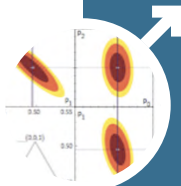




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○ ISSUE 7  
○ FALL  
○ 2007

## THE INSTITUTE FOR QUANTUM COMPUTING NewBit

### CLAIMING NEW TERRITORY FINDING A TEMPORARY PLACE TO CALL HOME

IQC will have a temporary new home next year at the University of Waterloo's Research Accelerator Centre.

The building is currently still in its beginning stages but has an estimated opening date of Spring 2008 when the first phase will be complete. Located in the Research and Technology Park on Wes Graham Way, IQC will be settling in while awaiting the construction of their new building, set for completion in 2010.



Above: Construction of the RAC building is underway

The UW Research Accelerator Centre is set to include three floors with approximately 70,000 square feet of lab and office space.

The Research and Technology Park is one of the newest research parks in Canada to date. It is designed to accommodate 1.2 million square feet of office space on

120-acres and house thousands of researchers.

UW president David Johnston, explained that the Research Accelerator Centre, "will act as an incubator for research and laboratory projects that will ultimately lead to startup companies".

The new IQC building set to be complete in 2010, will be located in the heart of UW's campus. Featuring a large atrium and multiple interaction spaces, its design encourages discussion and participation amongst all researchers.



Above: The artist's rendering of the Research Accelerator Building in its completed phase.

More details will follow regarding the new building in the near future. Log onto IQC's website for up to date news and an upcoming announcement at: [www.iqc.ca](http://www.iqc.ca)

### JOINING OUR FACULTY

Johnathan Baugh enhances his quantum knowledge and lends some expertise by joining the IQC team this fall.

Johnathan Baugh is working towards the physical realization of quantum information processors in solid-state systems, using the property of spin to encode and manipulate quantum information.

Past work has focused on solid-state nuclear magnetic resonance devices, and more recently on combined electron-nuclear spin systems and single electron spins in quantum dots. Prior to joining IQC and the department of Chemistry, he spent one year as a visiting researcher at the University of Tokyo. He was previously a post-doctoral fellow at IQC, and received his Ph.D. in Physics in 2001 from the University of North Carolina at Chapel Hill.

Jonathan is joined by his wife Atsuko Negishi, a biophysicist.





# QUANTUM BREAKTHROUGHS

## IQC RESEARCHERS ONE STEP CLOSER TO PROTOTYPE QUANTUM COMPUTER

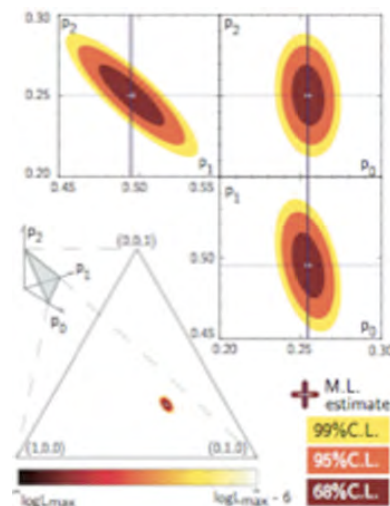
Researchers at the Institute for Quantum Computing and MIT, have identified an experimental method to facilitate the design of prototype quantum computers and any other technologies requiring many-body quantum coherence. This research is reported in "Symmetrized Characterization of Noisy Quantum Processes" by Emerson et al., in Symmetrized Characterization of Noisy Quantum Processes on page 1893 of the 28th of September issue of Science, see also the comment in Perspective: Does Our Universe Allow for Robust Quantum Computation? on 1876 of the same issue.

"The quantum process tomography techniques described here represent a first step toward accurately assessing the powers and limits of these new quantum machines. Indeed, thanks to the techniques developed by Emerson et al., we may soon know whether our universe is generous enough to allow for large-scale robust quantum computation." says David Bacon from the University of Washington.

