Onur Duman, PhD

Curriculum Vitae

Glasgow, Scotland, United Kingdom — dumanonur@gmail.com
https://www.linkedin.com/in/onur-duman-ph-d-2b706a11/ — Canadian

RESEARCH AREAS

Supply chain security, Smart grid security, Cyber-physical security, Security metrics, Network hardening

EDUCATION

PhD in Information and Systems Engineering
September 2016 - December 2023 (Thesis Defense Date: 11 December 2023)
Concordia University, Montreal, Quebec, Canada
Concordia Institute for Information Systems Engineering (CIISE)
Supervisors: Professor Lingyu Wang and Professor Mourad Debbabi
Thesis Title: Measuring and Improving the Security Postures of Smart Grid Substations Against Cyber Attacks
GPA: 4.3/4.3

The goal of this PhD was to develop security metrics for substations, provide a framework for improving their security posture, which is measured with the developed security metrics, and provide an online security monitoring framework.

Master of Information Systems Security (MASc)
January 2015 - June 2016
Concordia University, Montreal, Quebec, Canada
Concordia Institute for Information Systems Engineering (CIISE)
Supervisor: Professor Amr Youssef
Thesis Title: Application of Fault Analysis to Some Cryptographic Standards
GPA: 4.3/4.3

The goal of this Master's was to analyze the resistance of some standard ciphers to fault attacks.

Master of Science (Non-Thesis)
September 2008 - January 2011
McGill University, Montreal, Quebec, Canada
School of Computer Science
Project Title: Addition of Account Creation and Login Functionalities to the Multiplayer Game, Mammoth

The goal of this project was to utilize a newly designed remote procedure call protocol, based on XML-RPC, for adding login and messaging functionalities to the massively multiplayer online game, Mammoth.

Bachelor of Engineering
September 2004 - May 2008
Bilkent University, Ankara, Turkiye
Department of Computer Engineering
Senior Project Title: Mobile Search Engine for Restaurants and Activities in the City
GPA: 3.88/4.00 (4th best GPA)

EMPLOYMENT

Lecturer in Cyber Security and Networks
January 2025- *
Glasgow Caledonian University, Glasgow, Scotland, United Kingdom
Department of Cyber Security and Networks
In this highly practical university, I am teaching classes related to cyber security such as Digital Forensics and Security Operation Analysis. My approach to teaching cyber security involves giving labs in which students can practice what they learn in class and giving real-life examples in my classes.
Related Skills: VMWare, Snort, Splunk, Autopsy, Sleuth Kit, LimaCharlie EDR

Postdoctoral Research Fellow
September 2023- January 2025
Kristiania University College, Oslo, Norway
School of Economics, Innovation, and Technology (SEIT)
Project Title: Using Evolutionary Algorithms to Understand and Secure Web/Enterprise Systems (EAST)

Worked as a research fellow for the EAST project which has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation program (grant agreement No 864972). My main duties included developing automated tests for identifying security issues in Web APIs, maintaining the open-source project named EvoMaster, and co-supervising two PhD students.
Related Skills: Java, Kotlin, Spring Boot, Spring Security, REST, Fuzzing, GitHub, Guice, Web Application Security Testing.

Research Assistant
September 2016 - August 2023
Concordia University, Montreal, Quebec, Canada
Security Research Centre
Project Title : NSERC/Hydro-Quebec/Thales Industrial Research Chair in Smart Grid Security

As part of this research, first defined a novel security metric, namely Factor of Security (FoS), for measuring how well redundancy is designed from a security perspective, and validated it with simulations. After that, another novel security metric, namely $kSupply$, to measure the security posture of IEC 61850 substations against supply chain hijacking attacks is designed. Thirdly, designed and implemented a hardening system to improve the security posture of IEC 61850 substations against supply chain attacks. Lastly, developed a threat modeling framework that measures the security posture based on information from different sources.
Related Skills: VirtualBox, VMware, NumPy, MongoDB, pandas, Data Analysis, Threat Modeling, LaTeX, Security Metrics, MySQL, Object Oriented Programming, Cybersecurity Research, Linux, Kali Linux, MATLAB, Python, Java, PyQt, Genetic Algorithm Optimization, Wireshark.

