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THE INSTITUTE FOR QUANTUM COMPUTING

NewBit

ISSUE 11

WINTER

2009

GOVERNMENT INVESTS IN IQC 2009 BUDGET PLAN INCLUDES \$50 MILLION GRANT

The federal government officially announced the 2009 budget plan and committed a \$50 million grant to the Institute for Quantum Computing (IQC) for scientific research and groundbreaking experiments over five years.

The 2009 budget states, "...[we] will provide \$50 million to the Institute to support the construction and establishment of a new world-class research facility that will contribute to achieving the goals of the Government's science and technology strategy."



Left to right: Mike Lazaridis, Peter Baird, Gary Goodyear, Harold Ablrecht, David Johnston, Raymond Laflamme, and Stephen Woodworth.

With an official announcement on April 7th, honourable guests gathered to listen to the promise to fulfill the commitment made by the government.

The Minister of State for Science and Technology, Gary Goodyear said, "The institute provides this collective knowl-

edge to the private sector so Canadian industries can get ahead, a jump, maybe one would say a quantum leap on the world's competition."

Member of Parliament for Kitchener-Waterloo, Peter Baird commented, "Our government is committed to targeting resources where Canada has the potential to be a world leader and we firmly believe that this funding could not be better invested."

"The resources from the federal government will be used to complete the new IQC building," explained IQC Director, Raymond Laflamme. "Another part of the funding will be used to bring the pieces of equipment to attract the best minds of the world to come and work with us. Finally, the last fraction of the funding will be used to operate IQC for the years to come."

David Johnston, President of the University of Waterloo claims, "This puts us in a position to be best in the world in this new area of science."

This announcement follows other positive recognition when the institute was reviewed by the Natural Sciences and Engineering Research Council of Canada (NSERC) and determined IQC's international level of distinction in scientific research.

For more information, please visit: www.iqc.ca

NEW COO ARRIVAL STEVE MACDONALD

Steve MacDonald comes to IQC with experience in the financial, transportation, and manufacturing sectors. A Fellow of the National Society of Management Accountants and a Certified Management Accountant, Steve also has a Bachelor of Business Administration from Wilfrid Laurier University.



Upon his arrival IQC Director, Raymond Laflamme said: "We are delighted to have Steve join us. Stepping into the role of Chief Operating Officer, he will provide both strategic and operational leadership at IQC. He brings with him a set of skills complementary to our own and will help continually establish IQC as a global centre of excellence for quantum information research."

With a track record of developing and implementing corporate-wide initiatives, he is a leader who strives to promote innovation and teamwork. Steve's background ranges, from previous positions as Vice President of Finance at CIBC Mellon, Vice President of Financial Management Strategy and Research at Clarica Life Insurance, to most recently, the CFO at kidsLINK, a children's health services organization.

In support of the community, Steve has held several positions including the Treasurer for the Waterloo-Wellington Board of the Canadian National Institute for the Blind and the President and Treasurer of a Community Neighbourhood Association.

HIGHEST HONOURS



Visitors

IQC IS HONOURED TO HAVE HOSTED THESE DISTINGUISHED GUESTS OVER THE WINTER OF 2009:

- ▶ Dirk Bouwmeester – University of California, Santa Barbara
- ▶ Sophie Chagnon-Lessard – Laval University
- ▶ Karen Corkery – Industry Canada
- ▶ Pierre-Luc Dallaire-Demers – École Polytechnique de Montréal
- ▶ Rogerio de Sousa – University of Victoria
- ▶ Michel Devoret – Yale University
- ▶ Ross Diener – University of Ottawa
- ▶ Doug Grzetic – Memorial University of Newfoundland
- ▶ Sean Hallgren – Pennsylvania State University
- ▶ Lawrence Ioannou – University of Cambridge
- ▶ Claude Jean – DALSA Semiconductor Foundry Operations
- ▶ Sabre Kais – Purdue University
- ▶ Angelo Karantza – University of Toronto
- ▶ Raisa Karasik – Berkeley
- ▶ Jungsang Kim – Duke University
- ▶ Jarek Korbicz – University of Gdansk
- ▶ Frédéric Magniez – Université Paris-Sud
- ▶ Seth Merkel – University of New Mexico
- ▶ Akimasa Miyake – Perimeter Institute for Theoretical Physics
- ▶ Christopher Monroe – University of Maryland
- ▶ Daniel Nagaj – Institute of Physics, Slovak Academy of Sciences
- ▶ Simon Nigg – University of Geneva
- ▶ Kenneth Paterson – University of London