Precise, coherent control over the quantum dynamics of multi-body systems, such as laser-cooled trapped ions, quantum dots, nuclear spin systems, and superconducting circuits, is an active area of research that holds the promise of new quantum technologies, and, in particular, quantum computation and quantum communication. A major obstacle in this direction is the extreme sensitivity of these systems to the noise or 'decoherence' effects of the environment, as well as other control limitations. However, complete characterization of the decoherence affecting a given experimental arrangement is infeasible already for the number of interacting quantum systems that can be controlled in some of today's best labs.

"This technique provides a much needed solution to the important problem of efficiently characterizing the degree of experimental control over many-body quantum systems. The significance of this problem became particularly apparent over

the course of some very labor intensive experiments and analysis performed a few years ago at MIT to fully characterize the noise affecting a 3-qubit system." explains Joseph Emerson.



The number of experiments required by existing noise characterization methods, known as quantum process tomography, grows quadruply exponentially with the number of coherently coupled quantum subsystems (in particular, the quantum bits or 'qubits'). This is impractical already for the few qubits within reach of today's labs, and an infeasible task for the thousands of qubits required for eventual applications of quantum computation. The proposed technique removes this obstacle by requiring a number of experiments that grows slower than linearly in the number of qubits.

The features of the decoherence that can be measured by this technique are relevant to selecting optimal quantum error correction algorithms and validating some of the theoretical assumptions of fault-tolerant threshold theorems. Quantum error correction techniques and fault-tolerant threshold theorems were discovered in the 1990s by Peter Shor and others. They proved

that if the noise affecting the quantum computer is weak enough and satisfies certain other desirable properties than the resulting errors in the quantum computation can be corrected and, moreover, this error-followed-by-correction process can continue indefinitely, enabling arbitrarily complex quantum computations.

The problem is to determine if the noise affecting a given prototype quantum processor satisfies the various assumptions of these theorems. That's where the technique reported by Emerson et al. comes into play - it enables a practical method for measuring some of the properties of the noise that are required to determine the relevance of these various theorems and the appropriate noise-threshold for any prototype system.

The researchers also report in the paper an experimental demonstration of the method for the characterization of the robustness of 'quantum memory' consisting of nuclear spins in a crystal lattice controlled by nuclear magnetic resonance techniques. The experiments, performed by Raymond Laflamme's research group at IQC, demonstrated the characterization and optimization of an experimental control sequence designed to reduce the impact of unwanted interaction between the nuclear spins.

The theoretical technique is based on symmetrizing the unknown quantum noise by rapidly applying certain random operations and then their inverses after a controlled delay. The operations must be drawn at random from particular sets of operations that isolate the features of the decoherence that is of interest. The parameters of the symmetrized noise are much fewer in number and can be directly estimated by measuring the effect of the symmetrized noise on specific input states. The possibility that sufficiently random quantum operations were experimentally achievable and could be applied for the task of noise characterization was first proposed in an earlier Science report by two of the authors and other collaborators.

## TUNNELING BETWEEN A TREMBLE AND A SWING

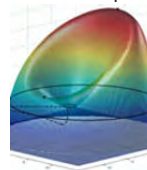
New research from Canada and Germany is challenging the notion that quantum mechanics is the science of the small and the static. Research published in the Physical Review Letters suggests that quantum tunneling, one of several phenomena associated exclusively with the quantum level, may also occur with larger and dynamic systems.

In quantum physics, quantum tunneling draws on micro and nanoscopic phenomenon in order to allow a particle to pass

through a barrier that is too high to overcome by classical physical events. It has been widely assumed that the larger a macroscopic system becomes, the less likely it is for the quantum physics effects, such as tunneling, to occur.

New results from Ioana Serban, of the University of Munich, and Frank Wilhelm, of the University of Waterloo, suggest that quantum tunneling may be more common than expected and can occur in macroscopic quantum mechanical systems. They

suggest that tunneling can occur not only between two places, but between two patterns of motion. In particular, it may be possible for a nanomechanical clapper to generate both a pendulum swing and a tiny tremor at the same time. The discovery will advance the development of detectors to be used in quantum computing.