Research Assistant
January 2015 - June 2016
Concordia University, Montreal, Quebec, Canada
Concordia Institute for Information Systems Engineering (CIISE)

During this research, I first applied differential fault analysis to the standard cipher, Kuznyechik, and demonstrated that its secret key can be recovered using an average of four faults. After that, I have shown that another standard cipher, namely Kalyna, can be broken using an average of three faults. Lastly, I have validated that the standard hash function Kupyna can be broken using fault analysis.
Related Skills: VirtualBox, VMware, LaTeX, Information Security, Cybersecurity, Research, Linux, C, C++, Python, Cryptography, AES, Fault Analysis, Cryptanalysis.

Self-Employed Freelance Software Developer
November 2013 - January 2015
Herakles Consulting Corporation, Montreal, Quebec, Canada

As a freelancer, I have designed, implemented, and maintained websites for several organizations. In addition, I have worked on a contract that involves the testing of a smart device.
Related Skills: HTML, CSS, PHP, MySQL, Python, Git

Software Quality Assurance Test Specialist
March 2013 - September 2013
Accedian Networks, Montreal, Quebec, Canada

In this role, I worked on automating test cases for network devices. I identified some important bugs in devices, which are worth hundreds of thousands of dollars, before shipment. In addition, I kept track of test results to identify bugs early during development.
Related Skills: Python, Ubuntu, Wireshark, Hudson Framework, C

Software Engineer
April 2011 - February 2013
Nuance Communications Inc, Montreal, Quebec, Canada

In this position, I worked on developing the Nuance Development Integration Platform (NDIP) from scratch to automate the process of deployment and running tests after modifications in the source code. After that, I developed unit tests, achieving a high test coverage, for different components of the project Nuance Voice Recognition (NVC). Finally, I have implemented the log analyzer component of the NVC project for extracting information from different logs belonging to different components.
Related Skills: Java, Python, Linux, VMware

PUBLICATIONS

Refereed Journal Articles

1. **Onur Duman**, Mohsen Ghafouri, Lingyu Wang, Marthe Kassouf, Ribal Atallah, Mourad Debbabi "Measuring the Security Posture of IEC 61850 Smart Grid Substations Against Supply Chain Attacks" To appear, accepted by IEEE Transactions on Industrial Informatics.

2. Seran, Susruthan, Man Zhang, **Onur Duman**, and Andrea Arcuri. "Handling Web Service Interactions in Fuzzing with Search-Based Mock-Generation." ACM Transactions on Software Engineering and Methodology (2025).

3. Andrea Arcuri, Man Zhang, Seran Susruthan, Amid Golmohammadi, **Onur Duman**, Juan Pablo Galeotti, Hernan Ghianni "EvoMaster 2.0.0: Black and White Box Search-Based Fuzzing for REST, GraphQL and RPC APIs" Accepted for Publication by the Automated Software Engineering Journal.

4. Maryam Rezaei, Manqi Liang, Zeynep Yalcin, Jacinta H Martin, Parinaz Kazemi, Eric Bareke, Zhao-Jia Ge, Majid Fardaei, Claudio Benadiva, Reda Hemida, Adnan Hassan, Geoffrey J Maher, Ebtesam Abdalla, William Buckett, Pierre-Adrien Bolze, Iqbaljit Sandhu, **Onur Duman**, Suraksha Agrawal, JianHua Qian, Jalal Vallian Broojeni, Lavi Bhati, Pierre Miron, Fabienne Allias, Amal Selim, Rosemary A Fisher, Michael J Seckl, Philippe Sauthier, Isabelle Touitou, Seang Lin Tan, Jacek Majewski, Teruko Taketo, Rima Slim "Defects in meiosis I contribute to the genesis of androgenetic hydatidiform moles." The Journal of Clinical Investigation 134.22 (2024). [Impact Factor: 13.3]

   Note: In this paper about human genetics, I collaborated with researchers in the field of human genetics. My contribution was identifying and utilizing methods for the data analysis part.

5. **Onur Duman**, Azadeh Tabiban, Lingyu Wang, Mourad Debbabi "Measuring and Improving the Security Posture of IEC 61850 Substations against Supply Chain Attacks" IEEE Transactions on Instrumentation and Measurement (Volume: 73) [Impact Factor: 5.6]

6. **Onur Duman**, Mengyuan Zhang, Lingyu Wang, Mourad Debbabi, Ribal F. Atallah, and Bernard Lebel. "Factor of Security (FoS): Quantifying the Security Effectiveness of Redundant Smart Grid Subsystems" IEEE Transactions on Dependable and Secure Computing, Volume 19, Issue 2 (2020): Pages 1018-1035. [Impact Factor: 7.0]

7. **Onur Duman**, and Amr M. Youssef. "Fault analysis on Kalyna" Information Security Journal: A Global Perspective, Volume 26, Issue 5 (2017): Pages 249-265.