PAUL CORKUM WINS CANADA'S TOP SCIENCE AWARD

IQC is proud to recognize the latest achievements by our Board Member, Paul Corkum who was recently awarded the country's top science prize, the Gerhard Herzberg Canada Gold Medal for Science and Engineering at an awards ceremony in Ottawa held March 16, 2009.

On hand to present the distinguished award was Prime Minister Stephen Harper, Minister of State (Science and Technology) Gary Goodyear, and Suzanne Fortier, President of Natural Sciences and Engineering Research Council of Canada (NSERC).

The NSERC Herzberg Medal is awarded annually to an individual for sustained excellence and overall influence of a body of research, which has advanced the natural sciences, or engineering fields in Canada. In addition to the medal, Dr. Corkum is also guaranteed \$1 million in research funding over five years.

Dr. Corkum's work at the National Research Council and the University of Ottawa has led to the development of a new field, "attosecond science". He believes this new field has the potential to help medical

researchers advance their understanding of cell processes, and provide new tools and fabrication methods for nanotechnology and new sub-cellular imaging methods.

"Canadian researchers have always been at the vanguard of scientific and technological achievement," said Prime Minister Stephen Harper. "Although attosecond movements, quantum computing, and cognitive neuroscience aren't typical conversations around the kitchen table, all Canadians stand to benefit from the practical application of research in these fields."



The Gerhard Herzberg Canada Gold Medal is funded by the Harper Government through NSERC, the federal agency responsible for promoting science, research and development. Named after one of Canada's most prominent scientists, Dr. Herzberg won the 1971 Nobel Prize in Chemistry for his contributions to understanding the structure of molecules.

For more information, please visit: www.nserc.ca

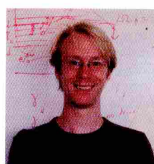
NEW CIFAR JUNIOR FELLOW APPOINTED

IQC Post-Doctoral Fellow, Bill Coish was recently appointed as a Junior Fellow in the Quantum Information Processing Program and The Canadian Institute for Advanced Research (CIFAR)'s Junior Fellow Academy.

Within the Program and Academy, Bill will have the opportunity to interact and collaborate with many of the top researchers in the field from across the world and receive mentorship from these distinguished leaders.

CIFAR's Junior Fellow Academy is designed to cultivate new generations of research leaders, targeted at individuals who have completed a Ph.D. degree and have demonstrated outstanding scholarship and research potential. CIFAR Junior Fellows are appointed and funded for two years.

For more information, please visit: www.cifar.ca



CANADA RESEARCH CHAIRS RENEWED

IQC Director, Raymond Laflamme won a renewal for his Canada Research Chair in Quantum Information. Entering his second term on a Tier 1 grant, Dr. Laflamme was awarded \$1.4 million, funded by the federal government.

"This announcement allows Waterloo to continue to create an environment conducive for ground-breaking research," said George Dixon, IQC's newly appointed Board Member and UW's vice-president of university research.

Laflamme's research involves information theory related to quantum mechanics. This funding includes support for research infrastructure, such as laboratories and equipment, from the Canada Foundation for Innovation (CFI).

Another five Waterloo professors also obtained renewals for their existing Canada research chairs.

For more information, please visit: www.chairs.gc.ca

FRESH INTELLECT

NEW FACULTY: THOMAS JENNEWEIN

Dr. Thomas Jennewein took up his new position as an IQC Faculty Member and Associate Physics Professor at the University of Waterloo, March 2nd, 2009.



Dr. Jennewein's research interests focus on the study of applications of quantum photonics and quantum optics, as well as the fundamental aspects of the quantum physics world.

"I am convinced that quantum information will play a key role in our future technologies for information processing," says Jennewein.

Particular examples of such quantum protocols being the secure communication based on the transmission of individual quanta, or the simulation of complex systems with quantum algorithms, both clearly outperforming today's classical methods.

