IQC Institute for Quantum Computing www.iqc.ca

University of Waterloo

ISSUE 8
WINTER
2008

THE INSTITUTE FOR QUANTUM COM

NewBit

CAP/CRM PRIZE
RICHARD CLEVE

The 2008 CAP/CRM Prize in Theoretical and Mathematical Physics is awarded to IQC professor, Richard Cleve, for fundamental results in quantum information theory, including the structure of quantum algorithms and the foundations of quantum communication complexity.

Richard Cleve is an outstanding computer scientist who has done seminal work at the boundary of physics, mathematics and computer science.

His work has transcended the area of computer science and has had a broad impact in physics of quantum information science.

He has contributed to tools in the fields that are now used by essentially all experimentalists in the field. He has created a new field called quantum communication complexity and discovered new algorithms that takes advantage of quantum mechanics.

His pioneering work and leadership has put Canada at the forefront of the development of quantum information worldwide.

IQC MOVES TO RAC
WE HAVE ARRIVED!

Monday, April 28th marked the official move-in day to the new Research Advancement Centre.

Bidding adieu to the BFG building that we called home for nearly 4 years, the IQC sign was dismantled and taken down on our last day in the building.

With our bags packed, it was just one more step in the right direction. The new Research Advancement Centre will now become our resting place for the next few years until the Quantum Nano Centre is built in 2010 on UW soil.

Taking several weeks to completely transfer our belongings from one place to the other, we'd like to thank everyone involved for the long hours they've put in to make this move a success.

Please visit our website for our new location information.

PREMIER'S DISCOVERY AWARD

Dr. Raymond Laflamme is the 2008 recipient of the Premier's Discovery Award for Natural Science and Engineering.

The Premier's Discovery Awards celebrates the research excellence of Ontario's finest accomplished researchers. By showcasing individual achievements, it aims to enhance Ontario's attractiveness as a global research centre. The $500,000 Natural Sciences and Engineering award celebrates achievements in the study of physical sciences and/or engineering processes.

Dr. Laflamme is internationally recognized as one of the world's leading quantum information scientists. His study of quantum computers, devices that store and process information at the level of individual atoms, has revolutionized the field.

Dr. Laflamme studied at Cambridge University under the direction of renowned physicist Stephen Hawking. He returned to Canada in 2001 to establish the Institute for Quantum Computing at the University of Waterloo. Dr. Laflamme has developed methods to counteract the effects of errors in quantum computing, resulting in his development of the world's largest functioning quantum computer.

These types of advances in quantum computing will significantly increase computational speeds and allow for the processing of large amounts of data. Dr. Laflamme's contribution has lead Ontario to world leadership in an area that holds extraordinary promise for the future.

AND THE AWARD GOES TO...

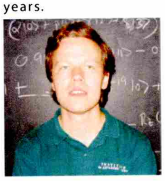
Visitors

IQC IS HONOURED TO HAVE HOSTED THESE DISTINGUISHED GUESTS OVER THE WINTER OF 2008:

- Rob Adamson – University of Toronto
- Gorjan Alagic – University of Connecticut
- Marco Barbieri – University of Queensland
- Anne Broadbent – University of Montreal
- Matthias Christandl – University of Cambridge
- Fernando Cucchieti – Los Alamos National Laboratory
- Magdalena Constantin – University of California at Irvine
- Sarah Croke – Perimeter Institute
- Sagarmoy Dutta – Indian Institute of Technology Kanpur
- Baris Erkmen – MIT
- Amr Helmy – University of Toronto
- Andrew Houck – Yale University
- Lane P. Hughston – King's College London
- Min-Hsiu Hsieh – University of Southern California
- Lawrence Ioannou – University of Cambridge
- Thomas Jennewein – Institute for Quantum Optics and Quantum Information
- Jens Koch – Yale University
- Alex Kuzmich – University of Rochester
- Francois Le Gall – Japan Science and Technology Agency
- Adrian Lupascu – Kastler Brossel Laboratory, École Normale Supérieure
- Denise Maurice – École Normale Supérieure

2008 RESEARCH FELLOWSHIP

Member of IQC and UW mathematics professor, Andris Ambainis of the Department of Combinatorics and Optimization, has received a 2008 Research Fellowship from the Alfred P. Sloan Foundation, valued at $50,000 over two years.



