Christopher Chun Ki Chan
Curriculum Vitae

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Curriculum Vitae

Christopher Chan, PhD.
Canadian-Born Citizen
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Education

Doctor of Philosophy in Computer Science, *2018*

Department of Computer Science, Toronto Metropolitan University, Toronto, Canada.

Dissertation Title: "A Simulation Algorithm Capable of Modelling Spatial Impact Points from the Neutralization of an Improvised Explosive Device"

Advisor: Alexander Ferworn, PhD.

Master of Science in Computer Science, *2015*

Department of Computer Science, Toronto Metropolitan University, Toronto, Canada.

Thesis Title: "Game-Based Threat Assessment Tool for Improvised Explosive Device Neutralization Training"

Advisor: Alexander Ferworn, PhD.

Honours Bachelor of Science in Computer Science and Co-op Completion, *2013*

Department of Computer Science, Toronto Metropolitan University, Toronto, Canada.

Programming Languages

- Java, Go, Python, C, C#, JavaScript, SQL, R, Perl, Shell (bash/zsh), MATLAB, Lua

Frameworks & Libraries

- Spring Boot, TensorFlow, PyTorch, Keras, Scikit-learn, NumPy, pandas, Matplotlib, React, Node.js, OpenCV, Flask, FastAPI

Cloud & Infrastructure

- GCP (BigQuery, Cloud Functions, Vertex AI, TPU, GKE), AWS (EC2, S3, RDS, Lambda, CloudWatch), Azure Machine Learning Studio, Docker, Kubernetes, Terraform

Tools & Development Support

- GitLab, GitHub, Jenkins, Jupyter Notebook, Figma, Postman, Ansible, Arduino IDE, NVIDIA CUDA, Raspberry Pi, CI/CD pipelines (GitLab CI, Jenkins)

Backend & Systems Architecture

- RESTful API design, microservices architecture, asynchronous job handling, scalable real-time systems, distributed systems (Kafka, RabbitMQ)

Databases & Data Warehousing

- PostgreSQL, MySQL, MongoDB, Redis, SQLite, Firebase Realtime DB, BigQuery, NoSQL systems, data warehouse modeling

Web & Full Stack Development

- React, Node.js, Flask, FastAPI, webhooks, real-time dashboard development

Data Engineering & ETL

- Apache Beam, Spark, Kafka, Hadoop, ETL pipeline design (batch and stream), orchestration with Airflow and Oozie

Machine Learning & AI

- Scikit-learn, TensorFlow, PyTorch, OpenAI GPT-4o, Claude, LangChain, vector databases, model design, training, and optimization

Business Intelligence & Data Visualization

- Power BI, Google Analytics, Tableau, feature engineering, star schema modeling

Operating Systems & Platforms

- Linux (Ubuntu, CentOS), Windows, macOS, Solaris OS, Android development, iOS simulation

Networking & Security

- WebSocket, RESTful APIs, GraphQL, OpenID Connect, OAuth2.0, JWT, SSL/TLS certificate management

Observability Tools Proficiency

- Grafana

Core Competencies

- Real-time Java-based financial systems and trading bot development (TSX equity markets)
- Performance tuning, debugging, and system resilience architecture
- Cross-functional collaboration in agile, English-speaking teams
- Mentorship, code review, and version control best practices
- Infrastructure automation and reproducibility in production environments

Work Culture & Soft Skills

- Multicultural team experience in hybrid/remote settings
- Interdisciplinary teaching, research, and technical communication
- High adaptability under relocation, visa, and deadline pressures

Languages Spoken and Written

- English: Native (spoken & written)
- Cantonese: Native (spoken & written)
- Mandarin Chinese: Native (spoken & written)
- Japanese: Conversational (spoken & written)
- French: Intermediate conversational (spoken), basic written

Employment (Sorted Most Current)

AI Researcher / Computer Vision Researcher, Ascent Robotics, July *2025 - Present*

As an AI Researcher at Ascent Robotics, I work on applied deep learning and computer vision systems deployed in real-world operational environments. My responsibilities include developing and evaluating deep neural network models for visual recognition tasks, with a focus on pharmaceutical product identification from complex imagery. I support end-to-end system development, including data preparation, model selection, performance benchmarking, and deployment feasibility assessment under real-world constraints. My work bridges applied AI research and production system requirements, contributing to scalable and reliable AI-enabled solutions.

Engineer Specialist in Humanities / International Services, Minagawa Co. Ltd. *June 2023 – July 2025*

As an Engineering Specialist, I am engaged in a wide array of projects that enhance our company's technological and market presence globally. My primary responsibilities include leading international outreach initiatives, spearheading internal business technical improvements, and implementing cutting-edge e-commerce solutions. I specialize in the integration of tailor-built AI technologies aimed at optimizing e-commerce platforms, ensuring they not only meet but exceed industry standards. My role is crucial in advancing our company's innovations and maintaining a competitive edge in the international market.

