Christopher Molloy (He/Him/His)

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Education

Queen's University — Kingston, ON
Ph.D. Computing — expected 2024
NSERC Postgraduate Scholarships – Doctoral Scholarship winner
Relevant Coursework: Data Mining, Deep Learning, Neural and Genetic Computing, Topics in Data Analytics

Queen's University — Kingston, ON
Bachelor's of Computing in Mathematics (Hons.) — April 2020
Dean's Honor list 2019-2020
Relevant Coursework: Time Series Analysis, Statistical Inference, Data Analysis, Evolutionary Game Theory

Research Experience

Queen's University — Kingston, ON
PhD Researcher — September 2020 – present
- Designed neural networks for clone search on zero-day malware.
- Created first two-player reinforcement learning game for adversarial malware generation and detection.
- Engineered sequence based neural network for aviation traffic anomaly detection.
- External reviewer for IJCAI conference (tier 1), KDD conference (tier 1), and WiSec conference.

BlackBerry LTD — Waterloo, ON
Research Technology Student — September 2022 – December 2022
- Independently researched, implemented, and compared various fusion methods for differing input data, such as synthetic vehicle time series data and malware features.
- Wrote survey on vehicle sensor fusion security for multi-university and industry partnership program (IDEaS).

Queen's University — Kingston, ON
Undergraduate Researcher — January 2020 – April 2020
- Developed image signature method from state-of-the-art.
- Matched malware families based on image signature.
- Implemented image signature method into large scale clone search system.

Employment Experience

Mitacs – Lab2Market Cybersecurity — Toronto, ON
Entrepreneurial Lead — January 2023 – April 2023
- Conducted market research on encrypted malware detection within healthcare, finance, and government.
- Researched, developed, and validated Neural Network for detecting malware on encrypted software data.

Lunenfeld-Tanenbaum Research Institute — Toronto, ON
Summer Engineer — April 2019 – August 2019

Vouchr — Toronto, ON
Summer Engineer — April 2018 – August 2018

J.F. Brennan Custom Homes — Toronto, ON
Summer Laborer — April 2017 – August 2017

Skills

Computer: Python (6 years), Git (6 years), Java (3 years), R (3 years), TensorFlow (3 years), MySQL (4 years), C++ (2 years), C (2 years), PyTorch (1 year), MATLAB (1 year), HTML/CSS/JavaScript (8 years)

Select Publications (2/6)

C. Molloy, J. Banks, H. H. Steven Ding, P. Charland, A. Walenstein and L. Li, "Adversarial Variational Modality Reconstruction and Regularization for Zero-Day Malware Variants Similarity Detection," in *2022 IEEE International Conference on Data Mining (ICDM)*, Orlando, FL, USA, 2022, pp. 1131-1136, doi: 10.1109/ICDM54844.2022.00143.

C. Molloy, S. H. H. Ding, B. C. M. Fung, and P. Charland, "H4rm0ny: A Competitive Zero-Sum Two-Player Markov Game for Multi-Agent Learning on Evasive Malware Generation and Detection," in *2022 IEEE International Conference on Cyber Security and Resilience (CSR)*, 2022, pp. 22–29. doi: 10.1109/CSR54599.2022.9850345. **This paper was awarded the Best Research Paper Award by the conference chairs.**