

ANNUAL RESEARCH EXPO

FACULTY OF COMPUTER SCIENCE

2026

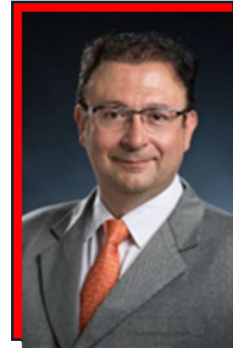
UNNB



UNB
UNIVERSITY OF NEW BRUNSWICK

**Computer
Science**

WELCOME FROM THE DEAN



The 2026 Faculty of Computer Science Annual Research Expo carries on a long-standing tradition of showcasing leading-edge research and new and evolving developments related to the area of information and communication technology. This year's unique combination of research and industry speakers ensures an engaging set of speakers on topics spanning most of Computer Science research and applications, and 27 posters in the poster sessions. You will see that the research contributions of our faculty researchers and students are very broad while remaining inherently discipline-related, which is one of the unique features that distinguishes our Research Expo from other events that focus on more specific areas of computing.

I hope you enjoy the Expo's program and find the experience of meeting and sharing thoughts and ideas with our students, researchers, and each other, an interesting and inspiring way to learn more about the Faculty of Computer Science and its related community.

I wish to thank the many faculty and staff who contributed to the success of this event. I am also profoundly grateful to the students and professors whose work is on display, and to all participants for devoting time to being here with us. It is your participation that makes it all worthwhile.

Thanks, and all the best,

Luigi Benedicenti

Dean and Professor | Faculty of Computer Science

WELCOME FROM THE ASSOCIATE DEAN, RESEARCH & GRADUATE STUDIES



Welcome to the Faculty of Computer Science 2026 Research Expo! The Expo is our annual showcase of research in computing, bringing together academic research with current innovations from industry. It's our opportunity to see what people are doing, to see what's been accomplished, and to engage with a wide range of innovative ideas in computer science.

This year, we'll hear from our newest faculty members about their research, from one of our most active newer researchers, and from several companies about their innovations. During breaks, students will be presenting their work on posters in the foyer. Graduate students will also be presenting briefly in our second annual Three-Minute Thesis competition and pitching their entrepreneurial ideas.

This year our program is honoured to include the UNB Computer Science Annual Lecture, a distinguished speaker series founded by royalties from NVision and IVS through the generosity of one of our former colleagues, Dr. Colin Ware. This year our speaker is Dr. Bettina Kemme from McGill University, who will be speaking to us about Data Management for Data Science.

Much thanks to our participants: our speakers from faculty and industry; students speaking and presenting posters; our staff for their support and organization; and all attendees for making our Expo a celebration of ideas and achievements in technology. A special thanks to Suprio Ray, Kalikinkar Mandal, Connor Wilson, Sonya Hull, Kelley Nelson, Shelley Zimmerman, Candace Currie and John Peterson for their work in support of this Research Expo.

Patricia Evans, Associate Dean (Research and Graduate Studies) and Professor | Faculty of Computer Science

AGENDA

8:30 – 9:00am	Registration
9:00 – 9:10am	Welcome and Opening Remarks: MC: Patricia Evans , Associate Dean, Faculty of Computer Science Dave MaGee , Vice President Research, UNB Luigi Benedicenti , Dean, Faculty of Computer Science
9:10 – 9:35am	Andrew Fisher , Assistant Professor, Faculty of Computer Science <i>Practical and Lightweight AI for Real-World Decision Support</i>
9:35 – 10:00am	Ted McDonald , Managing Director, DataNB (https://www.unb.ca/datanb/) <i>Doing more with data: innovation to support better policy and economic development</i>
10:00 – 10:25am	Mahtab Sarvmali , Assistant Professor, Faculty of Computer Science <i>Responsible AI: From Understanding to Control</i>
10:25 – 10:55am	BREAK / POSTER SESSION I
10:55 – 11:20am	Steve Moore , Global Digital Manufacturing Transformation Leader, McCain Foods (https://www.mccain.com/) <i>Metacontrol and the Continued Rise of Computing in Manufacturing</i>
11:20am -12:00pm	3-Minute Thesis Competition
12:00 – 1:00pm	LUNCH / POSTER SESSION II

