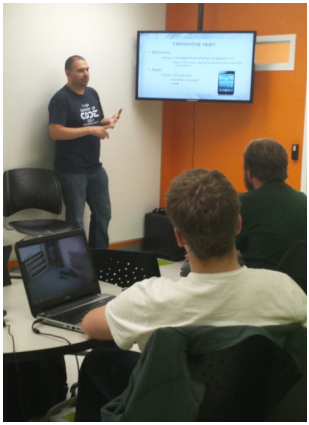
16TH ANNUAL
FACULTY OF COMPUTER SCIENCE
RESEARCH EXPOSITION
2019

UNB EST. 1785 UNIVERSITY OF NEW BRUNSWICK | Computer Science

April 12, 2019 I 8:30am-4:30pm
Wu Conference Centre
Fredericton, NB



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 2019 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 and ideas with our students and researchers – as well as one another – unique and worthwhile!

The 2019 Faculty of Computer Science Annual Research Exposition showcases the excellent research, new developments, and experience related to the area of information and communication technology. This year we have 42 posters. The coverage of the contributions is very wide while remaining inherently discipline-related, which is one of the features that distinguishes our Research Exposition from other events that focus on more specific areas.

Many people contributed to the success of this Exposition. I would like to thank Dr. Patricia Evans and Dr. Dima Alhadidi for organizing the Exposition, Ms. Brenda Stennick for providing logistical support, and faculty and staff for supporting and promoting 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 this Exposition: it is your participation that makes it all worthwhile.

Dr. Luigi Benedicenti
Professor and Dean

UNB EST. 1785 UNIVERSITY OF NEW BRUNSWICK | Computer Science

Program

8:30 - 8:50
Registration

8:50 - 9:00
Welcome and Opening Remarks

9:00 - 9:30
Kenneth Kent, FCS, "*Enhancing Academic Tools for Exploring Next Generation Mobile Phones*"

9:30 - 10:15
Jamie Rees, NB Power, "*Securing Converged Information and Operations Systems*"

10:15 - 11:00
Break & Poster Session I

11:00 - 11:20
Maria Patrou, PhD Student, "*Scaling Parallelism under CPU-intensive Loads in Node.js*"

11:20 - 11:40
Puya Memarzia, PhD Student, "*Toward Efficient In-Memory Query Processing for Big Data Analytics*"

11:40 - 12:00
Simon Gauvin, PhD Student, "*Virtual Machine Design for Controlled Dataflow Languages*"

12:00 - 13:00
Lunch & Poster Session II

Program

13:00 - 13:30
Mathieu Brideau, Université de Moncton, "*Artificial Intelligence for Perception Robotics and Intelligent Machines*"

13:30 - 14:00
Arash Habibi Lashkari, FCS, "*Cyber Security Data Repository*"

14:00 - 14:30
Fahd Gulzar, AWS - Amazon Web Services*, "The Cloud Workforce Imperative*"

14:30 - 15:00
Break & Poster Session III

15:00 - 15:30
Richard Jones, Propel ICT, "*Commercialization Of Research Using Lean Startup Methodology*"

15:30 - 15:50
Jeremie Boudreau, BCS Student, "*Cross-Lingual Word Embeddings for Mi'kmaq Language Modelling*"

15:50 - 16:10
Ian Smith, MCS Student,*" What Moves You? Augmented Biofeedback for Enhancing Motor Learning"*

16:10 - 16:20
Wrap Up

Posters

1. Mohammed Y. **Aldarwbi**, Arash H. Lashkari, Ali A. Ghorbani (CIC) – "NetflowScope: A novel Intrusion Detection System"

2. Dayton J. **Allen**, David Bremner, DeVerne Jones (UNB Faculty of Computer Science), Mark Stoodley, Daryl Maier, Leonardo Banderall (IBM Canada) – "Python on OMR"

3. Hamid **Azimy**, Ali A. Ghorbani (CIC) – "Competitive Selfish Bitcoin Mining"

4. Kwasi **Boakye-Boateng**, Arash Habibi Lashkari, Ali A. Ghorbani (CIC) – "Application of One-Time Pad in Security of Substation Automation Systems"

5. Kay **Boldt**, Arash Habibi Lashkari and Ali G. Ghorbani (CIC) – "Detection and characterization of multi-layer encryption traffic (VPN through Tor) using AI"

