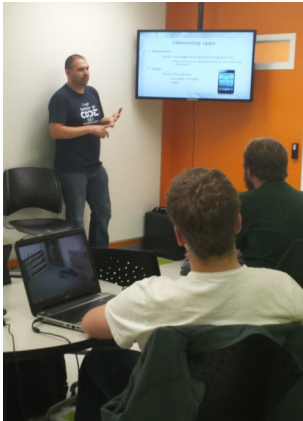
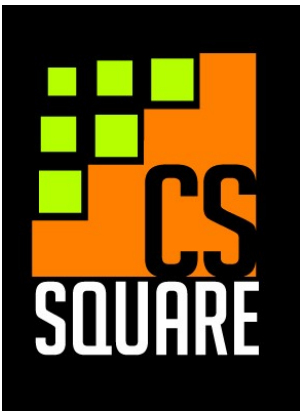


14TH ANNUAL FACULTY OF COMPUTER SCIENCE RESEARCH EXPOSITION

2017





Computing Science Creative Space: CS Square

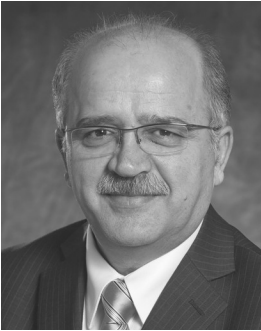
CS Square is a Creative Space for peer learning, knowledge sharing, and extra-curricular technical-creative IT related activities and entrepreneurship.

The facility also functions as an 'open space' entrepreneurship centre in the Faculty of Computer Science where students, faculty and local industry can meet to collaborate and exchange innovative ideas and vision.

As an INCUBATOR CS Square provides:

- Mentoring and networking opportunities
- Matchmaking with CS entrepreneurs and business leaders
- One-on-one support, advice and counselling for new entrepreneurs
- Workshops and seminars
- Customized business development workshops

Welcome



Welcome to the 2017 Faculty of Computer Science Annual Research Exposition. I hope that you enjoy the exposition's program and find the experience of meeting and sharing thoughts with our students and researchers as well as one another unique and worthwhile!

The 2017 Faculty of Computer Science's Annual Research Exposition showcases the excellent research, new developments, and experience related to the area of information and communication technology. This year we have 41 posters. The coverage of the contributions is very wide, which is one of the features that distinguishes our Research Exposition from other events that focus on more specific areas. The participants in the Exposition will have the opportunity to hear leading experts and IT leaders present keynote talks, participate in a panel discussion on the State of IT in New Brunswick, and view the posters at the poster session.

Many people contributed to the success of this Exposition. I would like to thank all the organizing committee members for their effort and dedication. I am also very pleased to thank all the students and professors for their posters which are the main attraction, the keynote speakers, members of the panel, and to all the participants. You are the ones who make all this effort worthwhile!

Ali A. Ghorbani
Professor and Dean

Program

8:30 - 8:50

Registration

8:50 - 9:00

Ali Ghorbani, Dean, Faculty of Computer Science, UNB

9:00 - 9:20

Erin Flood and Sara Taaffe, Co-Founders, Open Data Atlantic

9:20 - 9:40

Huajie Zhang, Faculty of Computer Science, UNB

"Learning Deep Belief Networks for Tweet Sentiment Analysis"

9:40 - 10:00

Rongxing Lu, Faculty of Computer Science, UNB

"Achieve Efficient and Privacy-Preserving Online Fingerprint Authentication over Encrypted Outsourced Data"

10:00 - 11:00

Break & Poster Session I

11:00 - 12:00

Ravin Balakrishnan, Computer Science Annual Lecture

"The Rebirth of Natural User Interfaces"

12:00 - 13:00

Lunch & Poster Session II

13:00 - 13:10

Suprio Ray, CS Square, Faculty of Computer Science, UNB

13:10 - 13:30

Peter Goggin, VP Operations and Co-Founder,

Resson Aerospace - "Resson's Data Drive Agriculture: Using Computer Vision, Analytics and Machine Learning on the Farm"