Adjunct Professor, Department of Computer Science, Toronto Metropolitan University, Ontario, Canada, *September 2018 - Present*

https://www.torontomu.ca/cs/our-people/christopher-chan/

Assistant Professor, Department of Information Management, Chaoyang University of Technology, Taiwan, Taichung, *September 2019- June 2023*

As an Assistant Professor at the Chaoyang University of Technology, my primary research interests encompassed Human-Computer Interaction (HCI), Human-Robot Interaction (HRI), deep learning, mechanical analysis, and small-scale robotics. I was dedicated to advancing these fields through innovative research and practical applications. I instructed a range of courses at both graduate and undergraduate levels. For graduate students, I taught Artificial Intelligence, Deep Learning, Big Data, and the Internet of Things; for undergraduates, I offered courses in C# and Web Programming. My commitment to high-quality, impactful teaching was reflected in my student evaluations, which consistently averaged 4.7 out of 5. As a recognized expert in my field, I served as a reviewer for numerous esteemed journals and conferences, including IEEE Access, Emerald's Journal of Knowledge Management, and MDPI's Risks. Additionally, I was a technical committee member for four international conferences. I fulfilled a contractually stipulated publishing quota, contributing to 2-3 journals or a mix of 1-2 conferences and journals each

academic year. My roles also included Technology Coordinator for an IEEE-sponsored Scopus-indexed conference and Principal Investigator for a bio-medical visualization lab within the Department of Information Management.

Post-doc Researcher, Department of Information Engineering, National Taiwan Ocean University, *January 2019 – September 2019*

In my position as a Postdoctoral Researcher, I collaborated closely with Professor Jun-Wei Hsieh on pioneering research in Deep Learning architectures, with a special focus on ship detection and recognition. My responsibilities involved translating cutting-edge Deep Learning models into publishable formats, thoroughly analyzing the complexities of new networks, and producing high-caliber scholarly articles and presentations for prestigious journals and conferences. Additionally, I played a key role in mentoring Master's and PhD students, guiding their research and assisting in the transformation of their findings into peer-reviewed publications.

Assistant Research Professor, Department of Electronic Engineering, National Taipei University of Technology (Taipei Tech), Taiwan, *November 2018 – January 2019*

During my tenure as an Assistant Research Professor at Taipei Tech, I specialized in Information Forensics and Information Security, with a particular emphasis on leveraging Deep Learning for enhancing Information Security and developing Smart Car Applications. My role encompassed supervising Master's and PhD students in their thesis work and research projects, as well as teaching a variety of undergraduate courses in computer science. My contributions were pivotal in advancing research and educational excellence within the department.

Blockchain Software Architecture Consultant, Capital Blockchain and IVehda, Toronto, Ontario, Canada *March 2018 – October 2018*

As a Blockchain Software Architecture Consultant, I collaborated with Capital Blockchain in Toronto and partnered with IVehda, a software consultancy firm, to develop a blockchain-based software architecture. This solution was designed to ensure the secure and factual transmission of individual employment application data. My contributions included the development of a proof of concept model and the formulation of specific architectural guidelines for integrating the Hyperledger Fabric blockchain methodology into the system, ensuring robust and secure information handling.

Sessional Lecturer, University of Ontario Institute of Technology, Toronto, Ontario, Canada, *April 2018 – September 2018*

As a Sessional Lecturer, I delivered a comprehensive course on Computer Architecture at the University of Ontario Institute of Technology. This course provided an in-depth introduction to the fundamental principles of computer architecture, organization, and design. Topics I covered included generations of computer systems (mainframe, mid-range, micro-computers); peripherals and interfaces; bus design; input/output systems and technologies; central processing units (comprising arithmetic logic and control units); various types of memory such as semiconductor (RAM and ROM), cache; digital logic; and computational methodologies like integer and floating-point arithmetic, pipelining, and parallelism. Additionally, the course incorporated practical

programming components in C, aimed at undergraduate students across diverse fields including IT security, networking, game development, and entrepreneurship.

Continuing Education Personal Tutor, Toronto Metropolitan University Chang School for Continuing Education, Toronto, Ontario, Canada, *September 2017 – September 2020*

I provide specialized one-on-one tutoring for continuing education students seeking to enhance their skills in specific areas of interest. My support is often sought by current and former data science students preparing for competitive platforms like Kaggle. This online competition challenges participants to apply innovative data cleaning techniques and tailor machine learning algorithms to complex problems using public datasets, such as those involving credit card fraud detection. In my role, I assist students with coding challenges, recommend effective algorithms, and help ensure that their competition entries are both technically robust and well-presented.

Instructor, Toronto Metropolitan University Chang School for Continuing Education, Toronto, Ontario, Canada, *September 2017 – September 2018*

I served as an instructor for the Certificate in Data Analytics, Big Data, and Predictive Analytics at the Chang School for Continuing Education, Toronto Metropolitan University. This program equips individuals with a robust foundation in analytics, leveraging tools and statistical methodologies applicable across a multitude of sectors. It caters to professionals involved in data management, data warehousing, and IT, enhancing their skills to optimize organizational performance and prepare them for career advancement. Graduates of this certificate are thoroughly prepared to pursue the Certified Analytics Professional (CAP®) exam, offered by the Institute for Operations Research and the Management Sciences (INFORMS), affirming their qualifications in this rapidly evolving field. My effectiveness as an educator is underscored by a personal reference letter from a student, a testament to the impactful and supportive learning environment I foster, which is included in my teaching portfolio (available upon request).

Doctoral Students Guidance - Personal Tutor, Toronto Metropolitan University, Toronto, Ontario, Canada, *September 2016- September 2020*

I provided personalized advice and guidance to PhD students in Computer Science at Toronto Metropolitan Corporation University, assisting them in identifying suitable and impactful thesis topics essential for their successful completion of the program. One notable example includes supporting a student interested in Agile Programming methodologies and the development of business models for Agile environments. I guided the student through the process of pinpointing specific focus areas within Agile development, exploring niche opportunities for innovation, and employing effective strategies for ongoing research. This collaborative effort culminated in the student crafting a well-defined and compelling candidacy proposal, demonstrating the tangible benefits of my mentorship.