# SUCCESS AT ITS BEST

## MAKING THE "DOCTOR" OFFICIAL - IQC GRADUATES 5 Ph.D'S

IQC is very pleased to announce that we had 5 students receiving their Ph.D's at this fall's convocation ceremony on October 20th. To celebrate their accomplishments we invited all members to join the new "Doctors" and their families at a reception following the ceremony. IQC hosted the reception on the 2nd floor of BFG beginning at 5:30 p.m. Members, family and friends all joined in to congratulate the following students on their success (from left to right): Jean Christian Boileau, Casey Myers, Carlos Perez-Delgado, Donny Cheung, and Phillip Kaye.



Directors, Raymond Laflamme and Michele Mosca stand proudly with their students.

Jean Christian presented his PhD on "The Physical Underpinning of Security Proofs for Quantum Key Distribution." He has since received an NSERC post-doctoral fellowship (he was chosen as the top candidate out of 73 applicants in the Physics and Astronomy category at

NSERC) and will take it up in Toronto with Hoi Kwong Lo. He has also received a CQIQC (Center for Quantum Information and Quantum Control) Prized Postdoctoral Fellowship from the University of Toronto.

Donny Cheung, as highlighted in the previous newsletter, presented his studies "On Algorithms, Separability and Cellular Automata in Quantum Computing." In January 2008, Donny will be starting a postdoctoral fellowship with Peter Hoyer at The Institute for Quantum Information Science at the University of Calgary.

Phillip Kaye presented his thesis on "Techniques for Quantum Computing." Phillip is planning on continuing his work for the government and hopes to complete the construction of his plane.

Casey Myers defended his thesis titled, "Investigating Photonic Quantum Computation." He has now taken a post-doctoral fellowship in the Quantum Information Sciences group at National Institute of Informatics under the direction of Kae Nemoto.

Carlos Perez-Delgado defended his thesis entitled, "An Optimizing Pulse Sequence Compiler for NMR QIP." His future endeavours include taking a post-doctoral position in the Physics department at the University of Sheffield, under Professor Pieter Kok.

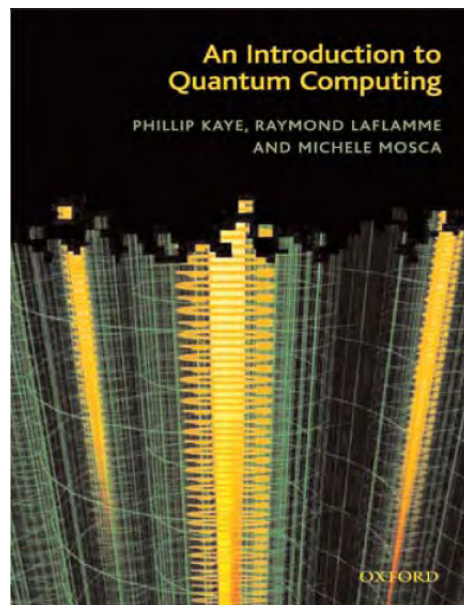
For additional information about this event or a full disclosure of the defenses, please visit the news section of our website at: [www.iqc.ca/institute/news.php](http://www.iqc.ca/institute/news.php)

## QUANTUM BOOK RELEASE

St. Jerome's University held a book launch event to celebrate the recently published books of faculty members including, "An Introduction to Quantum Computing" by IQC members, Phillip Kaye, Raymond Laflamme, and Michele Mosca.

This concise, accessible text provides a thorough introduction to quantum computing - an exciting emergent field at the interface of the computer, engineering, mathematical and physical sciences. Aimed at advanced undergraduate and beginning graduate students in these disciplines, the text is technically detailed and is clearly illustrated throughout with diagrams and exercises. Some prior knowledge of linear algebra is assumed, including vector spaces and inner products. However, prior familiarity with topics such as quantum mechanics and computational complexity is not required.