1:00 – 2:00pm	Bettina Kemme , McGill University Computer Science Annual Lecture <i>Data Management for Data Science</i>
2:00 – 2:25pm	Sophia Sampath , Senior Director of Product, Reveal Security (https://www.reveal.security/) <i>Protect Identities Beyond Access Controls with Behavioral AI</i>
2:25 – 2:45pm	BREAK
2:45 – 3:10pm	Hung Cao , Assistant Professor, Faculty of Computer Science <i>From Explainability to Contestability: Fostering Contestable Futures in Human-Centered Multi-Agent Healthcare AI</i>
3:10 – 3:55pm	Barrett Chair Pitch Session Hosted by Connor Wilson
3:55 – 4:00pm	Student Prizes and Wrap Up

OUR RESEARCH CHAIRS, INSTITUTES, AND CENTRES

The Faculty of Computer Science is proud of our distinguished Research Chairs, Institutes, and Centres, all focused on leading-edge computer science, technology, innovation, and entrepreneurship.

RESEARCH CHAIRS

Dr. Ali Ghorbani - Tier 1 Canada Research Chair in Cybersecurity

Dr. Ken Kent – Barrett Chair in Entrepreneurship for Digital Transformation

Dr. Sajjad Dadkhah – Mastercard Cybersecurity Research Chair in IoT security

Dr. Kalikinkar Mandal - NB Power Cybersecurity Research Chair - Smart Grid Security and Privacy

INSTITUTES AND CENTRES

Canadian Institute for Cybersecurity (CIC)



Founded in 2017, the CIC is Canada's premier cybersecurity innovation and talent development hub. As a multidisciplinary institute dedicated to training, research and development, and entrepreneurship, CIC is the first institute of its kind to bring together researchers and practitioners from public and private sectors, as well as academia, to promote the creation of innovative cybersecurity technologies. CIC is a founding member of the National Cybersecurity Consortium (NCC), which was established in 2020, and co-founder of the UNB-NRC Consortium in Cybersecurity in 2019.

Located at the University of New Brunswick within the CIC is the Cybersecurity Attribution Data Centre (CADC), a pioneering national hub dedicated to advancing cyber attribution capabilities.

Research Institute in Data Science and Artificial Intelligence (RIDSAI)



RIDSAI, established in 2023, is a focal point for fundamental and applied research in all areas of data science and AI, from developing new algorithms to leveraging their strengths for social good to ensuring their ethical and respectful use. By bringing together researchers across many domains, RIDSAI enables multidisciplinary, comprehensive, outcome-focused insights and solutions for community and industry partners in the Atlantic region and beyond.

SPECTRAL Spatial Computing Research Centre



SPECTRAL is the leading touch point for spatial computing technology in Atlantic Canada, providing access to cutting-edge applied research and pioneering technological leadership and fostering meaningful partnerships with industry, academia, and government. SPECTRAL seeks to leverage innovation in Extended Reality technologies (Virtual, Mixed, Augmented, Visual Digital Twins, and other 3D and spatial technologies) and empower effective implementation and maximization of these technologies, which has already transformed how people can and will work with technology.

Centre for Advanced Studies - Atlantic (CAS-A)



Co-Founded in partnership with IBM, CAS-Atlantic is a research-based centre dedicated to promoting and cultivating collaborative research between UNB and industry. The Centre conducts research aimed at advancing the performance of software systems and applying research findings to commercial products. Computer science researchers and students explore innovations in the context of real-world applications through our industry partnerships.

FACULTY OF COMPUTER SCIENCE SPEAKERS

Thank you to our presenting faculty member researchers.