His research will include the design of devices based on quantum photonics suitable for communication and computing with photons, and the development of ultra long distance quantum communication systems using terrestrial and satellite based systems.

Finally, Thomas is also expecting that with the planned advances of quantum photonics devices and quantum applications, a deeper exploration of fundamental questions in physics will become possible.

Thomas' full bio can be found at: www.iqc.ca/people

NEW FACULTY: ADRIAN LUPAȘCU

Dr. Adrian Lupașcu took up his new position as an IQC Faculty Member and Associate Physics Professor at the University of Waterloo, March 2nd, 2009.



Dr. Lupașcu's research interests focus on superconducting devices. He plans to develop effective architectures for control and measurement of systems of multiple qubits.

"I am looking forward to my new position at IQC," says Lupașcu. "I believe it is the ideal environment to develop the next generation of experiments on superconducting qubits."

He is also interested in quantum measurement using superconducting circuits and in exploring the properties of microwave photons.

Hybrid systems for quantum information processing is another area of research interest, which combine the advantages of microscopic and mesoscopic quantum systems.

Previous to joining IQC, Adrian was a postdoctoral researcher at École Normale Supérieure in Paris, France where he worked on the manipulation of neutral atoms on superconducting atom chips.

Adrian's full bio can be found at: www.iqc.ca/people



Visitors

- 13 Gabriello Presenza-Pitman - Laurentian University
- 13 Robert Prevedel - University of Vienna
- 13 Jérémie Roland - NEC Laboratories America
- 13 Charles Santori - Hewlett-Packard Laboratories, Palo Alto
- 13 Susumu Sasaki - Niigata University
- 13 Marcus Silva - Sherbrooke University
- 13 Akihito Soeda - University of Tokyo
- 13 Michael Sprague - University of Colorado
- 13 Marco Taucer - McGill University
- 13 Wolfgang Tittel - University of Calgary
- 13 Jerome Tribollet - Helmholtz-Zentrum Berlin
- 13 Avatar Tulsı - India Institute of Science
- 13 Falk Unger - UC Berkeley
- 13 Pawel Wocjan - University of Central Florida
- 13 Jonathan Ziprick - University of Winnipeg

To find out more about our visitors, please visit: www.iqc.ca/people and click on "Visitors"

APPOINTING NEW IQC BOARD MEMBER - GEORGE DIXON



Dr. D. George Dixon is the newest appointed IQC Board Member.

Dr. Dixon is currently Vice-President, University Research and Professor of Biology at the University of Waterloo.

Dr. Dixon has received both the Award for Excellence in Research and the Distinguished Teaching Award from the university.

He has over 25 years experience in aquatic toxicology and environmental risk assessment and management, principally but not exclusively, with respect to the environmental impacts associated with metals and mining activity.

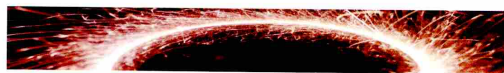
At various times during his career he has served as an advisor on metal contamination issues to Environment Canada, the Department of Fisheries and Oceans, the Department of Justice (Canada), the U. S. Environmental Protection Agency, the U. S. National Oceanographic and Atmospheric Administration, the Department of Justice (U. S.) and the World Health Organization, among others.

Dr. Dixon maintains an active research program, which at present is focused on development of methods for environmental effects monitoring, methods of assessing the environmental risks associated with exposure of aquatic organisms to metal mixtures, and on the aquatic environmental effects of oil sands extraction in northern Alberta.

Dr. Dixon is Associate Editor of three scientific journals, including the Canadian Journal of Fisheries and Aquatic Sciences.

George Dixon officially took up his position in March.

