)
18. Suryadipta Majumdar, Taous Madi, Yushun Wang, Yosr Jarraya, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "User-level Runtime Security Auditing for Clouds", IEEE Transactions on Information Forensics and Security (TIFS), Vol. 13, No. 5, May 2018, pages 1185-1199 (Impact factor: 5.824)
19. Suryadipta Majumdar, Yosr Jarraya, Momen Oqaily, Amir Alimohammadifar, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "LeaPS: Learning-Based Proactive Security Auditing for Clouds", 22<sup>nd</sup> European Symposium on Research in Computer Security (ESORICS 2017) (Acceptance rate: 16%)
20. Yushun Wang, Taous Madi, Suryadipta Majumdar, Yosr Jarraya, Amir Alimohammadifar, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "TenantGuard: Scalable Runtime Verification of Cloud-Wide VM-Level Network Isolation", The Network and Distributed System Security Symposium (NDSS 2017) (Acceptance rate: 16%)
21. Suryadipta Majumdar, Yosr Jarraya, Taous Madi, Amir Alimohammadifar, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "Proactive Verification of Security Compliance for Clouds through Pre-Computation: Application to OpenStack", 21<sup>st</sup> European Symposium on Research in Computer Security (ESORICS 2016) (Acceptance rate: 21%)
22. Taous Madi, Suryadipta Majumdar, Yushun Wang, Yosr Jarraya, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "Auditing Security Compliance of the Virtualized Infrastructure in the Cloud: Application to OpenStack", 6<sup>th</sup> ACM Conference on Data and Application Security and Privacy (CODASPY 2016) (Acceptance rate: 19%)
23. Suryadipta Majumdar, Yosr Jarraya, Momen Oqaily, Amir Alimohammadifar, Makan Pourzandi, Lingyu Wang, Mourad Debbabi, "Security Compliance Auditing of Identity and Access Management in the Cloud: Application to

OpenStack”, 7<sup>th</sup> IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2015) (Acceptance rate: 25%)

24. Abu Asadujjaman, Elisa Rojas, Mohammad Shah Alam, Suryadipta Majumdar “Fast Control Channel Recovery for Resilient In-band OpenFlow Networks,” 4th IEEE International Conference on Network Softwarization (NetSoft 2018)
25. Mohammad Amjad Hossain\*, Arif Akram Khan\*, Suryadipta Majumdar\*, Reaz Ahmed, “Analysis and Design of Individual Tax Return Systems”, 12th International Conference on Computer and Information Technologies (ICCI 2009)

## **UNDER REVIEW**

26. Sudershan Lakshmanan Thirunavukkarasu, Mengyuan Zhang, Suryadipta Majumdar, Yosr Jarrya, Makan Pourzandi, Lingyu Wang, “Caught-in-Translation (CiT): Detecting Cross-level Inconsistency Attacks in Network Functions Virtualization (NFV),” Submitted to ACM CCS in April 2021

## **NON-REFEREED CONFERENCE PRESENTATION**

27. “Current Challenges in IoT Security”, Jivan A Ramjisingh, Domenic Recchia, Michael A Cahill, Suryadipta Majumdar and Sanjay Goel, 14th Annual Symposium on Information Assurance (ASIA 2019), June 4-6, 2019, Albany, NY, USA