Program

13:30 - 14:15

Graduate Student Presentations:

Taees Eimouri

Rasoul Shahsavarifar

Amirhossein Gharib

14:15 - 14:30

Bahareh Atoufi, Business Development Specialist, MITACS

14:30 - 15:00

Break & Poster Session III

15:00 - 16:30

Panel Discussion

Topic: State of IT in New Brunswick

Moderator: Ed McGinley, CEO, TechImpact

Panellists:

Trevor Corey, Vice President, CGI

Kevin Hurley, Technology Partner, Consulting, Deloitte

Pierre Mullin, Executive Officer, Siemens Digital Grid
Software Solutions

Cathy Simpson, Vice President of Public Sector, T4G

Posters

1. Aaron Tabor, Alex Kienzle, Carly Smith, Alex Watson, Jason Wuertz, David Hanna, Scott Bateman, Erik Scheme. The Falling of Momo
2. Amirhossein Gharib, Arash Habibi Lashkari and Ali A. Ghorbani. A Framework for Detecting Mobile Ransomware
3. Andi Fitriah A. Kadir, Natalia Stakhanova, Ali A. Ghorbani. A Framework for Profiling and Detecting Android Financial Malware
4. Arash Habibi Lashkari, Amy Seo, Gerard Drapper Gil and Ali A. Ghorbani. An Artificial Intelligence-Based Online Ad Blocker
5. Arash Habibi Lashkari, Gerard Drapper Gil, Mohammad Mamun, Ali A. Ghorbani. Detection and Characterization of Tor Encrypted Traffic
6. Bing Yang, Kenneth B. Kent, Eric Aubanel. Multi-granularity Locking on Multi-tier Data Structures
7. Daniel King, Bradford G. Nickerson and Wei Song. Real-time Wireless Control via Ultra-Wideband (UWB) Communication
8. Eltaher El-Shanta, Dr. Weichang Du. Pattern Services for Service-Oriented Systems
9. Hassan Mahdikhani and Rongxing Lu. PMQ: Achieving Privacy-Preserving Multi-Dot-Product Query in Fog Computing-Enhanced IoT
10. Hugo Gonzalez, Ali Ghorbani and Natalia Stakhanova. StructSignature: Empirical Analysis of Android Binary File Layout
11. Hugo Gonzalez, Ratinder Kaur and Natalia Stakhanova. Secure Platform for Collaborative Research in CS
12. Hugo Gonzalez, Ye Ning, Yan Li, Ratinder Kaur and Natalia Stakhanova. Detecting Obfuscation on Android Apps
13. Iman Sharafaldin, Amirhossein Gharib, Arash Habibib Lashkari and Ali A. Ghorbani. BotViz: A Memory Forensic-Based Botnet Detection and Visualization Approach
14. Ismail Akbari, Yevgen Biletskiy, Weichang Du. RIFEnge: A Rule Engine for RIF Language

Posters

15. Jason Wuertz and Scott Bateman. A Virtual Memory Palace to Facilitate Memorizing Information
16. Jianguo Xie and Wei Song. Collaboration Message Distribution via Device-to-Device (D2D) Communications
17. Johannes Ilisei, Kenneth B. Kent, Gerhard W. Dueck. Killing Zombies - Generating Realistic Trace Files
18. Konstantin Nasartschuk, Kenneth B. Kent, Aleksandar Micic, Charlie Gracie. String Deduplication During Garbage Collection in Virtual Machines
19. Kris Bowman and Scott Bateman. A Comparison of Pointing Assistance Techniques in Different Environments
20. Li Ji and Weichang Du. Distributed Ontology Reasoning
21. Maria Patrou, Kenneth B. Kent, Gerhard Dueck, Charlie Gracie. NUMA Awareness Improving Memory and Thread Management in the JVM
22. Menelaos Kotsollaris, William Liu, Emmanuel Stefanakis, Yun Zhang. Implementing a Scalable Web Image Management System
23. Nafiseh Izadi Yekta and Rongxing Lu. Achieving Privacy-Preserving Query with Communication Efficiency in Internet of Things
24. Panagiotis Patros, K.B. Kent, M Dawson, Jiapeng Zhu. Performant PaaS Cloud
25. Panagiotis Patros, Maria Patrou, Maxim Uzun, Jiapeng Zhu, Kenneth B. Kent, Michael Dawson. Optimizing and Integrating Node.js for the Cloud
26. Priyal Nagra and Paul Cook. An Automatic Approach to Discover Lexical Semantic Differences in Varieties of English
27. Rasoul Shahsavari, David Bremner. Research On Data Depth

