



QuantumWorks NEWSLETTER

In This Issue

Associate Membership

Become an insider!

Workshop

Quantum Building Blocks team-members gather.

SECOQC

Live QKD Demonstration.

ETSI

QuantumWorks joins the European Telecommunications Standards Institute.

Write To Us....

We want to hear from you! Do you have a new publication you'd like to share? An event to advertise? A postdoc position to fill?

The semiannual QuantumWorks newsletter is always looking for information from members and our partners.

To contribute, or for any questions, comments or general feedback about the newsletter, contact Research Network Manager Sean Collins at collins@iqc.ca



Associate Membership Now Available

The quantum information processing field in Canada continues to grow and QuantumWorks is acting to reflect this expansion. To that end, QuantumWorks has introduced the designation of Associate Membership.

When first introduced at the Third Annual General Meeting and Technical Conference this past June in Montreal, the concept of Associate Membership was met with great enthusiasm.

New researchers are entering the Quantum Information Processing field and QuantumWorks strives to bring these newcomers into the folds of the established Canadian QIP community.

Existing QuantumWorks Members may nominate an individual at a university or research institution with whom they are or will be collaborating. Nominees may also be a representative of a private company or other organization with an interest in Quantum Information.

Associate Members in QuantumWorks will have the following privileges:

- * invitation to attend QuantumWorks events, including closed sessions at Annual General Meetings
- * eligible to request sponsorship of conferences, workshops, etc., subject to existing QuantumWorks regulations
- * candidate to become full Members of QuantumWorks, should another round of nominations arise

Watch for the announcement of Associate Member nominees that have been inducted into QuantumWorks. Together we are strengthening Canada's place in Quantum Information Processing.

For the Associate Member application form and more information please visit <http://quantumworks.ca/section/view/?fnode=100>

QuantumWorks Joins European Telecommunications Standards Institute

Following the SECOQC International Conference and Quantum Key Distribution Demonstration in Vienna, the ETSI Industry Specification Group on Quantum Cryptography and Quantum Technologies was launched. This group is an output of the SECOQC standardization initiative.

An Industry Specification Group (ISG) of the European Telecommunications Standards Institute (ETSI) is being formed to bring together the important European actors from science, industry, and commerce to address standardization issues in quantum cryptography, and quantum technology in general.

Successfully transferring quantum cryptography out of the controlled and trusted environment of experimental laboratories into the real world - with business requirements, malevolent attackers, and societal and legal norms to be respected - calls for special provisions. These provisions, though crucial for successful deployment, have not been sufficiently addressed yet. The ETSI QKD on Quantum Cryptography wants to shift the focus from development in laboratories to the real life environment.

ETSI representative Gaby Lehman announced, "The aim of this QKD ISG is to develop ETSI Group Specifications describing quantum cryptography for ICT networks. Quantum Key Distribution is the essential credential in order to use quantum cryptography on a broad basis. It

is the main task of the QKD ISG to specify a system for Quantum Key Distribution and its environment."

The QuantumWorks Network has joined the ETSI QKD ISG and will act as the portal through which Canada's key QKD scientists will reach the ISG. Dr. Norbert Lütkenhaus will take the lead role representing QuantumWorks within the ISG.

Furthermore, within the QKD ISG, a Specialist Task Force is being formed. An STF is a team of highly-skilled experts working together over a pre-defined period to draft an ETSI standard under the technical guidance of an ETSI Technical Body and with the support of the ETSI Secretariat. Dr. Lütkenhaus will lead the STF which includes fellow QuantumWorks members; Dr. Hoi-Kwong Lo (University of Toronto), Dr. Louis Salvail (Université de Montréal) and Dr. Michele Mosca (University of Waterloo).

The task of the STFs is to accelerate the standardization process in areas of strategic importance and in response to urgent market needs.

For more information, please visit

<http://www.etsi.org/WebSite/Technologies/QKD.aspx>





Midterm Review Gatherings

QuantumWorks is looking to its past to lay a path to its future. Canada's quantum information network is approaching the middle of its five-year mandate, and discussions are underway to answer the question of what comes next.

To facilitate this discussion, QuantumWorks is conducting a comprehensive review of network activities. The review will gather information in the three areas of focus for QuantumWorks: research in quantum information processing, both theoretical and experimental; production of highly qualified personnel; and the promotion of the field of quantum information processing in Canada and abroad.

The review will help track our areas of greatest strength so that they can be capitalized upon in the future. QuantumWorks is looking forward to using its current activities as a stepping stone; preliminary discussions have already affirmed the value of continuing to foster the "national community" of interested stakeholders from academia, industry and government institutions.