MapYourProperty Inc., Lead Back End Server Developer, *June 2013 - September 2018*

As a founding member and Lead Developer at MapYourProperty Inc., I played a pivotal role in developing the back-end server for our innovative online platform, which serves as a comprehensive mapping and analytic tool for land development in Canada. I led a team of developers in constructing the back-end infrastructure from the ground up, primarily utilizing PHP

for server-side applications and managing MySQL and PostgreSQL databases to ensure optimal functionality and performance. My responsibilities also extended to modernizing our technology stack by transitioning to industry-standard frameworks and tools such as GitLab, PHP 7, and Symfony, enhancing our platform's efficiency and maintainability.

Microsoft, Software Development Engineer in Test, ***June 2013 - September 2013 (Summer Internship - 4 months)***

At the Microsoft Seattle Research Lab, I contributed to the development of functional tests and model-based test suites for projects within the messaging domain. I collaborated with developer interns, co-developing product and test code simultaneously to streamline and optimize development processes. Additionally, I authored detailed test design specifications for new messaging features, ensuring comprehensive coverage and robust testing protocols. I also conducted competitive analyses of messaging features on iPhone and Android devices, providing key insights that informed our development strategies and helped position our products competitively in the market.

Graduate Teaching Assistant, Toronto Metropolitan University, Toronto, Ontario, Canada, ***September 2012 – September 2018***

As a Graduate Assistant, I played a key role in developing core course materials and designing assignments for Data Science and Big Data Analytics courses. I efficiently managed the grading of midterms and exams, providing detailed, tailored feedback to approximately 200 students within a 1-2 day turnaround. My commitment to student success was further demonstrated through the regular updates I posted on the digital learning platform, which included additional notes, corrections, and hints related to lab sessions and frequently asked questions about the course content. I established strong relationships with students, ensuring effective communication and resolution of common issues through timely announcements on Blackboard. Each piece of feedback I provided was accompanied by a detailed rubric, enhancing the transparency and utility of my evaluations. My proficiency in the instructional material spanned third and fourth-year undergraduate courses, graduate courses, and certain continuing education modules, underpinned by a comprehensive archive of all teaching materials and notes I maintained.

Government of Ontario, Lead Software Developer, Superior Court of Ontario JITO, ***June 2011 – September 2018***

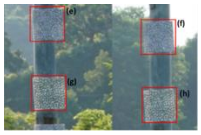
In my capacity as a Technical Consultant for the Government of Ontario, I assist Senior Law Officers in developing sophisticated database management systems and scheduling software tailored for the Court of Appeals and Superior Court of Ontario. These tools are designed to incorporate legal rules and adhere to complex restrictions, optimizing the assignment of experts to each unique court case. I spearheaded the development of an automated information retrieval system that enhances the accuracy and efficiency of cleaning judicial database records through advanced queries from active directories and online resources. Additionally, I enhanced the functionality of the existing Ontario Note Taking software, used in both the criminal and family justice systems of Ontario Courts. My role extends beyond development to serve as a crucial research and development link for the Judicial Information Technology Office (JITO). Here, I

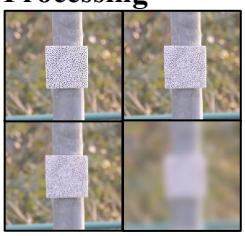
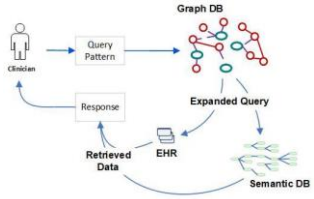
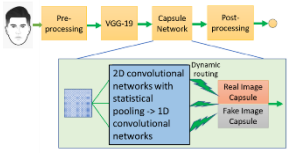
integrate academic theoretical research into practical applications, focusing on innovations in scheduling software and virtualization methodologies.

IBM Canada Inc. QA and SVT for DB2 Data Warehouse, *June 2010 – September 2011 (16 months – Co-op)*

At IBM, I was responsible for executing complex test plans and test cases for DB2, utilizing C, Java, and Perl across diverse multi-partitioned Windows and Linux operating systems. My role involved close collaboration with software development engineers and management to navigate the defect and product lifecycle, with a particular focus on optimizing DB2 source code and data warehouse workload applications. I played a key role in monitoring and ensuring DB2 stability and performance under high-stress workload conditions for online transactions. Additionally, I undertook the restructuring of IBM Websphere automation buckets to enhance testing efficiency and effectiveness. My innovative contributions to the company include filing two patent disclosures. These patents pertain to advanced automation tooling software for DB2 version 10 and real-time debugging techniques using BASH, underscoring my commitment to technological advancement and process improvement.

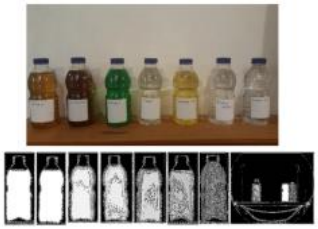
Current and Past Research Projects

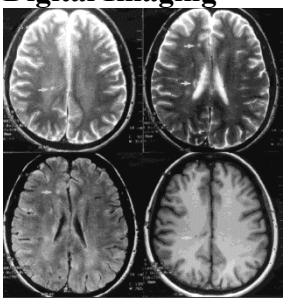
Significant Projects:	Description	Dates	Collaborators
Deep CNN Classifier for Intelligent DIC Preprocessing in Large Structure Health Monitoring 	Recent advances in digital image correlation (DIC) for structural health monitoring emphasize the importance of optimizing patterns based on saliency and uniqueness, traditionally dependent on operators' experience and established metrics. Our research introduces a novel preprocessing methodology designed to automatically classify the saliency and uniqueness of localized patterns. This approach facilitates more efficient DIC processing of large structures, enhancing the ability to monitor and assess their structural integrity.	2020-2023	David Kumar, and Chih-Hung Chiang
Localized High and Low-Resolution CNN Classifier for Evaluation of Fiducial Markers in Image	A system that can classify whether a marker in a real-world image is of a high fidelity sub-image resolution or not. The low fidelity image resolution of a marker in a real-world image produces correlation errors in DIC processing. Our study proposes a binary classifier for high and low-resolution fiducial markers as a preprocessing image processing step	2020-2023	Chih-Cheng Chen, and Steven Delaney