Andrew Fisher joined UNB Computer Science as an Assistant Professor of AI in January. He earned a PhD in Applied Science from Saint Mary's University in 2024, and he completed a postdoc at York University in 2025. Andrew develops lightweight, responsible AI, with an emphasis on rigorous evaluation and real-world deployment. Current projects include AI in construction/built-environment automation, and small language models for accessible health communication.



Mahtab Sarvmali is an Assistant Professor in the Faculty of Computer Science at UNB and the Director of the Responsible AI (RAI) Lab. Her research focuses on Responsible AI, with a focus on explainability, controllable large language models, generative AI, and multi-agent intelligent systems. Mahtab is dedicated to building AI systems that are transparent, reliable, safe, and privacy-preserving, with impact across both generative AI, and classical Machine Learning. She received her Ph.D. in Computer Science from Dalhousie University in 2024, specializing in Explainable AI and privacy-preserving methods, and later completed a postdoctoral fellowship in collaboration with LastMile AI, advancing research on the evaluation and reliability of retrieval-augmented generation and agentic systems.



Hung Cao is affiliated with the University of New Brunswick as an Assistant Professor of Computer Science. He is the founding member and director of the Analytics Everywhere Lab - a multidisciplinary research group focused on critical thinking, excellence, and innovation to foster future digital transformation and solve societal challenges. His lab

has been involved in different research projects in the field of IoT, Data Science, and AI (e.g., ACOA, MITACS, NSERC Engage, NSERC/Cisco IRC projects), collaborating with different start-ups, SMEs, and large companies, including Cisco, NB Power, Eigen Innovation, Rimot, SeafarerAI, Codiatic Transpo, HotSpot, etc., to develop working prototypes that could be used as a template for the company's products. Dr. Cao has been a member of 21 Technical Communities (e.g., IEEE Smart City, Internet of Everything, Big Data, Cloud Computing, Intelligent Informatics, Wearable and Ubiquitous Computing, etc.). He has served as a TPC member, conference program/session chair, and scientific reviewer invited by many conferences and journals. He is currently an Associate Editor of the Discover Artificial Intelligence Journal and IET Smart Cities Journal, a Topic Editor appointed by Electronics Journal, Editor Board Member of many other Journals. His research portfolio bridges the areas of Internet of Things (IoT), Explainable AI, Contestable AI, Edge/Fog/Cloud Computing, Machine learning, Data Science, Context-enriched Analytics, Streaming Analytics, Decision Intelligence, TinyML/Federated Learning, Cyber-Physical Systems (CPS), and Real-time Systems.

COMPUTER SCIENCE ANNUAL LECTURE

DATA MANAGEMENT FOR DATA SCIENCE

Dr. Bettina Kemme, McGill University

Abstract: As data science emerges as a rapidly evolving field and application, the systems community is asked to develop new data and compute platforms that support its many requirements. In this talk, we present the challenges of supporting the data science explorative phase where data scientists pre-process their data, run analytics functions, and experiment with a wide variety of machine learning algorithms to see which algorithm best fits their data and problem. We will present our efforts in developing solutions that allow for near-data analysis. This includes pushing the execution of analytics programs into the database engine, scheduling learning tasks and relational query execution in a concurrent manner exploiting both GPU and CPU compute resources, and allowing for distributed computations.



Bettina Kemme is a Professor of the School of Computer Science at McGill University, where she leads the Distributed Information Systems lab. Her general research interests lie in large-scale data management and analytics. Her recent projects involved graph-based database management, sustainable data systems for data science, and data analytics scheduling. Bettina holds a PhD degree in Computer Science from ETH Zurich. She has published well over 100 publications in major journals and conferences. She served on the editorial board of the VLDB Journal and Information Systems and has been on the program committee or area chair of major database and distributed systems conferences such as SIGMOD, VLDB, ICDE, EDBT, ICDCS, Middleware, SRDS and many more. She was the PC Co-Chair of Middleware 2017, DEBS 2023 and EDBT 2025, and is a senior IEEE member. She co-created the Workshop series on Data Systems meet Data Science (DSDS).