We look forward to publishing some of our statistics and success stories in the next QuantumWorks Newsletter!

Save the Date!

The Fourth QuantumWorks Annual General Meeting will take place June 11/12, 2009 in Toronto, Ontario!

Stay tuned to www.quantumworks.ca for registration information.



Led by Barry Sanders (Institute for Quantum Information Science, University of Calgary), twenty-three members of QuantumWorks Theme B - Quantum Building Blocks gathered September 10 & 11, 2008 at the Millcroft Inn in Alton, Ontario.

QuantumWorks researchers in this theme investigate devices that are the building blocks to implementing quantum information processing and provide the tools to assess the timescale and impact of quantum computing on information security.

The researchers shared their individual research progress and strengthened their approach toward common goals.

On October 2 & 3, 2008, a sub-set of Theme B members gathered to focus specifically on the Practical Issues of Quantum Key Distribution.

Led by Nobert Lütkenhaus, the group met at the Institute for Quantum Computing at the University of Waterloo.

Specifically the discussions centred around classical protocols: error correction/privacy amplification/parameter estimation, security of practical systems followed by presentations and discussions of actual QKD platforms developed by participating groups. Demonstrated platforms ranged from the use of free-space entangled photons, header based QKD in fiber and continuous variable QKD in fiber.



Accolades

As 2008 draws to a close, we would like to celebrate those in our membership who have been recognized in our industry and our society for their outstanding work.

Raymond Laflamme, the Scientific Director of QuantumWorks, has been named to Canada's highest academic honour. The Royal Society of Canada inducted Raymond as a fellow of the Society on November 15, 2008, in Ottawa.

The 2008 CAP/CRM prize in Theoretical and Mathematical Physics has been awarded to QuantumWorks researcher and theme leader, Dr. Richard Cleve.

QuantumWorks member Dr. Frank Wilhelm co-authored a review article in the leading science journal *Nature* on the field of superconducting circuits for quantum computing.

Early in 2008, the results of Dr. Alex Lvovsky's groundbreaking research into the trapping of a squeezed vacuum were featured in *Science Now*.

Team Addition

QuantumWorks is proud to welcome a new staff member. Stacey Desantis will take on the role of Media Developer.

Stacey has an extensive background in communications. She holds a college certificate from Niagara College in Broadcasting and Television Production and a second certificate from Centennial College in Web Design.

SECOQC International Conference...

Computersimulation of the Quantumcryptography-Network. Welcome Statements at the Live-Presentation by Jacques Bus (European Commission) and Christian Monyk (Austrian Research Centers)

Photos courtesy of the Austrian Research Centers



SECOQC International Conference, Vienna, Austria, Oct. 8-10, 2008.

The BBC Radio Science Unit proclaimed "Perfect secrecy has come a step closer with the launch of the world's first computer network protected by unbreakable quantum encryption at a scientific conference in Vienna."

The demonstration was held on October 8th, 2008, within the framework of the SECOQC international conference which ran until October 10th, 2008. The network consists of six nodes and eight intermediary links with distances between 6km and 82km (seven links utilizing commercial standard telecommunication optical fibres and one "free-space"-link along a line of sight between two telescopes). The links employ all together six different quantum cryptographic technologies for key generation which are integrated into the network over standardized interfaces.

QuantumWorks member Dr. Norbert Lütkenhaus was a key researcher in the SECOQC project and at the conference he gave a talk addressing the security of practical QKD systems. Fellow QuantumWorks member Dr. Hoi-Kwong Lo presented

an invited talk discussing the challenges of the deployment of QKD systems. Chris Erven gave a contributed talk on entanglement based QKD with two free space optical links. Erven is a student of QuantumWorks member Dr. Gregor Weihs.

In the framework of the Integrated EU-Project SECOQC a "Business-White-Paper" has been prepared. It addresses the business advantages, as well as the limitations, of this provably secure technology in order to facilitate the decision making process on utilizing quantum cryptography for the benefit of public or private organizations. The Business-White-Paper was presented at the international conference on quantum cryptography that took place after the demonstration of the quantum cryptographic network. The Business-White-Paper can also be downloaded from the project website at: www.secoqc.net

Information courtesy of SECOQC.

<http://www.secoqc.net/index.html>



RÉSEAU DE L'INFORMATION QUANTIQUE CANADA QUANTUM INFORMATION NETWORK CANADA

200 University Ave. W., Waterloo, Ontario, Canada N2L 3G1
p. 519-888-4567 x.38152 f. 519-888-7214