He's one of 118 "outstanding young scientists, mathematicians, and economists" to receive this year's Sloan Fellowships. The winners, are faculty members at 64 colleges and universities in the United States and Canada who are conducting research at the frontiers of physics, chemistry, computational and evolutionary molecular biology, computer science, economics, mathematics and neuroscience.

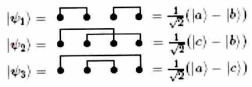
"The Sloan Research Fellowships support the work of exceptional young researchers early in their academic careers, and often at pivotal stages in their work," says Paul L. Joskow, president of the foundation.

Once chosen, the foundation explains, "Sloan Research Fellows are free to pursue whatever lines of inquiry are of most interest to them, and they are permitted to employ Fellowship funds in a wide variety of ways to further their research aims."

JOHN BRODIE MEMORIAL AWARD

Jean Christian Boileau came to IQC from McGill University in 2002 on an NSERC scholarship. He has done work in quantum cryptography and quantum computing using Nuclear Magnetic Resonance. He devised a new protocol to make quantum cryptography robust against collective noise and show adapted proofs of security to that case.

JC received his PhD in the Fall of 2007 under Raymond Laflamme. JC is presently the CQIQC Prized Postdoctoral Fellow in Toronto and plans to move to ETH in Zurich next year to work with Renato Renner. JC also received an NSERC post-doctoral fellowship, finishing first amongst 73 finalists in the Physics and Astronomy category.



JC's full PhD thesis can be viewed at www.iqc.ca/publications/theses/jcboileau.pdf

SCHOLARSHIPS

Congratulations to the following students who received scholarships:

Mohammad Derakhshani
International Masters Student Award
UW Grad Scholarship
Fall, 2006

Chris Erven
NSERC PGS D3
Spring, 2008

Agnes Ferenczi
International Doctoral Student Award
Fall, 2007 & Winter, 2008
Science Graduate Experience Award
Winter, 2008

Chris Ferrie
NSERC PGS D3
Fall, 2008

Behnood Ghamsari
Mike & Ophelia Lazaridis Fellowship
Winter, 2008

Peter Groszkowski
Bell Family Fund
Fall, 2007

Martin Laforest
Doctoral scholarship from Le Fonds Quebecois de la Recherche sur la Nature et les Technologies
2007-2008

Easwar Magesan
NSERC PGS D
Fall, 2008

David Ostapchuk
NSERC PGS D
Fall, 2008

Colm Ryan
CGS NSERC
PDF NSERC
Winter, 2009

Lana Sheridan
Mike & Ophelia Lazaridis Fellowship
2008 & 2009

Marcus Silva
NSERC PDF
2005-2008

Stephanie Simmons
NSERC PGS
Clarendon Scholarship at Oxford
Nominated for Valedictorian for Mathematics
Fall, 2008

Zhizhong Yan
OGS
2007-2008

REACHING NEW HEIGHTS

JONATHAN BAUGH RECEIVES CFI FUNDING

The development of real-world quantum technologies has the potential to reshape our society and to drive the future economy. The international research community recognizes that quantum devices realized in solid state systems, based on the quantum property of spin, offer strong potential for success and would be particularly attractive for commercialization.

Our project, entitled "Solid-state spin-based quantum information processing", seeks to establish a world-class research effort focused on the development of this technology.

The CFI-funded infrastructure will consist of a custom-built 3He/4He dilution refrigerator and electronic instrumentation for carrying out a wide range of quantum device experiments.

The various devices will be used to confine and manipulate single electron spins and will help lead the way to scalable quantum processors.