6. Jeremie **Boudreau**, Ian Sadler, Caleb Smith, Scott Bateman – "Plasma The voice assistant for gamers"

7. Jason **Chang** (Undergraduate) and Rongxing Lu (CIC) – "Achieving Privacy-Preserving Edit Distance Query in Cloud and Its Application on Genomic Data"

8. Eric **Coffin**, Scott Young, Kenneth B. Kent (UNB Faculty of Computer Science), Marius Pirvu, Vijay Sundaresan (IBM Canada) " Boosting MicroJIT - A Lightweight Just-In-Time Compiler"

9. Alex **Demmings**, Kasey Dionne, Connor Wilson, Scott Bateman – "No Contact Navigation Developing Gesture Sets for Navigational Tasks"

10. Rasool **Fatemi** and Ali A. Ghorbani (CIC) – "Threat Hunting in Windows using Big Security Log Data"

11. Mahdi D. **Firoozjaei** and Ali A. Ghorbani (CIC) – "Location Privacy issues with the online Services"

12. Vedang **Goswami**, Scott Bateman – "Artificial Landmarks for Spatial Interfaces"

13. Aaron **Graham**, Jean-Philippe Legault, Maria Patrou, Kenneth B. Kent – "Improved Synthesis and Simulation for FPGAs ODIN II for VTR 8.0 and Beyond"

Posters

14. Nasrin Eshraghi **Ivari**, Kenneth B. Kent – "Improving the Verilog-to-Routing FPGA CAD Flow"

15. Georgiy **Krylov**, Petar Jelenkovic, Gerhard W. Dueck, Kenneth B. Kent (UNB Faculty of Computer Science), Daryl Maier (IBM Canada) – "AOT compilation in OMR: Relocations"

16. Jean-Philippe **Legault**, Aaron G. Graham, Kenneth B. Kent (UNB Faculty of Computer Science), Daryl Maier (IBM Canada) – "Containerized Cross Platform Development for the New Age Polyglot"

17. Shlomi **Linoy**, Hassan Mahdikhani, Suprio Ray, Rongxing Lu, Natalia Stakhanova and Ali Ghorbani (CIC) – "Scalable Privacy-Preserving Query Processing Over Ethereum Blockchain"

18. Rongxing **Lu** (CIC) – "AGREE: Efficient and Privacy-preserving Speaker Recognition for Internet of Things"

19. Rongxing **Lu** (CIC) – "A New Communication-Efficient Privacy-Preserving Range Query Scheme in Fog-Enhanced loT"

20. Son **Luong** (Master Student) and Rongxing Lu (CIC) – "A Blockchain-Based Privacy-Preserving Medical Insurance Storage System"

21. Samaneh **Mahdavifar**, Ali A. Ghorbani (CIC) – "Android malware Detection Utilizing Translucent Deep Neural Network"

22. Hassan **Mahdikhani**, Rasoul Shahsavarifar, Rongxing Lu, David Bremner – "Privacy-Preserving Simplicial Depth Query over Outsourced Cloud Platform"

23. Nasim **Maleki**, Ali A. Ghorbani (CIC) – "Simulating Phishing Email through Graph Database Models"

24. Puya **Memarzia**, Virendra C. Bhavsar, and Suprio Ray – "In-memory Aggregation for Big Data Analytics"

25. Ali Hakimi **Parizi**, Paul Cook – "Evaluating Cross-lingual Sub-word Embeddings"

26. Maria **Patrou**, Kenneth B. Kent (UNB Faculty of Computer Science), Michael Dawson (IBM Canada) – "Scaling parallelism under CPU-intensive Loads in Node.js"

Posters

27. Reyhan **Pradantyo**, Scott Bateman – "What Are Video-Game Baddies? Observing and Evaluating Player Perception on Video-Game Villain Designs"

28. Md. Mahbubur **Rahman**, Hillary J. Soontiens, Jean-Philippe Legault, Aaron G. Graham, Kenneth B. Kent (UNB Faculty of Computer Science), Daryl Maier, Kazuhiro Konno (IBM Canada) – "AArch64 Support for the OMR Language Runtime Toolkit"

29. Rahul **Roychowdhury**, Dr. Eric Aubanel, Dr. Suprio Ray (UNB Faculty of Computer Science), Charlie Gracie (IBM Canada) – "Multiprocessing in Python to Exploit Multicore Hardware"