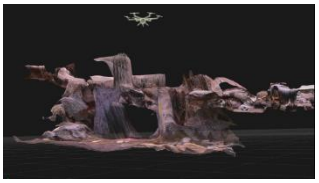
Processing 	towards determining the quality of fiducial markers in real-world images.		
Optimizing Clinician-Patient Interaction Through Patient-Centric Healthcare Systems 	Clinicians face diminishing interaction times with patients, primarily due to the cognitive load involved in managing vast volumes of patient data. To address this issue, there is a growing governmental interest in developing unified, patient-centric healthcare systems. These systems are designed to enhance efficiency by presenting the most relevant patient healthcare data tailored to the clinician's specific role and the immediate healthcare scenario. This targeted approach aims to reduce the cognitive burden on healthcare providers, thereby increasing the quality and duration of patient interactions.	2019-2023	Steven Delaney and Doug Smith
Decentralized Blockchain and Deep Learning Framework for Deepfake Detection 	This research develops a theoretical framework to establish a Proof of Authenticity (PoA) for digital media, utilizing a decentralized blockchain combined with deep learning techniques. Specifically, we employ multiple Long Short-Term Memory (LSTM) networks as deep encoders to generate unique, discriminative features from digital media. These features are then compressed and hashed into a blockchain transaction, ensuring a secure and immutable record of media authenticity. Assuming initial trust in the video at the point of reception, our framework provides a robust solution to combat the proliferation of deepfake media, leveraging the strengths of both blockchain technology and advanced	2019-2022	Vimal Kumar, Chih-Cheng Chen, Steven Delaney, Munkhjargal Gochoo, Cheng-Fu Yang

	machine learning to enhance digital security and veracity.		
Ship Hull Identification System for Human Robot Interaction 	Ship Hull Identification for public safety, border control and marine based monitoring is challenging as ship identification labels are difficult to recognize by visual inspection especially in cluttered and noisy environments. Our solution is a CNN-based visual inspection system for ship hulls in real time on an embedded system, allowing for multiple ship hull recognition with high accuracy.	2019-2020	Jun-Wei Hsieh, Ping-Yang Chen, Munkhjargal Gochoo, Chien-Yao Wang, and Mark Hong-Yuan Liao
Enhancing Intelligent Homecare Systems with Deep Learning Vision Techniques for HRI-Based Assistive Technologies 	Intelligent Homecare Systems, designed to aid the physically disabled and elderly, often fail to meet expectations due to presumptions about their ability to replace personal care. To address these challenges, our research focuses on augmenting existing systems, such as ASUS Zenbo and Sharp Robohon, with advanced deep learning techniques. By incorporating a multibox detector (SSD) framework, we significantly improve the systems' capabilities to monitor and recognize specific human activities and inactivities in real time. This enhancement not only ensures more effective operation of homecare robots but also boosts the quality of life by providing more precise and adaptive support.	2018-2019	Trung-Hieu Le, Shih-Chia Huang, Senior Member, IEEE, and Da-Wei Jaw
Advanced Simulation of Disruptor Shot Impact Points for IED Neutralization Training (Funded by NSERC CREATE ADERSIM and OGS) 	Professionals in Explosive Disposal Units (EDUs) commonly employ disruptors that project high-velocity water jets to dismantle Improvised Explosive Devices (IEDs) safely. Our project enhances training methodologies by integrating a sophisticated simulation that allows for the insertion of arbitrary mock IEDs. This simulation enables EDU professionals to analyze and understand the dynamics of water	2015-2018	Halton Police, Sunnybrook Hospital, Toronto Police Service (TPS), Network-Centric Applied Research Team (Primary Investigators: **C.**

	splatter impact points resulting from disruptor shots. Our innovative approach not only improves the realism and effectiveness of training scenarios but also aids in developing more precise techniques for neutralizing IED threats safely and efficiently.		**Chan, A. Ferworn)**
Unmanned Aerial Vehicle Guided Improvised Explosive Device Shrapnel Dispersal Simulation 	Our project develops a novel methodology for modeling and simulating the dispersal of shrapnel from Directionally Focused Charge (DFC) explosives, deployed via Unmanned Aerial Vehicles (UAVs). Utilizing simple particle game engine physics heuristics, we compute and simulate shrapnel trajectories and their impact zones on urban terrains. This advanced simulation tool is designed to provide emergency response and counter-IED teams with precise, actionable data on the potential risks associated with shrapnel impacts in densely populated areas. Through this methodology, our aim is to enhance the strategic capabilities of teams managing explosive threats, ultimately improving urban safety and response efficiency.	2016-2018	Network-Centric Applied Research Team (Primary Investigators: **C. Chan, A. Ferworn)**
Disaster Scene Path Planning with Automatic Access Hole Finding 	Our project develops a novel methodology for modeling and simulating the dispersal of shrapnel from Directionally Focused Charge (DFC) explosives, deployed via Unmanned Aerial Vehicles (UAVs). Utilizing simple particle game engine physics heuristics, we compute and simulate shrapnel trajectories and their impact zones on urban terrains. This advanced simulation tool is designed to provide emergency response and counter-IED teams with precise, actionable data on the potential risks associated with shrapnel impacts in densely populated	2013-2018	Town of Caledon Bolton Police Station, Network-Centric Applied Research Team (Primary Investigators: **C. Chan, A. Ferworn)**