The infrastructure will also be used to develop the next generation of nuclear magnetic resonance devices that utilize electron spins to achieve high spin polarization and to mediate interactions between nuclear spin quantum bits.

GRADUATE STUDENT RESEARCH CONFERENCE

IQC PhD student, Doug Stebila, gave a talk at the University of Waterloo's 8th Annual Grad Student Research Conference in April and came out on top in his category.

Taking home first prize, winning for the physical science, math & technology best judged oral presentation. Quite the impressive accomplishment, as Doug specializes in combinatorics and optimization.

The awards were presented at a special awards reception held on April 24th. The conference sets out to profile and promote graduate studies at UW, to highlight the types of research currently taking place and to share that information, and to encourage and foster more interdisciplinary research on campus.

Last year, PhD student Chris Erven was the recipient of this award. IQC would like to congratulate both of our students on a job well done!

We encourage all of our students to participate in next year's conference and prove what you're capable of.

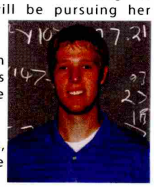
For more information regarding the conference, please visit UW's graduate studies website at: www.grad.uwaterloo.ca

ANOTHER SUCCESSFUL THESIS DEFENSE

Adam Hubbard, a graduate student of Raymond Laflamme, successfully defended his master's thesis on January 18th.

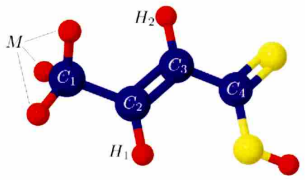
His thesis, "On Magic State Distillation using Nuclear Magnetic Resonance", explored the experimental feasibility of magic state distillation, a valuable technique in certain fault tolerant quantum computation schemes.

Adam and his wife Kara are moving to California where Kara will be pursuing her graduate studies.



IQC congratulates Adam on his success and wishes him only the best in the future.

To view Adam's full thesis, please visit IQC's website under publications.



Above: Molecular structure of trans-crotonic acid. The labeled spins correspond to the qubits used in the magic state distillation.

PEAKING POLITICAL INTEREST

Liberal MP for Kitchener-Waterloo, Andrew Telegdi, paid a visit to IQC's facilities in early April.

Bringing with him members of the standing committee on citizenship and immigration, they toured the BFG building's research labs led by Director, Raymond Laflamme and Executive Director, David Fransen.

The Liberal caucus also toured IQC in late January to gain a perspective on the kinds of research and progress that is done here in our labs.

We hope they gained some valuable information about IQC and welcome them back anytime.

Left to right: Dr. David Fransen, Bryce Graham, Sandra Elgersma, Mona Raynaud, Hélène Regimbald, Andrew Chaplin, Hon. Andrew Telegdi, Dr. Raymond Laflamme, Theirry St-Cyr, Nina Grewal, Norman Doyle, Hon. Ed Komarnicki, Robert Carrier, Robert Hoffman

Visitors

- Jeremy O'Brien – University of Bristol
- Ben Reichardt – Caltech
- Tobias Schaetz – Max-Planck Institute for Quantum Optics
- Graeme Smith – IBM
- John Smolin – IBM
- Miroslava Sotakova – University of Aarhus
- Denis Sych – Max-Planck Institute for Quantum Optics
- Zoltan Voros – University of Pittsburgh
- Qin Wang- Laboratory of Quantum Electronics and Quantum Physics, KTH