This text is now available to purchase at the University of Waterloo campus bookstore.



## Visitors

IQC IS HONoured TO HAVE HOSTED THESE DISTINGUISHED GUESTS OVER THE FALL OF 2007:

Mohammad Amin – D-Wave Systems  
Alain Aspect – École Polytechnique, Palaiseau, France  
Simon Benjamin – University of Oxford  
Robin Blume-Kohout – Perimeter Institute for Theoretical Physics  
Piet Brouwer – Cornell University  
Nilanjana Datta – University of Cambridge  
Hui Deng – Caltech  
Guillaume Gervais – McGill University  
Otfried Gühne – Institut für Quantenoptik und Quanteninformation  
Andrew Jordan – University of Rochester  
Frank Koppens – Delft University of Technology  
Troy Lee – Rutgers  
Xiongfeng Ma – University of Toronto  
Gerard Milburn – University of Queensland  
D.M. Miller – University of Victoria  
Susumu Sasaki – Niigata University  
Rafael D. Sorkin – Syracuse University  
Ashley Stephens – University of Melbourne  
Gottfried Strasser – University of Buffalo  
Ben Toner – CWI  
Dr. Carl E. Wieman – Carl Wieman Science Education Initiative at UBC

For more information and visitor biographies, please visit:  
[www.iqc.ca/people](http://www.iqc.ca/people)





# PROVING RESEARCH PAYS OFF



## Speakers

- ▶ SEPTEMBER 10 - Bill Coish  
"Electron spins as qubits: Coherence in a hostile environment"
- ▶ SEPTEMBER 13 - Carlos Perez-Delgado  
"Ph.D. Thesis Defense"
- ▶ SEPTEMBER 14 - Maarten van den Nest  
"Width parameters of graphs and codes, and tree tensor networks"
- ▶ SEPTEMBER 14 - Casey Myers  
"Ph.D. Thesis Defense"
- ▶ SEPTEMBER 14 - Phillip Kaye  
"Ph.D. Thesis Defense"
- ▶ SEPTEMBER 20 - Rafael D. Sorkin  
"Testing quantum mechanics with a 3-slit experiment"
- ▶ SEPTEMBER 21 - Jean Christian Boileau  
"Ph.D. Thesis Defense"
- ▶ SEPTEMBER 24 - Robin Blume-Kohout  
"Quantum information-preserving structures"
- ▶ OCTOBER 15 - Nilanjana Datta  
"Perfect transfer of Quantum Information across Spin Networks"
- ▶ OCTOBER 22 - Frank Koppens  
"Coherence and control of a single electron spin in a quantum dot"
- ▶ OCTOBER 29 - Ben Toner  
"The Unique Games Conjecture with Entangled Provers is False"
- ▶ NOVEMBER 2 - D.M. Miller  
"Quantum Circuit Simulation and Verification: Fast Methods for Very Large Matrices"
- ▶ NOVEMBER 5 - Andrew Jordan  
"Weak Quantum Measurements in the Solid State"
- ▶ NOVEMBER 12 - Andrew Childs  
"Evaluating Formulas with a Quantum Computer"
- ▶ NOVEMBER 15 - Otfried Gühne  
"Optimal spin squeezing inequalities detect bound entanglement in spin models"
- ▶ NOVEMBER 19 - Rainer Kaltenbaek  
"An Experimental Test of Non-Local Realism"
- ▶ NOVEMBER 22 - Mohammad Amin  
"Adiabatic Quantum Computation with Noisy Qubits"
- ▶ NOVEMBER 22 - Xiongfeng Ma  
"Quantum key distribution with PDC sources"
- ▶ NOVEMBER 26 - Troy Lee  
"Product theorems for discrepancy"
- ▶ DECEMBER 10 - Hui Deng  
"Scalable quantum networks with atomic ensembles"
- ▶ DECEMBER 17 - Susumu Sasaki  
"Direct NMR Observation of Local Magnetic Field Generated by Microscopic Magnet"