Photo Credit: Chris Hughes, University of Waterloo



PUBLIC DOMAIN



Speakers

- 1 JANUARY 12 – Robert Prevedel
"Experimental one-way quantum computing with linear optics"
- 1 JANUARY 19 – Frédéric Magniez
"Application of Phase Estimation in Quantum Walks"
- 1 JANUARY 23 – Avatar Tulsi
"General framework for quantum search algorithms"
- 1 JANUARY 26 – Sean Hallgren
"Quantum algorithms for ray class groups and some subfields of Hilbert class fields"
- 1 FEBRUARY 2 – Lawrence Ioannou
"Universal quantum computation in a hidden basis"
- 1 FEBRUARY 5 – Raisa Karasik
"Multi-particle decoherence free subspaces and incoherently"
- 1 FEBRUARY 9 – Michel Devoret
"Quantum-Mechanical Radio-Frequency Circuits"
- 1 FEBRUARY 23 – Rogério de Sousa
"The problem (and the origin) of magnetic noise from the interface"
- 1 FEBRUARY 23 – Jerome Tribollet
"The spin qubits in Zinc Oxide: promising systems for Quantum Information Processing"
- 1 FEBRUARY 25 – Maris Ozols
"How to Generate a Random Unitary Matrix"
- 1 MARCH 2 – Pawel Wocjan
"Quantum Speed-up for Approximating Partition Functions"
- 1 MARCH 9 – Christopher Monroe
"Quantum Networks of Atoms"
- 1 MARCH 16 – Wolfgang Tittel
"Photon-Echo Quantum Memory"
- 1 MARCH 18 – Sabre Kais
"Suppose we build a quantum computer, how chemistry can benefit from such a computer"
- 1 MARCH 23 – Daniel Nagaj
"Fast QMA Amplification"
- 1 MARCH 30 – Dominic Berry
"Phase Measurements at the Theoretical Limit"
- 1 MARCH 31 – Simon Nigg
"Universal detector efficiency of a mesoscopic capacitor"
- 1 APRIL 6 – Akimasa Miyake
"A scheme of measurement-based quantum computation"
- 1 APRIL 13 – Charles Santori
"Quantum optics with diamond NV centers"
- 1 APRIL 20 – Jungsang Kim
"Engineering a Quantum Information Processor"
- 1 APRIL 27 – Jérémie Roland
"The communication complexity of non-signaling distributions"

IQC LABS NOW OPEN FOR TOURING

IQC opens its doors to interested parties, to learn about the current experimental research being conducted throughout the year.

In attendance this term:

- > Waterloo-Oxford D.S.S
- > International Baccalaureate Physics Students
- > Open Text - IT Management Team
- > UW Computer Science Club
- > UW Development Officers
- > 4th Year UW QIP Students
- > The Information Technology Association of Canada (ITAC)
- > Science Teachers Association & RIM



Above: Duncan McGregor of Open Text, next to the QKD Experiment.

If you're interested in booking a tour, please contact Meghan Huras (mhuras@iqc.ca).

FINDING THE BALANCE: SCIENCE & ART

Internationally renowned artist, Royden Rabinowitch held a public lecture at IQC, on March 26th in reference to his latest sculpture, The Waterloo Bell - Bell for Kepler.

Entitled, "Humanity's Crisis of Being, Generated by the Scientific Revolution" Rabinowitch discussed the heuristic that allowed him to create his sculptures and drawings.

Recording of the lecture will be available for viewing at www.iqc.ca



Above: Artist, Royden Rabinowitch and IQC Director, Raymond Laflamme with The Waterloo Bell - Bell for Kepler.

UPCOMING CONFERENCES - REGISTER FOR YOUR SPOT!

The 4th Workshop on Theory of Quantum Computation, Communication, and Cryptography
May 11-13, 2009

Quantum computation, quantum communication, and quantum cryptography are subfields of quantum information processing, an interdisciplinary field of information science and quantum mechanics. TQC 200 focuses on theoretical aspects of these subfields. The objective is to bring together researchers so they can interact and share problems and recent discoveries. The workshop will be held at the University of Waterloo. It will consist of invited talks, contributed talks, and a poster session.

www.iqc.ca/tqc2009

The Undergraduate School on Experimental Quantum Information Processing
June 1-12, 2009

USEQIP is a two-week program on the theoretical and experimental study of quantum information processors aimed primarily at students who have recently completed their junior year. The program is designed to introduce students to the field of quantum information processing (QIP). The lectures are geared to students of engineering, physics, chemistry and math, though all interested students are invited to apply. The program has space for students and is fully funded through IQC.