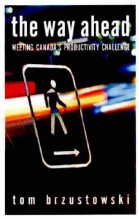
LEARNING FROM THE BEST

Speakers

- DECEMBER 20 - Baris Erkmen
  "Imaging with Phase-Sensitive Light"
- DECEMBER 20 - Fernando Cucchietti
  "What is time reversal good for?"
- JANUARY 8 - Rob Adamson
  "Harnessing the power of quantum measurements"
- JANUARY 14 - Gorjan Alagic
  "Quantum Algorithms for Product Groups"
- JANUARY 15 - Andrew Houck
  "A new superconducting qubit for circuit QED"
- JANUARY 21 - John Smolin
  "Additive Extensions of a Quantum Channel"
- JANUARY 28 - Min-Hsui Hsieh
  "A general method for studying quantum error correction"
- JANUARY 29 - Adrian Lupascu
  "Non-demolition measurement of a superconducting qubit"
- JANUARY 31 - Magdalena Constantin
  "Modelling Microscopic Sources of Noise in Josephson Junction Qubits"
- FEBRUARY 4 - Matthias Christandl
  "Finite de Finetti theorem for conditional probability distributions describing physical theories"
- FEBRUARY 11 - Ben Reichardt
  "Formula evaluation using a quantum computer"
- FEBRUARY 20 - Tobias Schaetz
  "Quantum Simulation of the Quantum Magnet"
- FEBRUARY 25 - D.Z. Djokovic
  "Polynomial invariants of several qubits - An overview"
- MARCH 3 - Austin Fowler
  "An introduction to the best and most practical quantum computing"
- MARCH 7 - Niel de Beaudrap
  "Quadratic form expansions for Unitaries"
- MARCH 17 - Thomas Jennewein
  "Quantum Photonics: Fundamental Science and Applications"
- MARCH 19 - Amr Helmy
  "Technologies for Phase Matching Second Order Optical Nonlinearities in Compound Semiconductors"
- MARCH 31 - Jay Gambetta
  "Superconducting qubits coupled to resonant cavities: quantum optics"
- APRIL 4 - Francois Le Gall
  "Quantum Property Testing of Group Solvability"
- APRIL 7 - Marco Piani
  "Monogamy of correlations for broadcast copies of entangled states"

INKING THOUGHTS TO PAPER

Tom Brzustowski, IQC's chair of the board of directors, launched his new book on boosting productivity in Canada on February 20th, at the Accelerator Centre, located in the University of Waterloo Research and Technology Park.



Entitled, "The Way Ahead: Meeting Canada's Productivity Challenge", the former president of the Natural Sciences and Engineering Research Council of Canada (NSERC), spoke about his book and signed copies at the event.

As NSERC president, Brzustowski has long called for strengthening links among universities, industry and government to commercialize research while dealing with issues of funding and conflict of interest.

The book, articulates a strategy for moving the economy toward higher-value products based on research and development. It describes the practical steps government, industry and academia must take to improve things in the short term and prepare strategically for the long term.

"The Way Ahead" is now available to purchase at the University of Waterloo campus bookstore. Information provided by the University of Waterloo.

TQC WORKSHOP A SUCCESS

The 3rd workshop on Theory of Quantum Computation, Communication, and Cryptography was held from January 30th - February 1st at the University of Tokyo. It consisted of invited talks, contributed talks and a poster session.

The objective of the workshop was to bring together researchers in the subfields of quantum information processing so they can interact with each other to share problems and recent discoveries.

Sitting on the program committee this year was Richard Cleve, and Program Chair, Michele Mosca of IQC. Other invited speakers included Andrew Childs, Dmitry Gavinsky, Niel de Beaudrap, Andris Ambainis, Simone Severini, Donny Cheung, and Dmitri Maslov.

Next year, the workshop will be held in Waterloo with Andrew Childs as Program Chair.

For more information about the workshop, please visit: http://www.brl.ntt.co.jp/tqc/2008

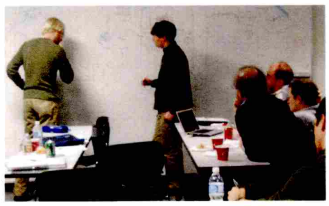
SPINTRONICS WORKSHOP 2008

Held on January 10th and 11th, IQC hosted a two-day workshop on "Coherent Spintronics." Approximately 40 participants attended, ranging from the Institute for Microstructural Science (NRC), David Cory's research group from MIT, and our very own members of IQC. 22 informal short talks were given, regarding their current or planned collaborative work.