## AMERICAN PHYSICAL SOCIETY AWARD WINNER VISITS IQC

The Member Physical Society Topical Group on Quantum Information, Concepts, and Computation offers an annual award for student papers in experimental research sponsored by IQC at the University of Waterloo. We were proud to sponsor the experimental research paper competition with a cash prize of \$500. The first award was presented at the 2006 APS Meeting in Baltimore and the second at IQC on the 22nd of October, 2007. Frank Koppens from Delft University of Technology received the award this fall.

Frank works on quantum dots and presented his recent work at the IQC Colloquium. The ability to control the quantum state of a single electron spin in a quantum dot is at the heart of recent developments towards a scalable spin-based quantum computer. In his talk, he discussed the realization of both magnetically and electrically induced single electron spin rotations in a gate-defined GaAs double quantum dot. With his colleagues he has coherently controlled the quantum state of the electron spin by applying short bursts of an on-chip generated oscillating magnetic field, and observed about eight Rabi oscillations of the spin state during a microsecond burst.

Frank Koppens was an IQC visitor from October 17th to the 23rd. He lectured in MC 5158 from 12:30-1:30 p.m. For more information regarding his colloquium please visit IQC's seminar page under Activities, at [www.iqc.ca/activities/seminar.php](http://www.iqc.ca/activities/seminar.php)

## RESEARCHER RECEIVES ONTARIO RESEARCH FUND

IQC Researcher Hamed Majedi receives an Ontario Research Fund.

Ultrafast Characterization of Quantum Optoelectronic and Microwave Photonic Devices and Circuits Research team is set to transfer new technologies to Ontario's photonic sector.

Leading-edge, high-technology industries such as photonics rely on universities to conduct the basic research for innovative products and technologies that enter the market. At the University of Waterloo, a team of scientists led by Dr. Hamed Majedi is investigating innovative, reliable, and cost-effective experimental techniques to characterize quantum optoelectronic and microwave-to-terahertz photonic devices. This new knowledge will become the building blocks for new photonics-based technologies in health care, advanced manufacturing and other core sectors of the economy.



## CFI AWARD RECIPIENT

Quantum information seeks to harness the quantum world for new technologies in computing, communication and precision measurement," explains Kevin Resch, professor of physics and astronomy. "Quantum effects, such as entanglement, superposition and the uncertainty principle, are often referred to as bizarre or paradoxical as they have no analogues in our everyday experience."

But with properly engineered quantum systems, he adds, those effects have profound implications for computing power and information security. "It will revolutionize how we process and share information." As a result of those challenges, quantum information has attracted researchers from a diverse range of traditional disciplines spanning from engineering, physics, computer science and mathematics.

The CFI-funded lab will be used to construct optical sources of entanglement for investigations of entangled quantum systems and quantum nonlinear optics. "The research and its results will enhance Canada's reputation and scientific presence in experimental quantum information science," Resch says.



## QuantumWorks SECOND ANNUAL GENERAL MEETING

QuantumWorks, Canada's Quantum Information Network, held its Second Annual General Meeting and Technical Conference this past September in Calgary, Alberta. The event was attended by 100 participants from the academic, industrial and government sectors. Participation was lively and the scientific discussions were received with great enthusiasm.

Reflecting Canada's expanding expertise in quantum information research, six new researchers were inducted into QuantumWorks, including three with ties to IQC: faculty members Norbert Lutkenhaus and Frank Wilhelm, and associate member Jan Kycia. We would like to welcome them into QuantumWorks, and look forward to their contributions.

With the strengths of these new researchers combining with the expertise of established members, QuantumWorks looks forward to keeping Canada at the front of the quantum information revolution.