INDUSTRY SPEAKERS

Thank you to our valued industry partners for coming to share their time, knowledge, and experiences with us.

Ted McDonald - Founding Director, DataNB & Professor in the UNB Department of Political Science



Ted McDonald is a Professor in the Department of Political Science at the University of New Brunswick in Fredericton. He is founding Director of DataNB, New Brunswick's only provincial administrative data centre. He is also a member of the Board of the Canadian Research Data Centre Network, a member of the ICES Scientific Advisory Committee, and a member of the Executive Committee of Health Data Research Network Canada.

Steve Moore - Director of Digital Manufacturing Portfolio, McCain Foods



Steve Moore is the Director of Digital Manufacturing Portfolio at McCain Foods, a Canadian multinational food company. Prior to joining McCain, Steve led Global Digital Manufacturing Strategy & Execution for Kimberly-Clark, a multinational consumer products company. Before moving into digital manufacturing, he held a broad range of roles at Kimberly-Clark across engineering, safety, finance, supply chain, and manufacturing, in plant and staff roles, and touching every business unit. Steve holds a bachelor's degree in mechanical engineering from the Georgia Institute of Technology and a master's in business administration from the University of Wisconsin and has over 25 years of experience in the industry.

Sophia Sampath - Senior Director of Product, Reveal Security



Sophia Sampath is Senior Director of Product at Reveal Security. She has worked in the cybersecurity sector for the past 12 years. At Reveal Security, Sophia leads the development of innovative cybersecurity solutions and drives the product vision for identity-based threat detection across applications and cloud services, with a key focus on defining the product strategy and

roadmap for identity security solutions. She translates complex security challenges into user-friendly tools, ensures seamless integration with customer security workflows and improves operational efficiency. Prior to Reveal, Sophia held product leadership roles at Huntress, Arctic Wolf, Sonrai Security and IBM QRadar and is a UNB Computer Science Alumna!

RESEARCH POSTERS

A big thank you to our twenty-seven poster participants!

Alfarizy, Ishimwe Pacis Hanyurwimfura, Aditya Bahosale - *Energy Cost of Resilience in Kubernetes Microservices: Autoscaling and Fault Recovery Analysis*

Alfarizy, Truong Thanh Hung Nguyen, H el ene Fournier, Ren e Richard, Hung Cao - *Instrumented Smart Walker for Continuous Health Monitoring in Aging in Place*

Alireza Azadi, Kenneth Kent - *A Graph-Based ECO Flow for High-Level Hardware Design*

Alireza Rahimi, Tony Furey, Scott Bateman, Ian Church, Hung Cao - *Edge-Cloud Data Collection Architecture for a Water-Focused Port Digital Twin*

Amir Arjomand, Kenneth Kent, Georgiy Krylov - *AI-driven Energy-Efficient Blood Pressure Estimation from Raw PPG Signals*

Arash Vashagh, Roozbeh Razavi-Far - *Edge Generation Graph Autoencoder (EGG-GAE) and Data Imputation*

Cameron Horwood, Aaron Tabor - *Interactive Real-time Visualizations for Gait*

Dewni Deraniyagala, Francis Palma - *Automated Detection of Duplicate, Ambiguous, and Incomplete Agile Issues Using Language Models*

Ethan Heavey, Paul Cook - *Smaller, Smarter, Greener: Reducing LLM Inference Emissions with RAG*

Griffin Higgins, Hossein Shokouhinejad, Roozbeh Razavi-Far, Ali Ghorbani - *Backtracking Meta-Coarsened GNN Malware Detection*

Explanations Onto Assembly Flow Graphs for Transparent Granular Explainability

Hamed Jeloder, Mohammad Meymani, Parisa Hamedi, Tochukwu Emmanuel Nwankwo, Samita Bai, Roozbeh Razavi-Far, Ali Ghorbani - A Principled and Structured Evaluation Framework for Small Language Transformer Models in Natural Language Description Generation