Topics varied from spin manipulation to magic state distillation, and nuclear spin diffusion. Day two consisted of breakout sessions where the group was split into thirds, initiating more focused discussions. By experimenting with this new format for deliberations, it proved to peak people's interest, as some valuable information was shared amongst one another.

The workshop was a great opportunity for the research groups at IQC to meet and familiarize themselves with the researchers from NRC and some of the newcomers in David's research group.

"The greatest accomplishment of the workshop was providing the environment to learn the status of major projects that we, and our collaborators at MIT are working on," explained IQC masters student, Jeremy Chamilliard. "There is a great deal of overlapping knowledge and experience between the members of our groups that I now know how to tap into, and hopefully vice versa."



IQC post-doctoral fellow, Bill Coish presents his research to the group.

Organizer and IQC professor, Jonathan Baugh, looks forward to another successful workshop next year. Thank you to everyone who participated this year and QuantumWorks for their generous funding which made this entire workshop possible.

NEW ARRIVALS & DEPARTURES

WELCOMING THE NEW AND BIDDING FAREWELL

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

POST-DOCTORAL FELLOWS

André Méthot: After an undergrad in physics at the University of Montreal, André started his academic career in cosmology. Working with Manu Paranjape, he studied an alternative gravitational theory, conformal gravity. He then had the pleasure to be invited by the University of Heidelberg for a short research stint with Christof Wetterich on effective models of QCD at high temperature. Afterwards, André went back home (University of Montreal) to start a Ph.D. in computer science with Gilles Brassard and quickly got Alain Tapp on board as a co-supervisor. His thesis "Intrication & non-localité" (which translates into "Entanglement and non-locality") has won several prizes. He then joined Nicolas Gisin's team at the University of Geneva for his first postdoctoral appointment, before coming to IQC on an invitation by Richard Cleve.

So far, his research has been focused on the title of his thesis, but he is also interested in communication complexity, cryptography and the foundations of physics.

STAFF MEMBERS

- **Lorna Kropf**
  Assistant Director, Administration

IQC is pleased to announce the appointment of Lorna Kropf as Assistant Director, Administration. Lorna joined IQC in late December of 2007, and has been a long-term staff member at UW, firstly in the Faculty of Engineering and more recently in her position as Administrative Manager in the David R. Cheriton School of Computer Science. She completed her B.A. in English Literature as a part-time student during her tenure here at the University of Waterloo.

GRADUATE STUDENTS

- **Abhinav Bahadur**
- **Aleksandrs Belovs**
- **Farzad Qassemi**
- **Ansis Rosmanis**

RESEARCH ASSISTANTS

- **Ruben Romero Alvarez**
- **Peter Forbes**
- **Zachari Medendorp**
- **Om Patange**
- **Dmytro Tomilovskiy**
- **Matt Volpini**

Speakers

- APRIL 14 - Alex Kuzmich
  "Towards a practical quantum repeater"
- APRIL 18 - Niel de Beaudrap
  "Flows and related topics in measurement based computing"
- APRIL 21 - Sarah Croke
  "Quantum State Discrimination and the No-Signaling Principle"
- APRIL 24 - Jeremy O'Brien
  "Quantum Information science with photons on a chip"
- APRIL 28 - Jingfu Zhang
  "Experimental detection of quantum critical points using Loschmidt echo"

DEPARTURES

Sadly, we must say good-bye to some of our best talents as they move forward in their careers. Good luck in all your future endeavours!

- **Tracy Cui**
- **Eyal Dechter**
- **Greg Egan**
- **Joe Fitzsimons**
- **Kjersti Follesdal**
- **Robert Huneault**
- **Robbie Irwin**
- **Aaron Niedbala**
- **Amir-Hossein Safavi-Naeini**
- **Grant Salton**
- **Benjamin Schmidt**
- **Mirette Sedarous**
- **Geoff Stanley**
- **Yi Su**

IN THE NEWS

Future Events

QNC GROUNDBREAKING

A ceremony declaring the new Quantum-Nano Centre will officially begin development. Set to be completed in 2010, it will be IQC's permanent home within UW's campus.