QuantumWorks' Third Annual General Meeting and Technical Conference will be held in Montreal on June 5th & 6th, 2008.

For more information regarding QuantumWorks, please visit their website at [www.quantumworks.ca](http://www.quantumworks.ca)





# NEW ARRIVALS

## NEW RECRUITS ADD STRENGTH TO THE TEAM

Since the beginning of September, IQC has seen the addition of a slew of new members ranging from students, to faculty, to staff.

### POST-DOCTORAL FELLOWS

**Bill Coish** completed his B.Sc. in Physics at the University of Manitoba and an M.Sc. in Physics at McMaster University in 2002. He completed his Ph.D. at the University of Basel, Switzerland in 2006 under Professor Daniel Loss. His thesis was on hyperfine interaction, transport and coherent control of electron spins in quantum dots.



**Jay Gambetta** completed his Ph.D. in 2004 at Griffith University, Australia, under the supervision of Professor Howard Wiseman. His Ph.D. thesis was on Non-Markovian stochastic Schrodinger equations and interpretations of quantum mechanics. Following this, he spent 3 years at Yale University as a post-doctoral fellow researching in quantum information and solid state implementations of a qubit.



**Rainer Kaltenbaek** completed his thesis on experimental quantum optics in the Zeilinger Group in Vienna. He has continued in these tracks during his Ph.D. thesis, which he has been working on, continuing with the same group. His main interest in physics is the investigation of the foundations of quantum theory.



**Caterina-Eloisa Mora** studied at the University of Trieste in Italy, where she obtained her M.Sc. in Theoretical Physics, with a thesis on "Information and complexity production in discrete billiards". Since 2004 she has been a student at the University of Innsbruck in the group of quantum information led by Professor Hans Briegel.



**Marco Piani** obtained both his masters and Ph.D. at the University of Trieste in Italy, under the supervision of Dr. Fabio Benatti. Since 2005, he has been a part of the research group of Professor Ryszard Horodecki at the University of Gdansk, Poland. His main research topics have been the description of the evolution of open quantum systems and the theory of relation between classical and purely quantum properties, both of states and of operations on states.



**Urbasi Sinha** was a post-doctoral research associate working on sol-gel techniques and thin films at the University of Cambridge, in the U.K. She completed her Ph.D. on superconducting and ferroelectric heterostructures and high frequency dielectric measurements and using high Tc Josephson junctions as ac oscillators. Before that, she obtained her M.Sc. in Physics from Cambridge. She looks forward to applying her skills towards experimental realization of problems in quantum computing.



**Tzu-Chieh Wei** obtained his Ph.D. in Physics from the University of Illinois at Urbana-Champaign in 2004. His thesis research was on quantum information theory and quantum optics, and was titled "Quantum entanglement: geometric quantification and applications to multipartite states and quantum phase transitions". He continued his academic career as a post-doctoral associate in UIUC, where he also worked on superconductivity, Bose-Einstein condensation, and optical lattices.



**Jingfu Zhang** obtained his Ph.D. from Beijing Normal University in July 2003. From 2003 to 2005, he did post-doctoral research at Tsinghua University. He also worked at Dortmund University, Germany as a post-doctoral fellow and obtained the Humboldt fellowship. His research field is in experimental implementation of quantum computing.



### GRADUATE STUDENTS

- ▶ **Normand Beaudry**
- ▶ **Devon Biggerstaff**
- ▶ **Jeremy Chamilliard**
- ▶ **Agnes Ferenczi**
- ▶ **Peter Groszkowski**
- ▶ **Harishankar Jayakumar**
- ▶ **Mohsen Keshavarz**
- ▶ **Laura Mancinska**
- ▶ **Felix Motzoi**
- ▶ **Brendan Osberg**
- ▶ **Yingkai Ouyang**
- ▶ **Maris Ozols**

- ▶ **Gina Passante**
- ▶ **Edward Platt**
- ▶ **Jamie Smith**

### RESEARCH ASSISTANTS

- ▶ **Greg Egan**

### STAFF MEMBERS

- ▶ **Meghan Huras**
  - ▶ **Kimberly Kuntz**
  - ▶ **Mary Lyn Payerl**
- 



# IN THE NEWS



## Future Events

### ► SPINTRONICS WORKSHOP

Researchers at IQC (Jonathan Baugh, Frank Wilhelm, Raymond Laflamme) and MIT (David Cory) will host a two-day workshop on "Coherent Spintronics" to be held January 10-11, 2008, at IQC.