## **TALKS**

28. (Invited Talk) “Proactive Security Auditing”, Concordia Institute for Information Systems Engineering (CIISE), Concordia University, Montreal, QC, Canada, May 20, 2021
29. (Invited Talk) “Proactive Security Auditing”, Concordia Institute for Information Systems Engineering (CIISE), Concordia University, Montreal, QC, Canada, May 5, 2020
30. (Invited Talk) “Proactive Security Auditing for Clouds”, Department of Computer Science, Colorado State University, Fort Collins, CO, USA, December 9, 2019
31. "Multi-Level Proactive Security Auditing for Cloud", the IEEE Conference on Dependable and Secure Computing (DSC 2019), Hangzhou, China, November 18-20, 2019
32. "Proactivizer: Transforming Existing Verification Tools into Efficient Solutions for Runtime Security Enforcement", 24th European Symposium on Research in Computer Security (ESORICS 2019), Luxembourg, September 23-27, 2019
33. "Cloud Security Auditing: Major Approaches and Existing Challenges", 11th International Symposium on Foundations & Practice of Security (FPS 2018), Montreal, Canada, November 13-15, 2018
34. “Stealthy Probing-based Verification (SPV): An Active Approach to Defending Software Defined Networks against Topology Poisoning Attacks”, 23<sup>rd</sup> European Symposium on Research in Computer Security (ESORICS 2018), Barcelona, Spain
35. “LeaPS: Learning-Based Proactive Security Auditing for Clouds,” 22<sup>nd</sup> European Symposium on Research in Computer Security (ESORICS 2017), Oslo, Norway
36. “TenantGuard: Scalable Runtime Verification of Cloud-Wide VM-Level Network Isolation,” Network and Distributed System Security Symposium (NDSS 2017), San Diego, USA
37. “Proactive Verification of Security Compliance for Clouds through Pre-Computation: Application to OpenStack,” 21<sup>st</sup> European Symposium on Research in Computer Security (ESORICS 2016), Heraklion, Greece
38. “Auditing Security Compliance of the Virtualized Infrastructure in the Cloud: Application to OpenStack,” 6<sup>th</sup> ACM Conference on Data and Application Security and Privacy (CODASPY 2016), New Orleans, USA
39. “Security Compliance Auditing of Identity and Access Management in the Cloud: Application to OpenStack,” 7<sup>th</sup> IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2015), Vancouver, Canada

## **DEMONSTRATIONS**

40. “Demo on Proactive Security Auditing,” Presented at Ericsson Research Day 2017, Stockholm, Sweden  
 41. “Demo on Retroactive Security Auditing,” Presented at Ericsson Research Day 2015, Stockholm, Sweden

## GRANTS AND AWARDS

- NSERC Discovery Grant (2021-2026) (**\$145,000**) with a Discovery Launch Supplement (**\$12,000**)
- University at Albany Faculty Research Award (**\$10,000**)
- SUNY/UAlbany Internet of Things (IoT) Research Seed Funding with Chinwe Ekenna and Zheng Yan (**\$8,000**)
- Doctoral Prize in Engineering and Computer Science, Concordia University (2020)
- NSERC Alexander Graham Bell Canada Graduate Scholarship-Doctoral (CGS-D), 2017-2019 (**\$70,000**)
- Fonds de Recherche du Québec - Nature et Technologies (FRQNT) B2 Scholarship, 2017-2018 (Declined) (**\$20,000**)
- NSERC Canada Graduate Scholarships - Michael Smith Foreign Study Supplements (CGS-MSFSS), 2018 (**\$6,000**)
- Concordia Full Tuition Recruitment Awards, Concordia University, Canada, 2015-2017 (**\$41,313**)
- Concordia Accelerator Award, Concordia University, 2019 (**\$5,000**)
- Director (Faculty of Engineering and Computer Science), Concordia Graduate Student Association, 2014
- Campaign for Concordia Graduate Award, Concordia University, Canada, 2013-2014 (**\$5,000**)
- Concordia Merit Scholarship, Concordia University, Canada, 2012-2013 (**\$10,000**)
- National Merit Scholarship, Bangladesh, 2004-2008

## GRANT APPLICATIONS UNDER REVIEW

- Mitacs Accelerate with Polytechnique Montreal (\$840,000)

## RESEARCH EXPERIENCE

2020-present	Assistant Professor Concordia Institute for Information Systems Engineering (CIISE) Concordia University, Canada
2018-2020	Assistant Professor Information Security and Digital Forensics, School of Business University at Albany, SUNY, USA
2012-2018	Research Assistant Concordia Institute for Information Systems Engineering (CIISE) Concordia University, Montreal, Canada
2014-2018	Research Assistant Audit Ready Cloud (NSERC CRD project with Ericsson Research Canada) Concordia University, Montreal, Canada
2012-2013	Research Assistant Android Rootkits: Classification and Mitigation (NSERC Engage project with Irdeto Canada) Concordia University, Montreal, Canada