Posters

28. Rongxing Lu, Kevin Heung, Arash H. Lashkari and Ali A. Ghorbani. A Lightweight Privacy-Preserving Data Aggregation Scheme for Fog Computing-Enhanced IoT
29. Saeed Shafiee, Jesus Alfonso Pereyra Duarte, Scott Wallace, Suprio Ray. Parallel Spatio-textual Similarity Join with Spark
30. Samuel Kelley, Kenneth B. Kent, Gerhard Dueck. Reordering Objects During Garbage Collection
31. Sana Oladi and Panagiotis (Panos) Patros. Arvin II: A Pressure Analysis Tool
32. Sasha Williams, Kenneth B. Kent, Gerhard Dueck. Balanced Collection Set in Garcosim
33. Scott Young, Gerhard Dueck, Kenneth B. Kent, Charlie Gracie. Identifying and Grouping Cold Objects
34. Shijie Xu, David Bremner, Daniel Heidinga. GraphJIT: a dynamic graph bytecode JIT compiler
35. Taees Eimouri, Kenneth Kent, Aleksander Micic. Object Layout Optimization in JVM
36. Vaibhavi Kalgutkar, Natalia Stakhanova, Paul Cook. Android authorship attribution through analysis of String n-grams
37. Waseem Gharbieh, Virendra Bhavsar, and Paul Cook. Multiword Expression Identification Using Deep Learning
38. Xichen Zhang, Arashh Habibi Lashkari, Ali A. Ghorbani. Online Advertisement Detection by Lightweight URL Analysis
39. Ye Ning, Hugo Gonzalez, Ratinder Kaur and Natalia Stakhanova. Fingerprinting Android Development Tools Using Visualization
40. Yiming Zhao and Wei Song. Device-to-Device (D2D) Data Dissemination with Power Budget Constraints
41. Zhendong Sha and Patricia Evans. Using tree decomposition for general pedigree inference

Annual Lecture

Ravin Balakrishnan

*Professor & Chair, Department of Computer Science
University of Toronto*



Ravin Balakrishnan is a Professor at the Department of Computer Science, University of Toronto where he co-directs the Dynamic Graphics Project (DGP) laboratory, and is currently serving as the department's chair. His research interests are in Human Computer Interaction (HCI), Information and Communications Technology for Development, and Interactive Computer Graphics. He earned his Ph.D. in Computer Science from the University of Toron-

to, working with Bill Buxton, while concurrently a part-time researcher at Alias|wavefront (now part of Autodesk). He was elected to the ACM CHI Academy in 2011, is the recipient of an Alfred P. Sloan Research Fellowship (2007), an Ontario Premier's Research Excellence Award (2003), the Bell University Laboratories Associate Chair in HCI at the University of Toronto (2002-2006), a Canada Research Chair (2006-2016) and multiple best paper type awards at the top conferences in his field (ACM CHI, CSCW, UIST). In addition to working with students and colleagues at Toronto, he collaborates with researchers at leading industrial laboratories and universities worldwide, including stints as a visiting researcher at Mitsubishi Electric Research Laboratories (MERL) (2005-2007), a visiting professor at the University of Paris & INRIA (2006), and a visiting researcher at Microsoft Research's Redmond, Beijing, Bangalore and Cambridge labs while on sabbatical from the University of Toronto during the 2007-2008 academic year. He was a co-founder of Bump Technologies Inc., which was acquired by Google in 2010, and is involved in two other start-ups that are commercializing research conducted in his lab: Arcestra & Conceptualiz. He has also consulted for various leading companies as an expert witness in patent infringement matters in multiple countries. Further information, including publications and videos demonstrating some of his research, can be obtained from www.dgp.toronto.edu/~ravin