Above: Artist's rendering of the Quantum-Nano Centre in its completed phase.

EVENT DETAILS

When: June 9th, 2008

Time: 2:30 p.m.

Where: Between MC, SLC and B2

Following the event, lab tours will be given throughout the new RAC building. Everyone is welcome and encouraged to attend.

Visit the IQC website on a regular basis for up to date news and announcements. More information about the event will be provided as soon as possible.

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

iqc@iqc.ca

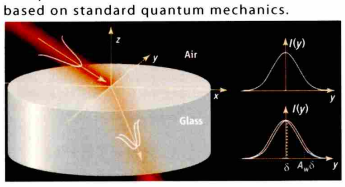
MEASURING THE UNIMAGINABLE

February's issue of Science Magazine features an article submitted by IQC professor, Kevin Resch.

"Amplifying a Tiny Optical Effect", discusses the research that's been done to measure the transverse shift of a light beam to within a nanometer.

Bringing up this "weak" measurement technique causes heads to shake and eyes to roll. Since it's introduction, it has been quite controversial. This is largely because the results that are produced can be arbitrarily large, even when standard quantum measurements are bounded.

However, it is argued that the issues are in fact, interpretational since weak measurement is based on standard quantum mechanics.



The full article is available online at: www.sciencemag.org

FRONT & CENTER

IQC masters student, Chris Erven, and his research team made front page news in the K-W Record on April 22nd. Highlighting the progress accomplished by the group led by Gregor Weihs, their recent findings show how quantum cryptography can be practical and work on a local level.

By using this type of quantum key distribution in a down-sized version, it could eventually work with hand-held devices such as RIM's BlackBerry.

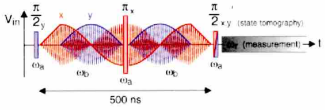
The full article is available online at: http://news.therecord.com

DIVING IN FIRST AND GETTING RESULTS

The recently published December issue of Science included a paper by Jay Gambetta, reporting the first experiment to observe a geometric operation on a solid state qubit.

The findings show a vector living on the surface of a sphere and changing its position without locally changing its direction. When the vector reaches its initial position again it ends up rotated by a certain angle due to a global property of the surface that is its curvature.

In this experiment, the team observed that the geometry dependent path reveals itself in the phase of the quantum state for the first time on a solid state qubit.



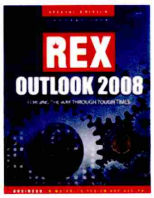
This qubit is made from approximately 1 billion aluminum atoms acting in concert like a single atom and the precise control of its Hamiltonian was achieved using microwave photons.

This type of qubit has also lead to the observation of the energy statistics of the microwave field, generation of single microwave photons, and coupling of two qubits by a microwave resonator.

The full article is available online at: www.sciencemag.org

OUTLOOK 2008

Pick up the January special edition of REX Magazine and you'll find the research of IQC featured along with other professors at the University of Waterloo, Wilfrid Laurier and the University of Guelph.



Within 20 years, IQC hopes to develop quantum computers, overpowering today's supercomputers. Confident in the institution's abiities, we have the largest concentration of quantum information experts in the world!

The full article is available online at: www.rexmagazine.ca

IQC SOCIAL-ITES

CHRISTMAS PARTY

Kris Cringle and his little helpers dropped in on IQC's annual Christmas Party this year held on December 11th, 2007. At a lovely dinner, hosted by Angie's Kitchen in St. Agatha, all of IQC got a chance to celebrate the holiday season together.

Everyone was encouraged to invite their families and friends to truly make it a special winter party. Despite the icy weather, Santa's sled made it to the event and brought along his magic sac and handed out gifts to all the youngsters.

It was a great turn-out with over 100 in attendance. We'd like to thank staff member, Kim Kuntz for organizing such a great event.