	areas. Through this methodology, our aim is to enhance the strategic capabilities of teams managing explosive threats, ultimately improving urban safety and response efficiency.		
Game-Based Modeling and Manipulation of CBRNe Threats (Funded by NSERC CREATE ADERSIM and OGS) 	Our research provides a groundbreaking approach for specialized response teams handling Chemical, Biological, Radiological, Nuclear, and explosive (CBRNe) incidents. By leveraging highly precise data from Computed Tomography (CT) sensors, we create detailed 3D models of suspected CBRNe threats. These models are manipulated within a sophisticated physics-based game engine, allowing teams to inspect and interact with these threats in a controlled virtual environment. This innovative method significantly enhances safety by enabling responders to understand and strategize their approach to neutralizing CBRNe materials without direct exposure, aligning with the critical response principle of avoiding contact until the threat's nature is fully assessed.	2013-2018	Sunnybrook Hospital, Toronto Police Service (TPS), Ontario Provincial Police (OPP), Proparms Montreal, Network-Centric Applied Research Team (Primary Investigators: **C. Chan, A. Ferworn)**
Explosive Disposal Unit Simulation Training (EDUST) (Funded by NSERC CREATE ADERSIM and OGS) 	Training for Explosive Disposal Unit (EDU) personnel typically requires significant resources, involving specialized disruption equipment, extensive experimentation, and inherent risks. Our project advances EDU training by implementing methodologies derived from Design Science Research (DSR) to the task of neutralizing Improvised Explosive Devices (IEDs). This approach enhances simulation-based training tools, providing EDU personnel with sophisticated, scenario-based reasoning skills necessary for the IED neutralization process. By simulating realistic neutralization scenarios, we	2013-2017	Sunnybrook Hospital, Toronto Police Service (TPS), Ontario Provincial Police (OPP), North York Emergency Task Force (ETF), Network-Centric Applied Research Team (Primary Investigators: **C.**

	aim to improve the effectiveness and safety of training, reducing both the cost and risk associated with conventional training methods.		**Chan, A. Ferworn)**
Effective Visualization of Patient Brain Disorders Using Digital Imaging 	Our project focuses on developing advanced techniques to enhance the characterization and extraction of significant, robust, and informative features from electroencephalography (EEG) signals, specifically targeting the interictal migraine with aura brain state. Current EEG visualizations fall short in facilitating effective doctor-patient interactions. Our goal is to create a new visualization approach that not only handles the complexity of EEG data but also presents it in a way that is meaningful and easily interpretable by both clinicians and patients. By improving how these data are visualized, we aim to enhance diagnostic processes and foster better communication regarding brain disorders.	2017-2018	Ryerson Mechanical Engineering and Industrial Engineering (MEIE), Ryerson Digital Media (DM), Headache Sciences Inc., (Primary Investigators: **D. Doidge, M. Garingo, W. Lewis, C. Chan, A. Ferworn)**
Utilizing Unmanned Aerial Vehicles (UAV) to Locate Wandering People with Dementia (Funded by NSERC CREATE ADERSIM) 	This project is dedicated to addressing the critical challenge of locating wandering individuals with dementia. Our objective is to develop a theoretical model that enhances Search and Rescue Operations (SAR) through the integration of Unmanned Aerial Vehicles (UAVs). By leveraging UAV technology, we aim to create a reliable and efficient system for finding lost dementia patients, potentially reducing search times and increasing safety. The model will include strategies for deploying UAVs effectively, utilizing advanced sensors and imaging technologies to detect and monitor individuals in diverse environments. This approach promises to revolutionize SAR efforts, providing	2017-2018	Department of Politics and Public Administration (PPA) Faculty of Arts (FoA), Network-Centric Applied Research Team (Primary Investigators: **D. Hanna, C. Chan, A. Ferworn)**

	a significant tool in the care and management of people with dementia.		
3D Disaster Scene Reconstruction with UAV and RGB-D Sensor 	Ongoing work in 3D Scene Reconstruction is used to build model rubble of collapsed buildings with the hope that we can eventually characterize rubble and provide additional situational awareness from the reconstructed model. This solution is a much-needed Urban Search and Rescue study.	2012-2017	Ontario Provincial Police (OPP), Town of Caledon Bolton Police Station, Network-Centric Applied Research Team (Primary Investigators: **C. Chan, T. Zannon, J. Tran, S. Herman, A. Ferworn)**
Archaeological Exploration Project in El-Hibeh 	Our project at the "Busa" dig site in Egypt addresses the critical issue of looter tunnel inspection through the innovative use of small-scale robotic technology. We have developed a 6-wheel, tethered tunneling robot, merging traditional archaeological methods with modern exploratory and information retrieval techniques. Deployed in 2017, this robot is designed to navigate and inspect narrow, hard-to-reach tunnels created by looters, enhancing our ability to safeguard and study archaeological sites effectively. This research not only protects historical artifacts from further damage but also provides a new avenue for archaeological exploration, ensuring that valuable cultural heritage can be preserved and studied in detail.	2016-2017	Department of History, Berkeley University of California, Ministry of State for Antiquities (SCA), Network-Centric Applied Research Team (Primary Investigators: **J. Li, J. Tran, C. Chan, A. Ferworn)**

Honours and Awards

- Taiwan Ministry of Science and Technology Early Research Professor Grant, 3 Million NTD, 2020-2023.