The program will consist of lecture: introducing quantum information theory and experimental approaches to quantum devices, followed by hands-on exploration of QIP using the experimental facilities of IQC.

www.iqc.ca/conferences/useqip

The Quantum Cryptography School for Young Students
July 27-31, 2009

QCSYS is an exciting week-long program offered to Canadian students in Grade 11. This year's program will run in Summer 2009. The program is run by IQC in conjunction with the University of Waterloo.

Students will be given a first-hand look into one of the most exciting topics in modern science—quantum cryptography. Not only will students have the opportunity to be exposed to cutting-edge topics like quantum physics and cryptography—they will meet some of the most renowned researchers in the field. Students also receive a tour of quantum computing and cryptography experiments.

Applicants must have completed (or are currently finishing) Grade 11 Mathematics. Grade 11 Physics, while not mandatory, is recommended.

www.iqc.ca/qcsys

STRENGTH IN NUMBERS

WELCOMING THE BEST & BRIGHTEST

Dominic Berry Postdoctoral Researcher

Dominic Berry received his PhD in physics from the University of Queensland in 2002, specializing in adaptive phase measurements. He was a postdoctoral fellow at Macquarie University in Sydney from 2001 to 2004, after which he became an Australian Research Fellow at the University of Queensland.



He worked at Macquarie University again between 2006 and 2008, before moving to IQC in 2009. Dominic Berry works on the theory of both quantum information and quantum optics.

His research interests include the use of adaptive techniques to beat the standard quantum limit for phase measurements, processing of quantum optical states to achieve tasks in quantum information, quantum algorithms for simulation problems, and Bell inequalities.

Colm Ryan Postdoctoral Researcher

Colm completed a B.Sc in Engineering Physics at the University of Alberta in 2003 and then went on to do a Ph.D. under the supervision of Dr R Laflamme at IQC which he finished in 2008.



His doctoral work concentrated on implementing efficient scalable methods for characterizing and controlling several qubits in both liquid-state and solid-state NMR systems.

He is now building a pulsed ESR system which will allow implementation of optimal control pulse shaping techniques in electron-nuclear systems as he transitions to post-doctoral work under David Cory at MIT.

Research interests: liquid and solid state NMR, quantum optimal control theory, and dynamic nuclear polarization.

Outside of the lab Colm enjoys many outdoor activities and his latest enthusiasm is kiteskiing.

NEW STUDENTS

Graduate Students:

Akihito Soeda

Research Assistants:

Ranhee Choi
Stacey Jeffery
James Mracek
Yudai Nakagawa
Dan Thompson

Co-op Students:

Rosanne Li

BON VOYAGE GRADS!

Congratulations to IQC students, Devin Smith and Douglas Stebila on their recent successful thesis defenses.

Devin Smith defended his M.Sc. thesis entitled, "An Ultrafast Source of Polarization Entangled Photon Pairs Based on a Sagnac Interferometer" on January 16th.



After successful completion, Devin plans to work with Dr. Andrew White in the Department of Physics at the University of Queensland, in Brisbane, Australia.



Douglas recently completed his Ph.D. in Combinatorics & Optimization; his thesis was entitled, "Classical Authenticated Key Exchange and Quantum Cryptography."

Upon completion, Douglas has taken a postdoctoral position in the Information Security Institute at the Queensland University of Technology, in Brisbane, Australia. Bidding farewell with final remarks, "Best wishes to everyone at IQC!"

Best of luck to you both as you continue your research efforts in the land down under.



Departures

We bid farewell to members who are leaving us for the short, and for the longer term, and wish them the best of luck in their future endeavours.

- Devin Smith
Masters Student
- Douglas Stebila
PhD Student
- Nikesh Dattani
Research Assistant
- Likun Hu
Research Assistant
- Botan Khani
Research Assistant

For a full listing of IQC Alumni, please visit www.iqc.ca/people and click on "Former Members"

Did You Know?

IQC now has its own Facebook Group & Global Fan Page.

Become a member:
www.facebook.com

HOT OFF THE PRESS

Future Events

► 2009 IEEE CONFERENCE

The TIC-STH (Toronto International Conference - Science and Technology for Humanity) conference is an international forum for state-of-the-art research across a broad spectrum of the IEEE science and technology fields of interest.

This year, the conference is being held September 27-29, 2009 at the Toronto Marriott Downtown Eaton Centre.