30. Britta **Sennewald**, Arash Habibi Lashkari, Ali A. Ghorbani (CIC) – "Authorship Attribution Within Different Dark Web Forums"

31. Iman **Sharafaldin** and Ali A. Ghorbani (CIC) – "A Novel Visual Anomaly Detection Method"

32. Aaron **Tabor**, Scott Bateman, Erik Scheme, M.C. Schraefel – "Designing Guided Breathing Technology Enhancing Cognitive Performance in the Work place"

33. A. **Taware**, K.B. Kent & G.W. Dueck (UNB Faculty of Computer Science), Charlie Gracie (IBM Canada) – "Cold Object identification, Sequestration and Revitalization"

34. Mark **Thom**, Gerhard W. Dueck, Kenneth B. Kent (UNB Faculty of Computer Science), Daryl Maier (IBM Canada) – "Secure, Pervasive Sharing of Language Runtimes in Cloud Applications"

35. Xi **Tao** and Wei Song – "Efficient Path Planning and Truthful Incentive Mechanism Design for Mobile Crowdsensing"

36. Haoru **Xing** and Wei Song – "Collaborative Content Distribution in 5G Mobile Networks with Edge Caching"

37. Chenghao **Xu** and Wei Song – "Intelligent Data Collection and Dissemination Application with Wi-Fi Direct"

38. Scott **Young**, Kenneth B. Kent – "Verilog Static Loop Unrolling Support in Odin II"

Posters

39. Xichen **Zhang**, Ali A. Ghorbani (CIC) – "Human Factors in Cybersecurity: Issues and Challenges in Big Data"

40. Xichen **Zhang**, Ali A. Ghorbani (CIC) – "An Overview of Online Fake News: Characterization, Detection and Discussion"

41. Yandong **Zheng**, Rongxing Lu, Xue Yang and Jun Shao (CIC) – "Achieving Efficient and Privacy-Preserving Top-k Query over Vertically Distributed Data Sources"

42. Yandong **Zheng**, Rongxing Lu and Jun Shao (CIC) – "Achieving Efficient and Privacy-Preserving k-NN Query for Outsourced eHealthcare Data"

Speakers

Fahd Gulzar, Canada Public Sector Programs Lead
Amazon Web Services

Fahd leads efforts to develop and localize cloud computing education and adoption programs for the Canadian Public Sector including government, health care, education and non-profit. In this role, he focuses on workforce development, promoting diversity and inclusion, education and cyber security.

Prior to joining Amazon in 2018, Fahd led large-scale fraud and anti-money laundering implementations at SAS Institute, a leading data analytics firm. Fahd is a Certified Anti-Money Laundering Specialist (CAMS) with experience in risks, methods, and preventative framework of money laundering and terrorism financing. Fahd has a Bachelors of Applied Science, Electrical Engineering, from the University of Waterloo and holds a Master's in Business Administration (MBA) from Wilfrid Laurier University.

Speakers

Richard Jones
Propel ICT

As an Entrepreneure-in Residence (EIR) at Propel, Richard is responsible for coaching start-up founders to build their idea into an innovative venture that has growth potential. Richard provides leadership to encourage founders to create great organizations at the leading edge of technical development in both product and services using Lean start-up principles, and leveraging Propel's ecosystem assets, community resources, and mentor networks.
Richard enthusiastically brings his thirty-plus years of experience in engineering, IT, and entrepreneurship, and his desire to help build great leaders and great organizations, to the EIR role.

Dr. Arash Habibi Lashkari
Faculty of Computer Science

Dr. Arash Habibi Lashkari is an assistant professor at the Faculty of Computer Science, University of New Brunswick (UNB) and research manager of the Canadian Institute for Cybersecurity (CIC). He has more than 22 years of academic and industry experience developing technology that detects and protects against cyber attacks, malware, and the dark web. Dr. Lashkari has been awarded 3 gold medals as well as 12 silver and bronze medals in international computer security competitions around the world. In 2017, he has been selected as the top 150 researchers who will shape the future of Canada. Also, he won the Runner up Cybersecurity Academic Award of the year at ICSIC conference in Canada. He is the author of 10 books in English and Persian on topics including cryptography, network security, and mobile communication as well as over 80 journals and conference papers concerning various aspects of computer security. His research focuses on cybersecurity, big data security analysis, Internet Traffic Analysis and the detection of malware and cyber-attacks as well as generating cybersecurity datasets.