## INDUSTRIAL EXPERIENCE

2010-2011	Software Engineer Team Lead (Multimedia team) Samsung R&D, Bangladesh
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## PROFESSIONAL ACTIVITIES

- Member of IEEE
- Journal Editor:

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- Lead Guest Editor: Special Section on Cyber Forensics for the IEEE Open Journal of the Communications Society (IEEE OJ-COMS)
  - Program Co-Chair:
    - 3rd Workshop on Cloud Security and Privacy (CLOUD S&P 2021), June 21-24, 2021, Kamakura, Japan, in conjunction with ACNS 2021
    - 2nd Workshop on Cloud Security and Privacy (CLOUD S&P 2020), June 22-25, 2020, Rome, Italy, in conjunction with ACNS 2020
    - 15th Annual Symposium on Information Assurance (ASIA '20), June 2-4, 2020, Albany, NY, USA
    - 1st Workshop on Cloud Security and Privacy (CLOUD S&P 2019), June 6, 2019, Bogotá, Colombia, in conjunction with ACNS 2019
    - 14th Annual Symposium on Information Assurance (ASIA '19), June 4-6, 2019, Albany, NY, USA
  - Conference PC Member:
    - The 17th EAI International Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (QSHINE 2021), November 29-30, Melbourne, Australia
    - The 18th International Conference on Security and Cryptography (SECRYPT 2021), July 6-8, Online Streaming
    - The 36th IFIP TC-11 SEC 2021 International Information Security and Privacy Conference (SEC 2021), June 21-24 2021, Oslo, Norway
    - The IEEE International Conference on Cyber-Security and Resilience (IEEE CSR 2021), March 22-24, 2021, Rhodes, Greece
    - The 35th IFIP TC-11 SEC 2020 International Information Security and Privacy Conference (SEC 2020), May 26-28 2020, Maribor, Slovenia
    - The IEEE COMPSAC Symposium on Security, Privacy and Trust in Computing (SEPT 2020), July 13-17 2020, Madrid, Spain
    - The International Conference on Information Systems Security and Privacy (ICISSP 2020), February 25-27 2020, Valletta, Malta
    - The 12th International Symposium on Foundations & Practice of Security (FPS 2019), November 5-7 2019, Toulouse, France
    - The Seventh International Symposium on Security in Computing and Communications (SSCC 2019), December 18-21, 2019, Trivandrum, India
    - The COMPSAC Symposium on Security, Privacy and Trust in Computing (SEPT 2019), July 15-19, 2019, Milwaukee, WI, USA
    - The 34th IFIP TC-11 SEC 2019 International Information Security and Privacy Conference (SEC 2019), June 25-27, 2019, Lisbon, Portugal
    - The IEEE Workshop on Security, Trust and Privacy for Software and Application (STPSA 2019), July 15-19, 2019, Milwaukee, WI, USA
    - The 11th International Symposium on Foundations & Practice of Security (FPS 2018), November 13-15, 2018, Montreal, Canada
  - Journal Paper Reviewer
    - IEEE Transactions on Services Computing (TSC)
    - IEEE Internet of Things Journal
    - ACM Transactions on Internet Technology (TOIT)
    - Journal of Cloud Computing
    - IEEE Transactions on Dependable and Secure Computing (TDSC)
    - IEEE Security & Privacy
    - Elsevier Computer & Security
    - International Journal of Information Security
    - IEEE Access
    - IET Information Security (IET-IFS)