- Chaoyang University of Technology Intelligent Micro Aerial Vehicle Research Proposal Funding, 20 Million NTD (Department of Aerospace Engineering), 2019-2021 as lead AI-Coordinator.
- Chaoyang University of Technology Bio-Tech Visualization Lab, $10 Million NTD, 2020-2023, as lead Principal Investigator.
- Taiwan Ministry of Science and Technology Einstein under 35 Research Grant, 1 Million NTD, 2018-2019
- Ryerson Early Doctoral Completion Award, $10,000 CAD, 2018
- NSERC CREATE ADERSIM Grant, $17,000 CAD, 2017-2018.
- NSERC CREATE ADERSIM Grant, $10,000 CAD, 2016-2017.
- Ontario Graduate Student (OGS) Scholarship, $15,000 CAD, 2014-2015.
- NSERC (ENGAGE) Grant, $25,000 CAD, 2014 with DreamQii Inc.
- Ontario Graduate Student (OGS) Scholarship, $15,000 CAD, 2013-2014.

Research Interests

- Artificial Intelligence (AI): Deep Learning, Machine Learning
- Internet of Things (IoT) and AIoT Applications in Industry 4.0
- Blockchain Technology and Its Applications
- Cybersecurity Measures and Data Privacy
- Data Science: Data Analytics Techniques and Tools
- Cloud Computing Services and Emerging IT Trends
- Computational Public Safety: Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNe), Urban Search and Rescue (USAR), and Emergency Disaster Units (EDU)
- Application and Software Development
- Autonomous Systems: Robotics and Control
- Human-Computer Interaction (HCI) and Human-Robot Interaction (HRI)
- Disaster and Emergency Management Strategies
- Networking and Communications Technology
- Design Thinking in Engineering
- Mechatronics and Control Systems
- Hardware Engineering: Design and Innovation

Strong Research Focuses and Ongoing Projects/Collaboration with International Scholars

- Human-Computer Interaction (HCI) and Human-Robot Interaction (HRI): Developing intuitive interfaces and interaction protocols.
- Robotics: Specializing in diverse environments—land, aquatic, and aerial systems.
- Simulations and Serious Games: Focused on applications in training, education, and health sectors.
- Service Robots: Enhancing automation for public and domestic use.
- Software Engineering and Process Automation: Streamlining development processes and integrating advanced automation technologies.

Publication List

Nam, Somang, and **Chan, Christopher Chun Ki**. **"Towards Designing User Interfaces for Optimized Human-AI Communication and Supervisory Control in Software Engineering."** *Proceedings of the 29th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD 2025 – Summer IV)*, Busan, Republic of Korea, June 25–27, 2025. IEEE. DOI: **10.1109/SNPD65828.2025.11252932**. (Indexed in IEEE Xplore; added November 28, 2025)

Christopher Chun Ki Chan, Chih-Cheng Chen*, Steven Delaney, and Alexander Ferworn, "Towards the use of High Resolution Depth Maps and Convolutional Neural Networks for Atopic Dermatitis Severity Recognition" *3rd IEEE Eurasia Conference on Biomedical Engineering, Healthcare and Sustainability 2021 (ECBIOS)*

Chan, Christopher CK, Steven Delaney, Chih-Cheng Chen, and Alexander Ferworn, "A Markerless High Resolution Structural Health Monitoring Framework for Smart Cities" *IEEE Technology & Engineering Management Conference 2021 (TEMSCON)*

Chan, Christopher CK, Chih-Cheng Chen, Steven Delaney, Cheng-Fu Yang, "Policy and Value Deep RL for Temporal Language-Agnostic Street Image Captioning" *Eurasian Conference on Educational Innovation 2021 (ECEI)*

Chan, Christopher CK, David Kumar, Chih-Hung Chiang **"**Coarse and Fine Localized CNN Classifier for Intelligent DIC Preprocessing in Large Structure Health Monitoring Sample" *SPIE Smart Structures & Nondestructive Evaluation 2021 Digital Forum (SPIE)*

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Chan, Christopher CK, Steven Delaney, Doug Schmidt "Natural Language Processing for Productivity Metrics for Software Development Profiling in Enterprise Applications" *Artificial Intelligence and Cloud Computing Conference (AICCC), 2018 International Conference Proceedings Series by ACM*

Chan, Christopher CK, Alexander Ferworn, Andy Olesen, Craig Dunfield "Simulating Naïve Particle Dispersion as a Result of High Velocity Projectile Impact".

Chan, Christopher CK, Alexander Ferworn, and David Tran "A Rudimentary Approach to Unmanned Aerial Vehicle Guided Improvised Explosive Device Shrapnel Dispersal Simulation" *Intelligent Networking and Collaborative Systems (INCoS), 2016 International Conference.* IEEE, 2017.

Chan, Christopher CK, Alexander Ferworn, and Lee Chin "Towards Determining Relative Densities for Common Unknown Explosives in Improvised Explosive Devices" *International Humanitarian Technology Conference (IHTC)*, 2017 IEEE Canada International. IEEE, 2017.

C. Chan and A. Ferworn, "Serious Gaming for Improvised Explosive Device Neutralization Training", *The 3rd International Conference on Industrial Engineering and Applications (ICIEA 2016)*, 5-7 June, Hong Kong, MATEC Web of Conferences. Vol. 68. EDP Sciences, 2016

*signifies corresponding author, which is equivalent weighing to first author in Taiwan, Asia.