Hamed Jeloder, Mohammad Meymani, Samita Bai, Tochukwu Emmanuel Nwankwo, Parisa Hamedi, Roozbeh Razavi-Far, Ali Ghorbani - A New LLM Dataset for Multi-Representational Software Intelligence

Hanieh Ghabeliiala, David Bremner, Rasoul Shahsavarifar - Community-Aware Graph Autoencoders for Suspicious Transaction Detection

Krishno Dey, Saqib Hakak - Behavioral Fingerprinting for User Identification in Metaverse Games

Michael Adekunle Adelere, Yasser Morgan, Luigi Benedicenti - RiskOnto 2.0: Ontology-Driven Threat Modeling and Explainable Risk Reasoning for Cyber Defense

Michael Mills, Ali Ghorbani - Beyond Rules: Behavioral Anomaly Detection for Post-Quantum Cryptography Operational Assurance in TLS

Mohammad Meymani, Roozbeh Razavi-Far - Divided We Fall

Muhammad Umair Akram Butt, Mahtab Sarvmaili - Local Knowledge Graphs and Conformal Path Tracing for Evaluating Response Faithfulness of Retrieval-Augmented Generation

Nethmi Hettiarachchi, Kalikinkar Mandal, Saqib Hakak - PQAap: Post-Quantum Anonymous Authentication Protocol for; ISO 15118 Plug-and-Charge

Prerona Tarannum, Saqib Hakak - Can LLM Differentiate Between Human- and LLM-generated Impactful Fake News?

S M Mozammel Hossain, Phil Munz, Kenneth Kent - A Visual Aid for Interpreting Software Terms and Conditions

Salman Shaik, Truong Thanh Hung Nguyen, Hung Cao - Addressing Data Scarcity in Glioma Imaging via Anatomically Conditioned Latent Diffusion for Few-Shot Cross-Domain 3D MRI Synthesis

Samuel Ansong, Ali Ghorbani - BLINDSPOT: Spatially-Localized Corruption Attacks Reveal Hidden Vulnerabilities in Segmentation-Based Perception Systems

Shabnam Saderi, Nethmi Hettiarachchi, Abhijat Sharma, Aymen Basli, Kalikinkar Mandal - Cyber-Physical Security Analysis of Photovoltaic Systems in DER Microgrids

Sk Mahtab Uddin, Saqib Hakak - Early Ransomware Detection using Static Multi-View Analysis

Sudip Chatterjee, Xiaozheng Zhang, Suprio Ray, Calisto Zuzarte, Ian Finlay, Mark Stoodley - CAMEL HT: Striking a Balance Between CPU and Memory Efficiency in Main-Memory Hash Join

Wei Liu, Ehsan Hallaji, Roozbeh Razavi-Far - A Graph Neural Network Framework for Fraud Detection with Imbalanced Data

THREE-MINUTE THESIS PRESENTATIONS

NOTES:

A big thank you to our thesis presenters!

Arshpreet Singh - *Data Driven Analysis and Optimization Strategies for Power Consumption in Electronic Gaming Machines*

Geetesh More - *Accelerating Database Query Processing on FPGAs*

Krishno Dey - *User impersonation in metaverse*

Michael Adelere - *RiskOnto: An Ontology-Driven Framework for Threat Reasoning and Risk Assessment in Cyber Defense Evaluation*

Mozammal Hossain - *Towards a Visual FactSheet*

Nethmi Hettiarachchi - *Post-Quantum Anonymous Authentication Protocol for ISO 15118 Plug-and-Charge*

Quazi Mahfuza Tasnim Mohona - *Multimodal Continuous Authentication System*

Syedeh Maryam Abbasnia – *Geometric Quadratic Separators for Symmetric Integer Programs*

Shabnam Saderi Oskouei - *Computing in the Dark: Keeping Your Data Private in Smart Systems*

Sudip Chatterjee - *Designing Memory-Efficient Hash Joins for Modern Architectures*

**Thank you for being part of our
2026 Research Expo!**