8. Riham AlTawy, **Onur Duman**, and Amr M. Youssef. "Fault analysis of Kuznyechik" Mathematical Aspects of Cryptography, Volume 7, Issue 2 (2016): Pages 21-34.

Conference Proceedings

1. Seran Susruthan, **Onur Duman**, and Andrea Arcuri "Multi-Phase Taint Analysis for JSON Inference in Search-Based Fuzzing" Accepted by The 18th Intl. Workshop on Search-Based and Fuzz Testing (SBFT), Ottawa, Canada, 2025.

2. **Onur Duman**, Mengyuan Zhang, Lingyu Wang, Mourad Debbabi "SecMonS: A Security Monitoring Framework for IEC 61850 Substations Based on Configuration Files and Logs" Proceedings of the 21st Conference on Detection of Intrusions and Malware & Vulnerability Assessment (DIMVA) 2024 [Acceptance Rate: 40 / 117 (%34)]

3. Abolfazl Rahiminejad, **Onur Duman**, Mohsen Ghafouri, Ribal Atallah, Arash Mohammadi, and Mourad Debbabi. "A Resilience Quantitative Framework for Wide Area Damping Control Against Cyberattacks" Proceedings of the 2023 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT), Washington, DC, USA, 2023

4. **Onur Duman**, Lingyu Wang, Minh Au, Marthe Kassouf, and Mourad Debbabi. "Hardening Substations Against Supply Chain Attacks Under Operational Constraints" Proceedings of the 2022 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT), New Orleans, LA, USA, 2022

5. **Onur Duman**, Mohsen Ghafouri, Marthe Kassouf, Ribal Atallah, Lingyu Wang, and Mourad Debbabi. "Modeling Supply Chain Attacks in IEC 61850 Substations" Proceedings of the 2019 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), Beijing, China, 2019

6. **Onur Duman** and Amr Youssef. "Fault Analysis of the New Ukrainian Hash Function Standard: Kupyna" In Foundations and Practice of Security: 11th International Symposium, FPS 2018, Montreal, QC, Canada, November 13–15, 2018, Revised Selected Papers 11 (Pages 225-240). Springer International Publishing.

7. **Onur Duman**, Mengyuan Zhang, Lingyu Wang, and Mourad Debbabi. "Measuring the security posture of IEC 61850 substations with redundancy against zero day attacks" Proceedings of the 2017 IEEE International Conference on Smart Grid Communications (SmartGridComm), Dresden, Germany, 2017

Researcher Information

- H-index: 6 (according to Google Scholar visited on 27 May 2025)
- Number of Citations: 98 (according to Google Scholar visited on 27 May 2025)
- ORCID: https://orcid.org/0000-0002-2489-8981

SCHOLARSHIPS

Concordia Conference and Exposition Award
Term: Fall 2019
Concordia University, Montreal, Quebec, Canada
1000 CAD

Concordia Merit Scholarship
Term: Summer 2018
Concordia University, Montreal, Quebec, Canada
10 000 CAD

Concordia Conference and Exposition Award
Term: Fall 2018
Concordia University, Montreal, Quebec, Canada
754 CAD

Concordia Conference and Exposition Award
Term: Fall 2017
Concordia University, Montreal, Quebec, Canada
1000 CAD

Concordia University Graduate Fellowship D Award
Term: Fall 2016
Concordia University, Montreal, Quebec, Canada
32 400 CAD

Concordia Merit Scholarship
Term: Winter 2016
Concordia University, Montreal, Quebec, Canada
10 000 CAD

Concordia Conference and Exposition Award
Term: Summer 2015
Concordia University, Montreal, Quebec, Canada
1000 CAD

McGill University Graduate Fellowship Award
Term: Fall 2008
McGill University, Montreal, Quebec, Canada
1500 CAD

Bilkent University Success Scholarship
Term: 2005, 2006, and 2007 academic years
Bilkent University, Ankara, Turkiye
25 110 USD

HONOURS

1. Ranked 1240th among 1 728 076 students in the University Entrance Exam in Turkey (OSS) in 2004
2. Finalist of the 2020 Turkish Intelligence Competition organized by the Turkish Intelligence Foundation
3. Ranked in the top 5% among users of tryhackme.com (https://tryhackme.com/p/herakles)
4. Obtained a 5-star gold badge for problem-solving in Hackerrank (https://www.hackerrank.com/dumanonur)
5. High Honour student for all terms during Bachelor's education at Bilkent University
6. 4th best GPA among 2008 graduates of the Computer Engineering Department of Bilkent University

TEACHING EXPERIENCE

Module Leader (Course Instructor)
Dates: 2025 Trimester B (January 2025 - May 2025)
Institution: Glasgow Caledonian University, Department of Cyber Security and Networks
Module Name: M2G426840 - Digital Forensics 1

This module enables students to be able to undertake a forensic investigation using current forensic tools. In this highly practical module, I am involved in preparing class materials, attending labs to answer questions from students, and preparing and grading both theoretical and practical exams.

