OUR MISSION

TO DEVELOP AND ADVANCE QUANTUM INFORMATION SCIENCE AND TECHNOLOGY AT THE HIGHEST INTERNATIONAL LEVEL THROUGH THE COLLABORATION OF COMPUTER SCIENTISTS, ENGINEERS, MATHEMATICIANS AND PHYSICAL SCIENTISTS.
CORE RESEARCH AREAS

QUANTUM COMPUTING
Using atoms, molecules and particles of light to create new bits of computer information – qubits, which can be 0 and 1 at the same time – for computing.

QUANTUM COMMUNICATION
Developing ultrasecure communication channels, low-noise transmission protocols and satellite-based global networks by harnessing the power of the quantum world.

QUANTUM SENSING
Using the laws of quantum mechanics to develop new sensors with exponential precision, sensitivity, selectivity and efficiencies.

QUANTUM MATERIALS
Engineering materials that exhibit quantum properties for robust quantum information processors and other devices.
FACULTY HIRES SINCE 2016

- Michel Sigl
  - Institute for Quantum Computing
  - Faculty Hire

- Jonathan Baugh
  - Quantum Computing

- Raffi Budakian
  - Physics and Astronomy

- Kyung Soo Choi
  - Physics and Astronomy

- Richard Cleve
  - Quantum Computing

- David Cory
  - Quantum Computing

- Joseph Emerson
  - Quantum Computing

- K. Rajibul Islam
  - Physics and Astronomy

- Thomas Johannesen
  - Physics and Astronomy

- Na Young Kim
  - Electrical and Computer Engineering

- Raymond Laflamme
  - Physics and Astronomy

- Debbie Leung
  - Quantum Computing

- Adrian Ltheis
  - Physics and Astronomy

- Norbert Lükenkün
  - Physics and Astronomy

- Matteo Mariotti
  - Quantum Computing

- Guo-Xing Niu
  - Quantum Computing

- Michele Mosca
  - Quantum Computing

- Christine Muschik
  - Physics and Astronomy

- Arshin Navid
  - Quantum Computing

- Vern Paulsen
  - Quantum Computing

- Dmitry Pushin
  - Physics and Astronomy

- Michael Reimer
  - Electrical and Computer Engineering

- Kevin Schaich
  - Physics and Astronomy

- Crystal Sankar
  - Physics and Astronomy

- William Siegenthaler
  - Pure Mathematics

- Wei Tsen
  - Chemistry

- John Vaidya
  - Chemistry

- Christopher Wilson
  - Electrical and Computer Engineering

- Jon Yard
  - Combinatorics and Optimization
RESEARCH EXCELLENCE

29 Faculty  153 Graduate Students  39 Postdoctoral Fellows

Annual publications and cumulative citations

1,501 publications since 2002
173 publications in 2016
29,876 cumulative citations
RECENT RESEARCH HIGHLIGHTS

RESEARCHERS SUCCESSFULLY DEMONSTRATE PROTOTYPE FOR SPACE-BASED QUANTUM-SECURED COMMUNICATION

SOLVING TSIRELSON’S PROBLEM

ESTABLISH QUANTUM INNOVATION (QUIN) LAB FOR SEMICONDUCTOR AND NANO SCALE QUANTUM DEVICES
RESEARCH AWARDS

200+ ACTIVE GRANTS

INCLUDING:

41 NSERC FUNDED RESEARCH GRANTS
6 CFI FUNDED RESEARCH GRANTS
1 CFREF GRANT

6 NOTABLE AWARDS

EARLY RESEARCHER AWARDS
3 AMERICAN PHYSICAL SOCIETY FELLOWS
3 OUTSTANDING PERFORMANCE AWARDS
3 FELLOWS OF THE ROYAL SOCIETY
1 CAP-CRM PRIZE IN THEORETICAL AND MATHEMATICAL PHYSICS

7 RESEARCH CHAIR APPOINTMENTS

CANADA EXCELLENCE RESEARCH CHAIR LAUREATE
DAVID CORY (June 2017)

CANADA RESEARCH CHAIR
KEVIN RESCH (2013-2018)
RAYMOND LAFLAMME (2002-2022)

UNIVERSITY RESEARCH CHAIR
DEBBIE LEUNG (2015-2022)
MICHELE MOSCA (2012-2019)

MIKE AND OPHELIA LAZARIDIS “JOHN VON NEUMANN” CHAIR IN QUANTUM INFORMATION
RAYMOND LAFLAMME (2017-2027)

NANOTECHNOLOGY (WIN) ENDOWED CHAIR IN SUPERCONDUCTIVITY
RAFFI BUDAKIAN (2014-2019)
Over 70% of co-authored papers are with international collaborators
RESEARCH
POWERED BY INTERDISCIPLINARY COLLABORATION

PAPER
ENTANGLEMENT AREA LAW IN SUPERFLUID $^4$HE

PAPER
GROWTH AND CHARACTERIZATION OF EPITAXIAL ALUMINUM LAYERS ON GALLIUM-ARSENIDE SUBSTRATES FOR SUPERCONDUCTING QUANTUM BITS

PAPER
DYNAMICAL CASIMIR EFFECT IN CIRCUIT QED FOR NONUNIFORM TRAJECTORIES
38 courses offered through the Quantum Information Graduate Program
IQC ALUMNI

Master's Program

DONNY CHEUNG
MASTERS' 2002, PhD 2007
Now at Google Canada

25% INDUSTRY
64% ACADEMIA
10% UNKNOWN

1% GOVERNMENT

PhD Program

CHRIS PUGH
PhD 2017
Now at Brandon University

21% INDUSTRY
76% ACADEMIA
6% UNKNOWN

1% GOVERNMENT

PDF Program

ANNE BROADBENT
PDF 2013
Now at the University of Ottawa

6% INDUSTRY
68% ACADEMIA
5% UNKNOWN

1% GOVERNMENT
UNDERGRADUATE RESEARCH ASSISTANTS

URAs supervised by IQC faculty

377 URAs since 2012

70%+ of USEQIP students stay for a URA (2016; 2017)
SCIENTIFIC OUTREACH

QCSYS
Quantum Cryptography School for Young Students
318 participants since 2012

USEQIP
Undergraduate School on Experimental Quantum Information Processing
135 participants since 2012

QKD
Quantum Key Distribution Summer School
173 participants since 2012

QI
Quantum Innovators
230 participants since 2012

SC
Schrödinger’s Class
82 participants since 2015
TAKING QUANTUM BEYOND BORDERS

QUANTUM EXHIBITION AND POP-UPS

151,443 visitors across Canada

5,000+ visitors in 5 overseas countries
EARNED MEDIA

769 MEDIA MENTIONS SINCE APRIL 2017

NATIONAL POST
CTV
CBC News
PHYS ORG
SCIENTIFIC AMERICAN
WIRED
TORONTO STAR
MOTHERBOARD
GIZMODO
THE WALL STREET JOURNAL
THE GLOBE AND MAIL