Speakers

Erin Flood

Co-Founder, Open Data Atlantic



Dog owner, aspiring hobby farmer and entrepreneur. Erin has spent the past four years running a tech start-up where her passion weigh most heavily in the exploration of how various data sets could be connected to build stories that would enhance the overall citizen experience. Erin's passion for innovation and technology can be reflected through her positions as Chairman of the Fredericton Start-Up Task-force and Board Member of the Canadian

Open Data Exchange. She received her Bachelor of Arts with a major in Psychology from St. Francis Xavier University and was inducted into the C100 Top Technology Women in Canada in 2015. When not problem solving with new technologies, you can find Erin exploring the corners of New Brunswick on her road bike or sail boat.

Sara Taaffe

Co-Founder, Open Data Atlantic



Data-geek, aspiring-triathlete, and lover of all combinations of chocolate and peanut butter. Sara Taaffe is currently working as a Public Sector Analyst at T4G in Fredericton, NB where she works to deliver solutions using data, technology and design for the public sector. She received her BPhil in Interdisciplinary Leadership from the University of New Brunswick's Renaissance College where she developed a passion for social innovation. In her spare time, Sara enjoys spending time in the

great outdoors, cooking vegetarian meals, and analyzing various data sets.

Speakers

Peter Goggin

*VP Operations and Co-Founder
Resson*



Resson brings big data analytics to the farm. Resson's platform helps large and small agriculture companies and agricultural service providers boost productivity and profits with near real-time predictive analysis for crop management. Using recent advances in large-scale cloud-based data processing, computer vision, machine learning, and advanced data analytics, Resson's data-driven agriculture solution analyzes crop metrics to assess crop status and health, providing operators with the information required to optimize agricultural operations, improve efficiency, boost yields and maximize profitability.

"There is a lot of energy in Agriculture Tech industry" says Goggin, "we have a vision for bringing a great new technology to the market, and we are showing it is possible to build and retain a top class workforce here in New Brunswick." Goggin partnered with fellow UNB graduate and engineer Rishin Behl to launch the company. Peter holds a Master of Business Administration (MBA), Concentration in Entrepreneurship from University of New Brunswick.

In June 2016, Resson announced it had raised USD \$11 Mil. Round of financing, building upon a previous round of CAD \$3 Mil. in 2014. The company has experienced massive growth, greatly expanding its workforce, and in August 2016 opened a new business office in Silicon Valley to help tap into the global market and access to world-leading data analytics resources.

Find out more at www.resson.com

Panel Moderator

Ed McGinley

CEO, TechImpact



As the CEO of TechImpact, Ed McGinley is a passionate voice for the transformative potential of technology in our region. For Ed, technology adoption is not just a goal - it's a launch pad.

With nearly 20 years' experience working with Atlantic Canadian ICT companies, Ed understands the business landscape in our region. He appreciates the ability of technology to help our businesses compete and work with companies and governments around the world. Our size and obvious capacity for innovative thinking permits us to develop smart solutions for global problems. We are also unafraid to welcome new ideas that can make life better here at home.

Ed understands the power of technology and networking to permit Atlantic Canadians to create unique valuable solutions by "connecting the dots"

By encouraging cooperation between government, business, industry and the public, Ed is working to help our region develop the strategies needed for our economy to become a model of innovation and smart government.

In a small region like ours, no one sector stands alone. Ed knows that technology can act as a catalyst for cooperation between different sectors, scientific and even civic invention, and for social advancement.

Panellists

Trevor Corey

Vice President CGI for New Brunswick



Mr. Corey is the CGI Vice President for New Brunswick. Mr. Corey is a senior IT executive with a 27 year career in the IT services industry. Trevor has lead complex IT delivery, managed large teams of IT professionals, architected and defined solutions and strategy; and been successful in managing and meeting operational IT KPI's.