Module Leader (Course Instructor)
Dates: 2025 Trimester B (January 2025 - May 2025)
Institution: Glasgow Caledonian University, Department of Cyber Security and Networks
Module Name: M2G426860 - Digital Forensics 1

This module enables students to be able to undertake a forensic investigation using current forensic tools. This module has the same contents as M2G426840. The only difference is: this module is presented online to Graduate Apprenticeship (GA) students. In this highly practical module, I am involved in preparing class materials, attending labs to answer questions from students, and preparing and grading both theoretical and practical exams.

Module Leader (Course Instructor)
Dates: 2025 Trimester B (January 2025 - May 2025)
Institution: Glasgow Caledonian University, Department of Cyber Security and Networks
Module Name: M3G426849 - Security Operation Analysis

This module provides students with the knowledge and skills needed to evaluate the complex threat environment facing today's organizations. In this highly practical module, I am involved in preparing class materials, preparing labs, preparing project assignments, attending labs to answer questions from students, and preparing and grading both theoretical and practical exams.

Module Leader (Course Instructor)
Dates: 2025 Trimester B (January 2025 - May 2025)
Institution: Glasgow Caledonian University, Department of Cyber Security and Networks
Module Name: M3G426870 - Security Operation Analysis

This module provides students with the knowledge and skills needed to evaluate the complex threat environment facing today's organizations. This module has the same contents as M3G426849. The only difference is: this module is presented online to Graduate Apprenticeship (GA) students. In this highly practical module, I am involved in preparing class materials, preparing labs, preparing project assignments, attending labs to answer questions from students, and preparing and grading both theoretical and practical exams.

Guest Lecturer
Date: 19 November 2024
Institution: Bilkent University
Course Name: CS 491 Senior Design Project

I attended this course as a guest lecturer to give an overview of the field, cybersecurity, and to discuss project ideas with students.

Guest Lecturer
Date: 13 February 2024
Institution: Kristiania University College
Course Name: MI210 Information Risk and Security

I attended this course as a guest lecturer to present threat modeling.

Guest Lecturer
Date: 26 October 2023
Institution: Kristiania University College
Course Name: MS341 Emerging Technologies

I have attended this course as a guest lecturer to present some works from my PhD thesis.

Teaching Assistant
Terms and years taught: Fall 2016, Fall 2017, Fall 2018, Winter 2020, Fall 2021, Fall 2022
Institution: Concordia University
Course Name: INSE 6130 Operating System Security

In this course about operating system security, I have taken roles as a lab demonstrator, who is responsible for guiding students to complete lab assignments, and a marker, who is responsible for grading exams and providing feedback to students.

Teaching Assistant
Terms and years taught: Winter 2019
Institution: Concordia University
Course Name: INSE 6140 Malware Defenses and Application Security

In this course about ethical hacking techniques, I have taken roles as a lab demonstrator, who is responsible for guiding students to complete lab assignments, and a marker, who is responsible for grading exams and providing feedback to students.

Tutor
Terms and years taught: Fall 2016
Institution: Concordia University
Course Name: COMP 248 Introduction to Programming

In this introductory course about Java programming, I have taken the role of a tutor who is responsible for explaining concepts students learn in the class with examples, helping them with their assignments, and answering their questions.

Grader
Terms and years taught: Winter 2016
Institution: Concordia University
Course Name: INSE 6120 Cryptographic Protocols and Network Security

In this course about network protocols, I got involved in grading exam papers.

Teaching Assistant
Terms and years taught: Fall 2015
Institution: Concordia University
Course Name: COEN 212 Digital Systems Design

In this course about digital design, I have taken roles as a lab demonstrator and a marker.

Teaching Assistant
Terms and years taught: Winter 2010
Institution: McGill University
Course Name: COMP 322 Introduction to C++

In this introductory course about C++ programming, I was responsible for answering questions from students and grading their programming assignments.