Speakers

Dr. Kenneth Kent
Faculty of Computer Science

Dr. Kenneth Kent received his Ph.D. degree in computer science from the University of Victoria in 2003. He has worked for the University of New Brunswick since 2002 in The Faculty of Computer Science where in 2009 he formed the Centre for Advanced Studies - Atlantic. Dr. Kent has expertise in Field Programmable Gate Arrays (FPGA), Computer-Aided Design (CAD), virtual machines, embedded systems and high performance computing. His work in FPGA/CAD has led to the release of verilog-to-routing (VTR), an open-source software tool for packing, placing and routing verilog circuits on an FPGA.

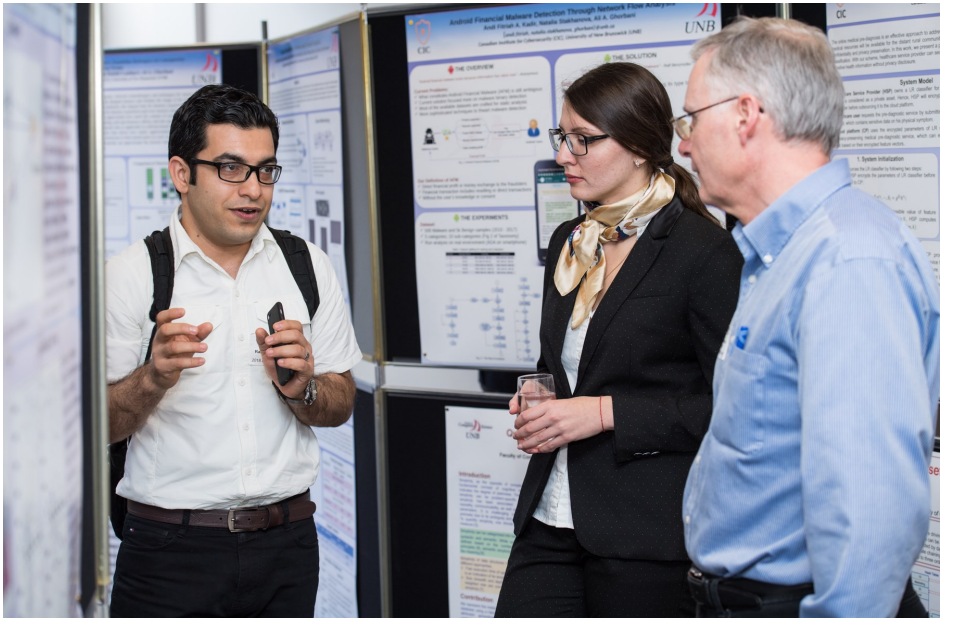
He has co authored many journal/conference papers, holds a patent and has 6 patents pending. In 2016, Dr. Kent was recognized as the IBM Faculty Fellow of the Year and as a UNB Research Scholar. He is a steering committee member of the International Conference on Computer Science and Software Engineering (CASCON) and IEEE International Symposium on Rapid Systems Prototyping.

Jamie Rees, Chief Information Security Officer
NB Power

Jamie Rees believes in cybersecurity as a provider of value and enabler of innovation in organizations. He has spent the past 18 years in senior roles, cultivating security cultures, creating new positions and developing award winning programs in telecommunications, financial services, government, and utility verticals.

Jamie shares, with the teams he has directed, the North American CSO 50 Award, the IT Association of Canada Ingenious Award for technology projects demonstrating outstanding business value, and was presented with the CyberSmart Award for his work demonstrating to students the importance of developing cybersecurity skills. He holds an MSc in Information Security from Royal Holloway and is certified in cyber-risk oversight by the National Association of Corporate Directors and Carnegie Mellon SEI.

Jamie works for NB Power as the Chief Information Security Officer. He is also a member of the editorial advisory board for the UK based Cyber Security: A Peer-Reviewed Journal, a co-founder of B-Sides Fredericton, a member of the CISO Forum Canada Advisory Board, and serves as chair on ICTC's National Cyber Security Leadership Council on Youth and Education.



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.