Best Paper Awards and Invited Talks

2021	**Best Paper Award for The 3rd IEEE Eurasia Conference on Biomedical Engineering, Healthcare and Sustainability 2021 (IEEE ECBIOS 2021)**
2020	**Best Paper Award for The 4th Eurasian Conference on Educational Innovation 2021 (IEEE ECEI 2020)**
2019	**Best Paper Award for The 3rd IEEE International Conference on Knowledge Innovation and Invention 2020 (IEEE ICKII 2019)**
2018	**Speaker at the Artificial Intelligence and Cloud Computing Conference, Tokyo, Japan, Awarded Best Presenter**

2018 **Invited Speaker at ASTM E54.09 Standard Committee Meeting in connection with National Institute of Standards and Technology (NIST); Gaithersburg, MD**

2017 **BDIA Invited Speaker at The Fields Institute for Research in Mathematical Sciences**

Lecture: Towards Determining Relative Densities for Common Unknown Explosives in Improvised Explosive Devices

Teaching Experience (University Level and Professorship Level)

2019-2023 **Assistant Professor for Dept. of Information Management** – Chaoyang University of Technology, Taichung, Taiwan

2018-2019 **Sessional Instructor for Computer Architecture –** University of Ontario Institute of Technology, Toronto, Ontario, Canada

2017-2018 **Instructor for Data Organization for Data Analysis Hybrid –** Toronto Metropolitan University, Chang School, Toronto, Ontario, Canada

2017 **Guest lecturer –** Toronto Metropolitan University, Toronto, Ontario, Canada

Course: Human Computer Interaction

2013-2018 **Graduate Teaching Assistant,** Toronto Metropolitan University, Toronto Ontario, Canada

Courses: Extreme Programming Agile Processes, Information Retrieval, Graphics, Bioinformatics, Adv. Computer Organization, Web Systems Development, Data Analytics Advanced Methods, Big Data Analytics Tools, Software Verification/Validation, and Software Tools for Startups

Academic Service (Journals and Conferences)

Technical Committee (Selected and Current Appointment)

2020 - Present	International Journal of Informatics and Communication Technology
2020 - Present	International Conference on Innovation and Intelligence for Informatics
2020 - Present	International Conference on e-Learning
2020 – Present	International Sustainability and Resilience Conference

Reviewer (Selected and Current Appointment)

2020 - Present	Inter Journal of Computing and Digital Systems (IJCDS)
2020 - Present	IAES International Journal of Artificial Intelligence (IJ-AI)
2020 - Present	Discrete Dynamics in Nature and Society
2020 - Present	Risks
2020 - Present	East European Journal of Psycholinguistics
2020 - Present	Computer Science and Information Technologies
2020 - Present	Defence Technology
2020 - Present	Journal of Education and Learning
2020 - Present	Emerald Publishing Limited's Journal of Knowledge Management
2020 - Present	Sustainability MDPI

2019 - Present	MDPI's Mathematics Journal
2019 - Present	Technology Advancements in Artificial Intelligence (ITCE 2020)
2019 - Present	IEEE Access
2019 - Present	Journal of Applied Sciences
2019 - Present	Elsevier's Electronic Commerce Research and Applications (ECRA)
2018 - Present	IEEE Transaction on Engineering Management (TEM)
2018 - Present	International Congress: Future Vision (ICFV)
2018 - Present	Special Issue: Emerging Technologies and Strategies in Education in the Big Data Era
2017- Present	Springer's Service Oriented Computing and Applications (SOCA)
2017- Present	Information Systems Frontiers (ISFI)
2017- Present	Journal of Network and Computer Applications (JNCA)
2017 - Present	Journal of Systems Architecture (JSA)

Academic Outreach

Chaoyang University of Technology Conference Core Committee (SSIM) and Technology Coordinator, *2019-2023*

As a core committee member and Technology Coordinator for the inaugural international IEEE conference hosted by CYUT, I led critical efforts in multiple domains, including budgeting, website development, and adherence to IEEE conference standards. My responsibilities extended to overseeing finance, marketing, and expanding the conference's reach to esteemed international academics, ensuring a robust platform for scholarly exchange.

Chaoyang University of Technology International Society (CYIS), *2019-2023*

In my role as the lead events planner for CYUT's International Society, I orchestrate social events that foster a vibrant community among international staff and faculty. My initiatives aim to celebrate and promote diverse cultures within the university, enhancing the overall experience and cohesion of the international community.

Amazon Coding Competition, *2017-2018*

Amazon annually hosts an online competition known as the "Amazon Prime Code Champ," similar to Google Code Jam, where participants can compete and earn placements on leaderboards like HackerRank by submitting solutions that surpass previous records. Recognizing the interest in competitive programming challenges, I organized and facilitated participation among like-minded individuals, setting up computer rooms and coordinating team efforts.

For instance, collaborating with a Computer Science Master's student, we tackled coding problems of varying difficulties (levels 1-3) and successfully submitted a correct solution within the given 3-hour timeframe. This initiative not only fostered a collaborative environment but also honed our problem-solving skills in high-pressure situations.

STEM Program Director Fairview Library Youth Hub, *2016-2017*

At the Toronto Public Library's Fairview Youth Hub, I served as the STEM Program Director, leading a series of workshops focused on technology and innovation for youth aged 13-19. My responsibilities included designing and delivering comprehensive STEM enrichment programs that fostered technological skills and creativity among participants. One notable program I ran was a ten-week robotics workshop centered on coding with a block programming IDE and using the educational robotic system 'Sphero.' This system, equipped with sensors, timers, actuators, and gyroscopes, allowed participants to navigate and interact with complex environments. Each week, the workshop content progressively increased in difficulty, building upon the skills learned in previous sessions. By the conclusion of the ten-week program, participants were adept at creating various robotic inventions, video games, and basic computer programming projects, equipping them with valuable skills and sparking their interest in STEM fields.