The format includes several parallel Symposia focusing on the advanced scientific and technological problems, especially of the interdisciplinary nature.

Program topics range from Biometrics, to Nanotechnology, to Physics of Superconductivity.

Sitting on the Symposium Technical Program Committee are IQC members, Hamed Majedi (Chair), and Frank Wilhelm-Mauch (Co-Chair).



For more information and to register, please visit:
<http://www.TIC-STH2009.org>

For questions, comments or general feedback regarding IQC

contact:

iqc@iqc.ca

SIMPLIFYING QUANTUM LOGIC

Quantum computing promises to solve many problems that are hard on the computers we use today. Elementary logic gates have been demonstrated in many quantum systems, such as NMR, optics, ions, and superconductors. Now a major task is to use these quantum systems to compute in the most efficient way possible.

A recent work published in *Nature Physics* by first author Ben Lanyon and team leader Andrew White (University of Queensland), and involving two IQC faculty, Thomas Jennewein and Kevin Resch, has demonstrated a new method for efficiently combining quantum logic gates together to perform more complex tasks.

It is well known that one can decompose a Toffoli gate into single- and two-qubit gates, but it requires at least 5 two-qubit gates. This makes it too technically difficult for many physical systems today. Using a theoretical technique developed by Tim Ralph and coworkers, Toffoli gates can be implemented using as few as 2 two-qubit gates if one of the quantum information carriers is expanded from a two-level system to a three-level system, i.e., a qubit to a qutrit, for the duration of the computation. The addition of this extra level gives a little extra space needed for logic operations to proceed and results in large savings in resources.

In the *Nature Physics* work, the authors demonstrated the Toffoli gate operations on three optical photons, explicitly demonstrating the practicality of these ideas. While this specific experiment was optical in nature, the ideas are transferable to many quantum systems and may be a route to larger scale quantum information processing.

The research can be found online at:
www.nature.com/naturephysics

KEEPING A QUANTUM STATE ALIVE IN AN OPTIMAL WAY

One of the main challenges in the practical realization of quantum computing is the tendency of many quantum systems to become classical, non-quantum, over time. This process is called decoherence. For any given mechanism of decoherence, researchers usually manually construct strategies to overcome them to the largest possible extent.

New research from IQC involving visiting graduate student Patrick Rebentrost, Postdoc Dr. Ioana Serban, and Dr. Frank K. Wilhelm published in *Physical Review Letters* takes a more systematic approach. It applies a systematic optimization method to literally explore all possible strategies to overcome decoherence, and find the best one.

For a model ubiquitous to decoherence in qubits based on nanoelectronics, they show how a known strategy can be taken to a new

SIMULATING QUANTUM SYSTEMS

Masters student, Matthew McKague and Deputy Director, Michele Mosca's recent publication was featured in *Physical Review Letters* in January.

With collaborative work with Nicolas Gisin of the University of Geneva, the team explored how necessary complex numbers are in quantum theory.

"It is well known that we can formally represent everything in quantum theory using real numbers," McKague explains. "But we show that we can also do so operationally."

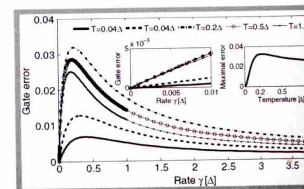
This means that they can duplicate the results of any quantum experiment using a different system that is described using only real numbers.

Importantly, they show that this can be done for multi-part systems where locality plays an important role. This solves two open problems, one involving restrictions on self-testing black-box quantum apparatus and the other involving Bell inequalities.

This research extends previous results which were unable to simulate local evolution on measurements with local operators and was limited to discrete evolution.

McKague and Mosca's research were featured as, "Simulating Quantum Systems Using Real Hilbert Spaces" in *Physical Review Letters*, 102, 020505 (15 January 2009).

level, improving quantum coherence by several orders of magnitude. This method should find wide applications in quantum computing devices from now on.



The team's research were featured in "Optimal Control of a Qubit Coupled to a Non-Markovian Environment" in *Physical Review Letters*, 102, 090401 (2 March 2009).

