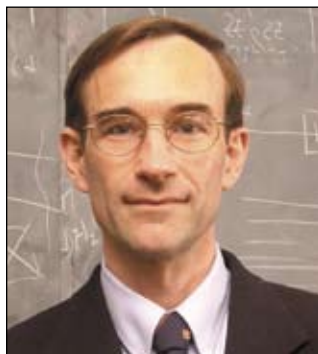


# COiN Meeting Review — September 10, 2007

By Glenn Gundermann



Dr. Raymond Laflamme



Michele Mosca

The first COiN meeting of the 2007/2008 year opened with a bang at the Institute for Quantum Computing (IQC), in Waterloo Ontario. First up was COiN president **Peter Starodub** to present gifts to outgoing board members **Jim Mathie**, **Eveline Gaede**, **Ken Brown**, and **Barbara McDonald**. It is very rewarding being a board member but also a lot of work. Good work you four for everything you have contributed to COiN!

## IQC

We had two fascinating speakers; **Raymond Laflamme**, a Director at IQC, and **Michele Mosca**, Deputy Director at IQC.

One interesting fact we learned was that IQC is the leader in quantum computing world-wide, and is attracting the world's best in their respective fields.

They have 16 full-time faculty members (10-11 are from outside Canada), 65 graduate students, and 20 post-doctorates. These people have a background in either: science, math, or engineering.

Other institutions are trying to catch up, including MIT, Cal Tech, etc. Right now there is some collaboration with these schools but only when beneficial to do so.

## What is Quantum Computing?

We learned the concept that a classical computer follows the laws of classical physics, whereas a quantum computer follows the laws of quantum mechanics.



(Originally used by Neil Gershenfeld in a quantum computing paper published in Scientific American magazine – [www.sciam.com](http://www.sciam.com))

We all know that our beloved computer uses bits at the lowest level. A bit can have two states; off and on, and we represent these states numerically as 0 and 1. In a quantum computer, the fundamental unit of information is a quantum bit (qubit), which can exist as a 0, 1, or simultaneously as both 0 and 1, with a numerical coefficient representing the probability for each state. This has enormous ramifications. For example, a molecule with only 50 qubits could store the same amount of information as  $2^{50}$  classical bits (1 Petabyte).

The night was full of complex terms, which made some sense at the time but are now long forgotten for some of us. Things like quantum superposition, quantum interference, and more...

The second IQC speaker Michele Mosca is an expert in quantum cryptography and talked about computationally secure cryptography. A quantum computer has the power of cracking any existing classical cryptography, whereas nothing, including another quantum computer, can crack quantum cryptography. In 5-10 years, government and military will be using quantum cryptography. There is obviously great potential for this new science.



"As soon as I heard about quantum computing," said Dr. Laflamme, "I wanted to show that it would never work. In the course of trying to demolish the argument, I changed my own mind!"



We walked away with a brochure and an interesting CD about IQC. Thank you Raymond and Michele!

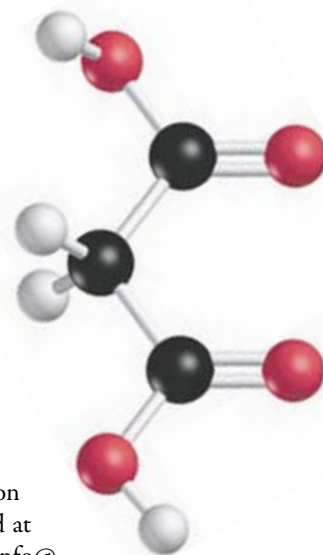
**Next Meeting:**

COiN's bi-monthly meetings are worth the drive for any System i professional who wants to continually keep learning.

Voice over IP (VoIP) will be the topic on November 5, 2007 at the Conestoga College meeting location.

**More Information:**

More information (including presentation materials and newsletters) can be found at [www.coinusergroup.ca](http://www.coinusergroup.ca) or e-mail [coininfo@coinusergroup.ca](mailto:coininfo@coinusergroup.ca) for further details.



"Quantum computing is not another way of speeding up or miniaturizing the computers we're familiar with. It's something fundamentally different, based on the more exotic aspects of quantum mechanics—how nature behaves at the atomic and sub-atomic level." — Patricia Bow author of the book *Leap of Faith*

TUG and COiN have a reciprocal arrangement whereby any TUG member can attend a COiN meeting and any COiN member can attend a TUG meeting.



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