Maker Extravaganza Festival, *2015-2018*

Toronto Metropolitan University's N-CART lab actively participated in the annual Maker Extravaganza Festival at the Toronto Reference Library. This event gathers hundreds of makers, craftspeople, technologists, and hobbyists to showcase their innovative creations. Alongside N-CART business relations lab advisor Rodney Yip, I managed a promotional and educational booth for the festival participants. My responsibilities included facilitating transportation and logistics, ensuring that all equipment and robots were functional, and engaging with attendees about our lab's cutting-edge research. We featured explosive ordnance disposal (EOD) robots and unmanned aerial vehicles (UAVs), providing demonstrations and discussions to highlight the practical applications and advancements in robotics and UAV technology developed by our lab.

Google Code Jam, *2014-2016*

Google Code Jam is a global online competition that challenges participants to solve complex programming problems requiring innovative thinking and detailed analysis, often reflective of real-world scenarios. After participating in the event with a few friends for two years, I took the

initiative to engage Ryerson University's Computer Science students by organizing and facilitating a series of coding competitions on campus. During these competitions, I oversaw the participation of students and a few administrators as they tackled timed questions, successfully advancing to stage 2 of the competition. This achievement placed our team in the approximate 80th percentile of the 30,000 participants worldwide, showcasing our high skill level. A notable highlight of my involvement was witnessing a graduate student receive a recruitment email from Google offering a full-time developer position, a success story that quickly spread across campus. This initiative not only piqued the interest of students from various disciplines, including architecture, engineering, and interior design, but also encouraged many master's and postgraduate students to participate in future Google Code Jams. My efforts have fostered a collaborative and competitive coding environment, preparing students for this prestigious annual event.

Science Rendezvous, ***2013-2015***

During the annual Science Rendezvous event, Toronto Metropolitan University's N-CART lab showcased the innovative work of undergraduate and graduate students from the Computer Science department. This event aimed to engage high school students and increase awareness of the programs offered by Toronto Metropolitan University. My role involved facilitating the operation, logistics, transportation, and planning of our booth and equipment. Additionally, I was responsible for demonstrating robotics and computing technologies developed by our students. I also served as a judge for robotic competitions when needed. Through these efforts, we successfully highlighted the cutting-edge research and educational opportunities at our university, inspiring the next generation of students.

IBM Student Ambassador, ***2012-2013***

As an IBM Student Ambassador, I was part of an outreach team dedicated to helping students and IBM interns bridge the gap between academic life and work-life balance. My role involved promoting IBM certifications, organizing academic seminars and presentations, and facilitating discussions to raise awareness of IBM initiatives, such as the IBM EPIC program for undergraduate students. This outreach aimed to foster a deeper understanding of IBM's resources and opportunities among the student community.

Ryerson Game Maker's Union (GMU) Executive, ***2010-2012***

As an executive member of the Game Makers' Union, I was responsible for connecting with industry professionals and alumni working at prominent companies like Google and IBM to share their experiences and insights with current students. I also taught students shader programming and Nvidia's CUDA parallel computing architecture to create special effects and video post-processing. This role allowed me to contribute to the development of practical skills and industry knowledge within the gaming community at Ryerson.

Across U-Hub, *2006-2010*

As a volunteer higher education promotional leader at Across U-Hub, a Toronto-based organization for Asian and newly immigrated young individuals, I focused on providing STEM-related information and resources to youth, particularly young females aged 13-21. My responsibilities included organizing job shadowing opportunities, workshops, and seminars led by STEM professionals. This outreach aimed to inspire and support young individuals in pursuing careers in STEM fields, fostering a diverse and inclusive environment for future generations.

Professional Certifications

IBM Professional Certification Program (Prometric ID: PR1356605, chrisc@ca.ibm.com):

- IBM Certified Application Developer - Programming with IBM Enterprise PL/I
- IBM Certified Database Associate - DB2 9 Fundamentals
- IBM Certified Database Administrator - DB2 9 for Linux, Unix, and Windows
- IBM Certified Database Associate - DB2 Universal Database v8.1 Family
- IBM Certified Application Developer - DB2 9
- IBM Certified Advanced Database Administrator - DB2 Universal Database v8.1 for Linux, Unix, and Windows
- IBM Certified Database Administrator - DB2 Universal Database v8.1 for Linux, Unix, and Windows
- IBM Certified Solution Designer - DB2 Business Intelligence v8
- IBM Certified Database Administrator - DB2 9 for z/OS
- IBM Certified Database Administrator - DB2 Universal Database v8.1 for z/OS
- IBM Certified Application Developer - DB2 Universal Database v8.1 Family
- IBM Certified Deployment Professional - Tivoli Usage and Accounting Manager v7.1
- IBM Certified Specialist - Tivoli Storage Manager FastBack v5.5
- IBM Certified Deployment Professional - Tivoli Storage Productivity Center v4.1
- IBM Certified Information Security - 2010

Memberships and Professional Affiliations

- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Member of the IEEE Technology and Engineering Management Society (IEEE TEMS)
- Member of the Association for Computing Machinery (ACM)
- Member of the EOD Robotics Testing Committee for the U.S. National Institute of Standards and Technology (NIST), reporting to the Department of Homeland Security (DHS) and ASTM International

References

Available upon request.