WINTER WONDERLAND

'TIS THE SEASON TO CELEBRATE

It was that time of year again for Santa to make his appearance at IQC's Annual Holiday Party. Held this year at the Waterloo Inn on December 11th, families and friends were invited to share a delectable dinner and show with fellow IQC members.



The youngsters all anxiously awaited their turn to sit on Santa's lap and received their gifts while the others were entertained by Crumbly the Clown. Thank you to all who attended the event.

ALOHA!

Once February hit, we combated the Winter blues and threw our first Hawaiian Party on the 13th. To kick-start our monthly IQC Gatherings, a pot-luck style party with video games and prizes were open to choose from.



Above: Osama Moussa shows off his flexibility in the Limbol.

SMALL PACKAGES



Mohammad Javad Mohebbi

Proud parents, Hamid and Shima and brother Mohammad Hossein Mohebbi welcomed Mohammad Javad, their new baby boy into their family on March 25th.

MODERNIZING THE TOBOGGAN

Why resort to the old-fashioned toboggan when you can hop in a tube? Propelling down the snowy mountainside, IQC members, families and friends felt the pull of gravity at Ontario's best Tube Park at Chicopee this February. Designed with specially made chutes, hold on to your hat, you could really feel the wind in your hair!



Left to right: Gina Passante, Jean-Luc Orgiazzi, Chris Erven, Kim Kuntz, Meghan Huras, and Chris Simmermaker.

Congratulations to the best dressed:

Evangeline Gambetta (Best Child)

Gina Passante (Best Individual)

Kurt & Meredith Schreier (Best Couple)



A reminder that the IQC Gatherings will occur the first Monday of every month.

PHOTO CONTEST

Every month we are having a photo contest. Send us your best photo of you decked out in your IQC gear! The more creative and exotic the location, the better!

Deadline submission is the end of each month. The winner will be announced and given a prize at the monthly IQC gathering, the first Friday of every month.

The only rules: the IQC logo must be visible, and those who use Photoshop will lose points!

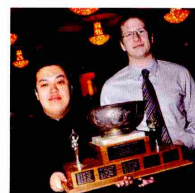


Athletics

COACH OF THE YEAR

At UW's 49th Annual Athletics Award Banquet, Ph.D. student, Chris Erven won the Imprint Coach of the Year Award for the Warrior's Varsity Badminton team after leading them to an OUA Silver Medal.

The trophy is presented to a Waterloo Varsity coach to recognize commitment to the physical and mental welfare of the student athletes.



Above: Chris Erven (right) accepting the Imprint Coach of the Year Award.

CHAMPIONS OF THE COURT

IQC students, Chris Erven, Nathan Killoran, and Mike Zhang teamed up with the University of Waterloo's Physics Department to make an all-star basketball team, "Maxwell's Demons." Their skills were put to the test against others from across campus.

At the end of the season, the team came out on top and finished first in their league. "I was the star of the team, just like Shakira O'Neal," claims Erven.

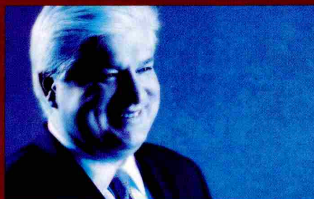
ICE HOCKEY

It wouldn't be real Canadian hockey if we didn't take it to the ice. With the frigid temperatures this Winter, players took to the ice covered pond behind RAC to play weekly games.

The K-W Record even gave our players a taste of fame and featured them in the Local section in February.

For more information about regular ice hockey games or to challenge our IQC team, please contact Professor Kevin Resch.

IQC THANKS ITS PARTNERS FOR THEIR
CONTINUING SUPPORT OF OUR VISION



MIKE & OPHELIA 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 Canada
Government of Canada
Helios/Oceana
Institute for Computer Research
Mathematics of Information Technology and
Complex Systems
Natural Sciences and Engineering Research
Council of Canada
Ontario Centres of Excellence
Ontario Innovation Trust
Ontario Ministry of Research and Innovation
Ontario Research and Development Challenge
Fund
Perimeter Institute for Theoretical Physics
Premier's Research Excellence Awards
QuantumWorks
Research In Motion
Silicon Graphics, Inc.
St. Jerome's University
Sun Microsystems, Inc.



IQC Institute for
Quantum
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