Teaching Assistant
Terms and years taught: Fall 2009
Institution: McGill University
Course Name: COMP 202 Introduction to Computer Systems

In this introductory course about Java programming, I was responsible for answering questions from students and grading their programming assignments.

Teaching Assistant
Terms and years taught: Winter 2009
Institution: McGill University
Course Name: COMP 206 Introduction to Software Systems

In this introductory course, I was responsible for answering questions from students and grading their assignments.

SERVICE TO PROFESSION

Program Committee Member

1. ACM Conference on Computer and Communications Security (CCS) 2023 Poster Session
2. ACM Conference on Computer and Communications Security (CCS) 2024 Poster Session
3. The 1st International Symposium on Intelligent Technology for Power and Energy Systems (ITPES) 2025

Conference Session Chair

1. 21st EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (MobiQuitous) 2024

Journal Paper Reviewer

1. IEEE Transactions on Industrial Informatics
2. IEEE Transactions on Dependable and Secure Computing
3. ACM Transactions on Internet Technology
4. IEEE Communication Letters
5. IEEE Transactions on Reliability
6. Computers & Security
7. International Journal of Critical Infrastructure Protection
8. IET Information Security
9. ACM Computing Surveys
10. IET Generation, Transmission & Distribution

Conference External Reviewer

1. European Symposium on Research in Computer Security (ESORICS)
2. International Federation for Information Processing (IFIP) Information Security Conference & Privacy Conference
3. Annual Symposium on Information Assurance (ASIA)
4. IEEE International Conference on Communications

Thesis External Examiner

1. Human Activity Recognition on Real Time Sensory Data Using Machine Learning Approaches: A Comparison between Triplet Neural Network, Convolutional Neural Network andCat Boost - Master's Thesis by Urwah Munir, Supervised by Prof. Hasan Ogul at Østfold University College

TRAININGS

The WNGER II Doctoral Supervision Program
Dates: 16 January 2024, 17 January 2024, and 12 March 2024
Institution: Western Norway Graduate School of Educational Research II
The purpose of this training was to expand supervisors' repertoire of strategies to make supervision a professional, effective, and enjoyable process.

Computer Security and Systems Management
Dates: 17 May 2018 - 21 October 2018
Institution: Coursera
This was an online course about managing Windows and Linux systems.

Comprehensive Project Management
Dates: January 2014 - June 2014
Institution: McGill University
The purpose of this training was to learn the best project management practices, such as defining tasks, estimating costs, and identifying critical paths.

Effective Public Speaking and Speech Preparation
Dates: Winter 2010
Institution: McGill University
The purpose of this training was to learn and practice public speaking and speech preparation.

PROFESSIONAL SKILLS

Programming Languages
Python, Java, Kotlin, C, C++, MATLAB, PHP

Operating Systems
MacOS, Windows, Ubuntu, Kali Linux, ParrotOs

Other Technical Skills
Git, MongoDB, MySQL, HTML, CSS, Spring Boot, Spring Security, Bash Scripting, Docker, Pandas, Ethical Hacking, Digital Forensics

LANGUAGES

1. Turkish - Native
2. English - Near Native
3. French - Intermediate
4. Norwegian - Beginner

VOLUNTEER WORK

1. Worked as a photographer at the international conference, Foundations and Practice of Security (FPS) 2018
2. Helped with event organizations in Concordia Multi-faith & Spirituality Center between 2018-2019
3. Student mentor for final-year undergraduate students at Bilkent University, as part of "Bilkent University Mentorship Program". So far mentored 7 students.

INTERESTS

Movies, Stack Overflow, TryHackMe, HackTheBox, Coding, Learning New Skills, Traveling, Fitness, Improv, Reading About History

REFERENCES

Dr. Lingyu Wang
Professor, NSERC/Ericsson Industrial Research Chair (IRC) in SDN/NFV Security
Concordia Institute for Information Systems Engineering (CIISE)
wang@ciise.concordia.ca

Dr. Mourad Debbabi
Professor, Dean of the Gina Cody School of Engineering and Computer Science
Concordia Institute for Information Systems Engineering (CIISE)
debbabi@ciise.concordia.ca

Dr. Amr Youssef
Professor
Concordia Institute for Information Systems Engineering (CIISE)
youssef@ciise.concordia.ca

Dr. Mohsen Ghafouri
Associate Professor
Concordia Institute for Information Systems Engineering (CIISE)
mohsen.ghafouri@concordia.ca