"JUMPER" FALLS FLAT

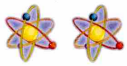
Tuesday, March 18th, IQC members filtered into the Cineplex Odeon to watch the film "Jumper".

A sci-fi thriller about a young man having the ability to teleport himself anywhere in a matter of seconds. A fitting subject, this idea of quantum teleportation was critiqued by students and proved just how unrealistic this portrayal actually is.

Quantum teleportation has been achieved on forms of tiny particles, but on large-scale objects such as a human body, requires a massive amount of bits to be transmitted between jump sites for each teleportation.

As Sevag Gharibian explains, "quantum teleportation doesn't actually 'teleport' an object - rather, it destroys the original and reconstructs a new object with the same 'state' as the original." Which begs the question, after teleporting, would you really be "you"?

Although the film may entertain the everyday audience, there's no fooling our students. While the facts of science were lacking, Gus Gutoski sees it as a positive, "if it gets people interested in quantum mechanics, then how bad can it possibly be?"



Overall Rating:
2/5 Atoms

YOUNGEST MEMBERS

Richard Cleve and wife Kimie celebrated the birth of their twin boys, Hugo & Hatski, on February 21st weighing in at 6lbs, 8oz and 5lbs, 10 oz.

SN OPEN HOUSE

The Spousal Network, together with IQC and Perimeter Institute, got to showcase what they're all about at their Open House event on Saturday, February 9th.

Krumbly the clown made a special appearance for all the kids to enjoy.

Students, researchers, staff, and spouses were all invited to attend and socialize. Some of K-W's best businesses were also on hand to show new and old members of the community just what they have to offer. Free massages and make -up consultations were some of the many services being given out to anyone interested.

Luxurious spa and restaurant prizes were among the numerous prizes that were raffled off to lucky winners. It was truly a successful event whether you wanted to simply relax, grab a refreshment and socialize, or to pick up some free swag and learn more about the Kitchener-Waterloo region.

Frank Wilhelm and daughter, Felizia.

EASTER EGG HUNT

On his way through Waterloo, the Easter Bunny hopped into BFG and left some goodies and treats for our younger IQC members to seek out and find.

On the afternoon of March 20th our hallways were full of eager youngsters searching for their own special treats.

SUGAR BUSH TOUR

IQC found out how a sugar bush is run at the Elmira Maple Sugar Bush on April 12th. The day included a wagon ride, a tour of the sap shanty, and free maple sugar candies for everyone. Free time at the store also allowed everyone to take home some yummy treats!

All bundled up and ready to go!

Athletics

ICE HOCKEY

All winter long, IQC members braved the cold, put their game faces on, and played both on and off the ice.

Kevin Resch looks on as a scramble for possession of the puck begins.

Games still continue to be played at Perimeter Institute in the parking lot every Saturday at 1:00 p.m.

Newcomers of all skill levels are more than welcome to join! For more information please contact Joseph Emerson.

UPCOMING SOCCER GAMES

As the snow melts away, what better way to enjoy the outdoors than with some casual soccer games. Beginning April 27th, every Sunday, players will meet at Waterloo Park in the fields near the zoo at 2:00 p.m.

All of IQC and their friends are welcome to come out, enjoy the weather, and have some fun. For more information or to be added to the e-mail list, please contract Christophe Couteau at ccouteau@iqc.ca

Did You Know?

Stephen Hawking set a record with his book, "A Brief History of Time" spending over 4 years on the London Sunday Times Bestseller list.

IQC THANKS ITS PARTNERS FOR THEIR CONTINUING SUPPORT OF OUR VISION

MIKE LAZARIDIS

- AND -

Advanced Research Development Activity
Bell Family
Canada Foundation for Innovation
Canada Research Chairs
Canadian Institute for Advanced Research
Centre for Applied Cryptographic Research
The City of Waterloo
Communications Securities Establishment
Helios/Oceana
Institute for Computer Research
Mathematics of Information Technology and Complex Systems
Natural Sciences and Engineering Research Council of Canada
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