In his role as Vice President, he is responsible for IT delivery to clients, P&L management, personnel management, sales and business development activities for the CGI portfolio of business in the province of New Brunswick. Trevor joined CGI in 2006 after a short tenure leading xwave's Contact Centre Industry vertical upon returning from Ontario in the fall of 2005. During the prior 15 years, Mr. Corey had become a key senior executive on one of the largest and most important client teams in the Canadian practice of Accenture.

Trevor is a graduate of the University of New Brunswick and holds a degree in Computer Science. Trevor is the chairperson for SpeedSkate New Brunswick, he sits on the Board of Directors for the Chalmers Hospital Foundation and is Board Member of TechImpact.

Panellists

Kevin Hurley

Technology Partner, Consulting, Deloitte



Mr. Hurley specializes in providing technology advice to public sector clients. He has 30 years of experience in working with clients in Atlantic Canada, Ontario, and North-East USA. He has led many large public sector project delivery including replacing an enterprise Motor Vehicle Registration/

Records system, service delivery to citizens and electronic health records project – both transforming service delivery to be public or patient centric that leverage transformational modern process and new technology. Kevin's main focus now is digitizing government services.

Pierre Mullin

Executive Officer

Siemens Digital Grid Software Solutions



Pierre Mullin is the executive responsible for the global custom software development organization for Siemens Digital Grid Software Solutions business. His teams include locations in the USA, Canada, Germany, Austria and India. Prior to joining Siemens, he was a Software Development Manager in the BlackBerry R&D organization.

Pierre is a graduate of UNB's Computer Science program and began his professional career in the utility industry. During his 25+ year career in the

IT industry he has held leadership roles in product development start ups, consulting firms and corporate IT organizations.

He currently sits on the boards of the OpenADR Alliance and Tech Impact (formerly the New Brunswick Information Technology Council), and is also a member of the UNB Faculty of Computer Science Advisory Board.

Panellists

Cathy Simpson

Vice President of Public Sector
T4G



Champion of leadership and diversity, innovator and soon-to-be dog owner. Cathy Simpson is T4G's Vice President of Public Sector, where she is passionate about building a digital society and embracing data and technology to make that happen. Her twenty-six years of experience spans telecom marketing and operations, software product management and sales, and IT marketing and consulting for NBTel, Innovatia, Bell Aliant and now, T4G Limited.

As a member of T4G's leadership team, she has driven the strategy for the Public Sector practice and has collaborated with clients to enable citizen engagement and digital transformation while building T4G's brand, presence, and engagement in New Brunswick. Most recently, Cathy served as chair of the Big Data Congress which brought educators, industry leaders, world renowned speakers, and students together to understand and see the impact that data, IOT, and technology is having on our lives.

Her passion is Atlantic Canada and building economic opportunities for growth. Cathy's contributions to the New Brunswick economy include roles as Co-Chair of NB+, the Chair of the New Brunswick Innovation Foundation, Investment Committee Member for the Pond Deshpande Centre and she is one of the original founders of PropellCT.

Committed to her community, she is involved in initiatives that focus on the leadership, entrepreneurship and STEM development for both youth and women of all ages. She has started her own social enterprise program, Up and Go, which is dedicated to building authentic, confident, self-assured, and decisive girls and young women who can achieve anything, building the next generation of business, government, and social leaders.

She is a member of the International Women's Forum and has her BBA from Acadia University.



We at the Faculty of Computer Science pride ourselves on many things:

We take pride in our history as the first faculty of computer science in Canada and the leader in Atlantic Canada since 1968 with the oldest and most successful co-op program in Atlantic Canada. We take pride in our extraordinary students and in our graduates who have excelled and continue to excel in many different places across Canada and throughout the world. We take pride in our academic excellence, the relevance of our undergraduate programs and our master's and PhD programs to the country and the region, and in the high demand for our graduates regionally, nationally, and internationally. We take pride as well in our faculty and staff who are working hard to ensure the best quality education for our students.

Congratulations to our students and faculty on their research.