It will bring together experimentalists and theorists who are working towards physical realization of practical quantum devices, fostering collaborative work on topics such as coherent spin systems, quantum dots, and superconducting quantum devices.



Above: Group photo of previous meeting on Coherent Spintronics, 2006

Discussions will be informal, and are presently planned to focus on projects involving researchers at the Institute for Microstructural Science (NRC-Ottawa), MIT and IQC.

Other researchers interested in participating should contact Jonathan Baugh (baugh@iqc.ca) for more information. Post-doctoral fellows and student researchers at all levels who are involved in these fields are welcome to attend.

For questions, comments or general feedback regarding the IQC Newsletter, please feel free to contact:

[iqc@iqc.ca](mailto:iqc@iqc.ca)

## IQC'S COURSE CONTENT CATCHES THE EYE OF RICOH

What exactly is quantum mechanics? Maybe the best place to look and find out is your television.

Scott Aaronson, an IQC post-doctoral fellow who just recently departed this past July, had some interesting ideas about quantum computing that caught the attention of the advertising team at Ricoh, a global leader in digital office solutions located in Australia.



Ricoh released a commercial, showcasing their new model of ESA enabled printers which includes material from Dr. Aaronson's physics course, 'Quantum Computing Since Democritus'.

The commercial includes two models engaging in a conversation that reads as follows:

Model 1: "But if quantum mechanics isn't physics in the usual sense -- if it's not about matter, or energy, or waves, or particles, -- then what is it about?"

Model 2: "From my perspective, it's about information and probabilities and observables, and how they relate to each other."

These lines were the main feature of the commercial which were taken directly from Aaronson's lecture materials.

At the time, Dr. Aaronson was teaching at the University of Waterloo and is now an assistant professor of electrical engineering and computer science at MIT.

For full disclosure of his lecture materials, they can be found on Aaronson's website at: [www.scottaaronson.com/democritus/](http://www.scottaaronson.com/democritus/) under lecture 9.

The commercial is also available for viewing at [www.YouTube.com](http://www.YouTube.com)

## PUTTING CANADA AND QUANTUM COMPUTING ON THE MAP

During the months of September and October, quantum computing articles were featured in issues of Canadian Business and Science magazines.



In Canadian Business, they explored the idea of how quantum computing can be Canada's winning ticket for a first place finish in a race for the next global technological revolution.

Along with the research that was published by IQC members in the magazine Science, it also features physics articles on quantum decoherence. Through its analysis, it shows it may help further progress quantum computing.

The Canadian Business article is available for viewing on their website at: [www.canadianbusiness.com/canadian\\_business\\_magazine/index.jsp](http://www.canadianbusiness.com/canadian_business_magazine/index.jsp)

The Science article is available for viewing on their website at: [www.sciencemag.org](http://www.sciencemag.org)



# IQC SOCIAL EVENTS

## MEET & GREET BBQ

Waterloo Park was filled with IQC members along with their friends and families on September 17th for the Meet & Greet BBQ Picnic. It was a great opportunity for new members to be recognized and for everyone to interact and get to know one another a little bit better. Organized by staff member, Cindy Schnarr, the event took place beginning at 4:00 p.m.