- Journal of Computer Engineering & Information Technology
- Journal of King Saud University - Computer and Information Sciences
- Peer-to-Peer Networking and Applications
- Research Grant Proposal Reviewer
  - Mitacs Accelerate Program
- Conference External Reviewer
  - 24th European Symposium on Research in Computer Security (ESORICS 2019)
  - 14th International Conference on Network and Service Management (CNSM 2018)
  - 23rd European Symposium on Research in Computer Security (ESORICS 2018)
  - 32nd Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec 2018)
  - 4th IEEE International Conference on Network Softwarization (NetSoft 2018)
  - 22nd European Symposium on Research in Computer Security (ESORICS 2017)
  - 31st Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec 2017)
  - 9th International Symposium on Foundations & Practice of Security (FPS 2016)
  - 20th European Symposium on Research in Computer (ESORICS 2015)
  - 13th IEEE International Conference on Dependable, Autonomic and Secure Computing (DASC 2015)
  - 11th International Conference on Information Security Practice and Experience (ISPEC 2015)

## TEACHING EXPERIENCE

- Operating Systems Security (INSE 6130) (Graduate Course), Concordia University
  - Instructor (Winter 2021)
- Introduction to Information Systems (BFOR 100) (Undergraduate Course), University at Albany
  - Instructor (Spring 2020)
- Assembly Language and Malware Reverse Engineering (BFOR 418/618) (Graduate / Undergraduate Course), University at Albany
  - Instructor (Fall 2019)
- Introduction to Database Systems (BFOR 205) (Undergraduate Course), University at Albany
  - Instructor (Fall 2019)
- Introduction to Information Systems (BFOR 100) (Undergraduate Course), University at Albany
  - Instructor (Spring 2019)
- Assembly Language and Malware Reverse Engineering (BFOR 418) (Undergraduate Course), University at Albany
  - Instructor (Fall 2018)
- Introduction to Information Systems (BFOR 100) (Undergraduate Course), University at Albany
  - Instructor (Fall 2018)
- Cloud Computing Security and Privacy (INSE 6620) (Graduate Course), Concordia University
  - Guest Lectures on Cloud Security Auditing (Summer 2018, Summer 2017 and Summer 2016)
  - Teaching Assistant (Summer 2017)
- Operating System Security (INSE 6130) (Graduate Course), Concordia University
  - Teaching Assistant (Fall 2017, Fall 2016, Winter 2016 and Fall 2015)
- Malware Defenses and Application Security (INSE 6140) (Graduate Course), Concordia University
  - Teaching Assistant (Winter 2018, Winter 2017 and Winter 2016)
- Cryptographic Protocol and Network Security (INSE 6120) (Graduate Course), Concordia University
  - Teaching Assistant (Fall 2013)

**STUDENT ADVISING**

- Current Students
  - A S M Asadujjaman (PhD) - co-advised with Dr. Lingyu Wang
  - Mahmood Gholipour (MASc) - co-advised with Dr. Lingyu Wang
  - Md. Wasiuddin Pathan Shuvo (MASc)
  - Hugo Kermabon-Bobinnec (MASc) - co-advised with Dr. Lingyu Wang
  - Sima Bagheri (PhD) - co-advised with Dr. Lingyu Wang
  - Shiva Sunar (MASc)
  - Md. Nazmul Hoq (PhD)
  
- Former Students
  - Andy Dolan (MS in Computer Science at CSU) - co-advised with Dr. Indrakshi Ray
  - Jivan Ramjisingh (BSc in Digital Forensics)
  - Kayla Ibrahim (BSc in Digital Forensics)
  - Jimmy Kong (BSc in Informatics)

**MEDIA COVERAGE**

- TV: Expert comments on the ransomware attacks of the city of Albany- CBS 6, April 2, 2019
- Magazine: Hacking the Smart Home via the Internet of Things- Communications of the ACM, September 17, 2019
  - Link: <https://cacm.acm.org/news/239502-hacking-the-smart-home-via-the-internet-of-things/fulltext>
- News: Digital Forensics Professor Coauthors Book on Improving Cloud Security Auditing- University at Albany News Center, October 3, 2019
  - Link: <https://www.albany.edu/news/92427.php>