Director, Raymond Laflamme announces the new members to the crowd

Member achievements were also announced at the picnic. The announcement of Donny Cheung's successful thesis completion as well as a 5-year recognition award was presented to administrative officer, Wendy Reibel for her outstanding dedication to the institute. With great weather cooperation, a friendly football game was rallied up preceding the picnic for all to join in and have some fun.

Thank you to all who participated in the event and we look forward to our next Meet & Greet event when even more new faces join our team!

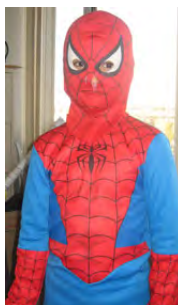
## RIM ROCKS 2007

IQC was invited to join Research In Motion at the Air Canada Centre on November 15th to enjoy the RIM ROCKS 2007 mystery concert event in Toronto. The bands were kept secret until earlier that day when they were unveiled. Canada's very own, The Tragically Hip opened up the show to a packed arena filled with

## HALLOWE'EN VISIT

Members of the Spouse Network were invited to bring their young one's to the institute for a special Halloween visit on October 31st.

Staff and students were greeted by all kinds of jungle animals, pirates and comic book heroes who were eagerly awaiting their Halloween treats.



Door-to-door visits were made throughout the offices as the excited little ones collected various colouring books, toys, and candy while getting to know the IQC staff members.

In related news, the Network is planning a dinner and music night in February 2008. If you are interested in attending, please contact the network at: [Spousal.Network@Gmail.com](mailto:Spousal.Network@Gmail.com) to get your tickets.

For more information regarding the Spouse Network please visit their website at: [www.iqc.ca/piqcsn](http://www.iqc.ca/piqcsn)

14,000 employees and guests. For the main event, the recently reunited, Van Halen with original singer, David Lee Roth brought the house down. Pure rock and roll filled the BlackBerry-lit arena all night long. A special thanks to Mike Lazaridis for his kind gesture for inviting all of IQC to be a part of their special event.

## YOUNGEST MEMBERS

Congratulations to IQC members, Frank Wilhelm-Mauch, Matthew McKague, and Kevin Resch who recently welcomed new IQC family members.



Frank Wilhelm-Mauch and wife Barbara Mauch celebrated the birth of their new daughter, Karoline-Anna on September 22nd just before 11:00 p.m. weighing in at 8lbs, 6oz.



Matthew and Iko McKague welcomed their new baby daughter, Sofia Rose, on October 1st at a healthy weight of 7lbs, 10oz.



Kevin and Norma Resch were excited with the arrival of their new baby daughter, Elspeth on November 20th at 10:34 p.m. She weighed in at 8lbs, 1oz.



## Athletics

IQC students have organized and currently participate in two sports teams:

### ► CURLING

IQC has a team in the UW Curling Club's Fall league. While the team has lost several games, many of which have been close, they are all enjoying the curling season. The team consists of Gina Passante at lead, Bill Rosgen at second, David Ostapchuk playing third, and Devin Smith as skip.



From left to right: Bill Rosgen, Devin Smith, David Ostapchuk, and Gina Passante

Games are played on Sundays at 6:00 p.m. at the K-W Granite Club. IQC has also generously supported the team with matching IQC branded shirts. The same team will likely join the UW Curling Club for the Winter semester, but there is room in the club for both individuals and teams.

If you would like more information or would like to attend as a spectator, contact Bill Rosgen at [wrosgen@iqc.ca](mailto:wrosgen@iqc.ca).

### ► BALL HOCKEY

Friendly games are played at Perimeter Institute in the parking lot every Saturday at 1:00 p.m. Equipment is not necessary as nets and extra hockey sticks are provided. However please do bring any safety equipment you may need.

For the upcoming winter season, if the weather persists, players will switch to skates and play on a frozen pond.

Beginners, friends, and children are all welcome to play. If you are interested in joining, please contact Joseph Emerson.



IQC THANKS ITS PARTNERS FOR THEIR  
CONTINUING SUPPORT OF OUR VISION



MIKE LAZARIDIS

- AND -

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