

Faster, Cheaper is Winning Combination for X-ray Start-up

There's one detail the comic books never reveal: how did Superman ensure that he was getting the best image with his X-ray vision without exposing people to unnecessary risk?

The man of steel may not have worried about meeting international standards for X-ray safety, but for X-ray equipment manufacturers and users, safety is a top concern. A new invention by a researcher at the Robarts Research Institute makes it easier and faster to test how well digital X-ray systems are working and the systems' compliance with safety standards.

This technology is so revolutionary that a newly established start-up, formed to commercialize the technology, has already sold its first unit to an X-ray device manufacturer internationally.

This technology has its roots in the digital revolution. Just as digital cameras have supplanted film cameras in the home photography market, digital X-rays are quickly replacing traditional

film X-rays. The change is driven by the same cost and convenience factors in both fields.

If your holiday snapshots are dark and blurry, someone will inevitably suggest

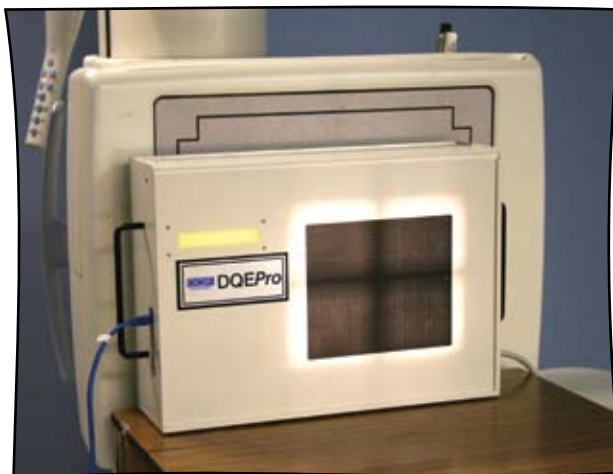
ment manufacturers need to balance the risks of X-ray exposure with the risk of an inaccurate diagnosis caused by a poor X-ray image; the goal is to generate the highest quality image with the fewest X-rays.

Fortunately there is a way to measure this balance using a methodology known as detective quantum efficiency (DQE). Unfortunately, traditional manual DQE tests are slow and expensive, taking about eight hours and costing approximately \$15,000.

Enter Dr. Ian Cunningham, a biophysicist at Robarts Research Institute and an expert in DQE who realized there had to be a better way. After years of research he invented the *DQEPro*, a laboratory-grade instrument for high-accuracy measurements of DQE.

Not much bigger than a laptop computer, the *DQEPro* can perform a complete DQE assessment in 15 minutes and doesn't require specialized training.

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The *DQEPro* ensures digital X-rays generate high quality images with minimum radiation exposure for patients.

you use a flash to add more light. When your flash is an X-ray, making it stronger creates health risks. Consequently, equip-

C4 Makes Cooperation Easier with Template IICA

Too many cooks won't spoil the broth if all the cooks understand their responsibilities.

That's the message of a jointly developed Inter-Institutional Commercialization Agreement (IICA) template recently released by C4.

The C4 IICA provides a template for splitting up the commercialization work for technologies which were created jointly by researchers at different institutions. It addresses important issues such as: who manages the commercialization activities, what kind of input or approval is to be given by the non-lead (partner) institution, and what happens if a partner fails to contribute financially to the commercialization expenses or wants to withdraw from commercialization.

The C4 IICA will be used at McMaster, Guelph, Waterloo, Western, Windsor, and Wilfrid Laurier universities whenever a technology is jointly created by researchers at more than one C4 institution. Other universities are free to adopt this template agreement.

The C4 IICA is based upon a collaborative approach to commercialization in which one institution takes the lead on commercialization but consults with and engages the partner institution in major decisions, such as patents and licenses. It reflects the standard approach at many C4 institutions, as well as the approach advocated by MATTO, the Massachusetts Association of Technology Transfer Offices.

"The C4 IICA establishes a baseline of expectations for multi-institution commercialization cooperation," says Elsie Quaitte-Randall, executive director of the McMaster Industry Liaison Office. "It is a template that universities across Canada will find useful."

The new IICA realizes C4's joint goals of sharing best practices between institutions and reducing the barriers for collaboration between both C4 members and other institutions.

The template, along with an explanatory guide, is available on the C4 website at: www.c4ontario.ca/templates

Inter-Institutional Commercialization Agreement

From Research to Product with C4 POP Funding

A way to detect toxins in liquids, such as apple juice; an MRI RF coil to measure whiplash; and a finger-free pointing system for surgeons are among the projects C4 has supported through its Proof-of-Principle (POP) fund over the past several months.

Applications are reviewed by commercialization experts. The program has several levels, providing a small amount of funding to early stage technologies, typically \$10,000. More advanced technologies are eligible for larger awards.

For example, Glen Crossley, a business development adviser based at McMaster University recently worked with a chemistry professor on a successful application that sought funding to validate a polymer-based capsule technology for delivering drugs into the human body.

"This funding is helping us move great research closer to the point where it can be used in a product to improve human health," says Crossley.

Here are some additional examples of the projects that C4 POP funds support.

Improving MRIs

Whiplash is a notoriously difficult injury for doctors to evaluate because it doesn't appear on standard X-rays or MRIs. Researchers at McMaster University have developed a new MRI technique designed specifically to measure whiplash severity. C4 POP funding will help the researchers refine their prototype MRI RF coil and the supporting software.

Worse than a pebble in your shoe



Kidney stones are an often painful condition that occurs in more than 10 percent of the population and has a high rate of reoccurrence. Researchers at the University of Western Ontario have developed a peptide that could be the first drug to stop kidney stone formation. The researchers will use their C4 POP funding to test the efficacy of this drug in animals.

Peptide as transport

What do Toastmasters and drug designers have in common? They both need a great delivery! Many potential drugs are

thwarted because there's no effective way to deliver them to the right place in the human body. Two technologies developed by a researcher at the University of Waterloo have received C4 POP funding to address this problem. The first uses peptides to deliver siRNA drug therapies. The second uses a similar peptide technology to deliver chemotherapy drugs to cancer cells. C4 POP funding will be used to refine and demonstrate the effectiveness of both technologies.

The gun shots came from over there

Sound is a key part of many video games, providing clues and warning, but sound can leave deaf and hard-of-hearing players at a disadvantage. Researchers at the University of Waterloo have invented a system of visual indicators to replace sound in video games. They will use their C4 POP funding to refine their prototype software in advance of marketing it to video game developers.



Symbol meaning "Gun fire is coming from direction forward"



Pointing a finger at innovation

How do you point to something when your hands are busy? This is a very real problem for surgeons using minimally invasive surgery equipment who need to keep their hands on their equipment while referring colleagues and trainees to an endoscope screen. Researchers in the Canadian Surgical Technologies and Advanced Robotics program at Lawson Health Research Institute have developed a system that allows surgeons to guide an endoscope screen pointer without using their hands. The team will use their C4 POP funding to refine their prototype with hopes of attracting a commercial partner.

Does this taste funny to you?



A poisoned apple fooled Snow White, but you can rest easy knowing your apple juice is safe thanks to researchers at the University of Guelph. They have developed a test to detect toxins in apple juice. The apple juice test is a proof of concept implementation for a testing platform that promises fast and inexpensive detection of toxic agents in liquids. C4 POP funding will be used to characterize the technology and apply it to a second problem, detecting toxins in orange juice.

I'd prefer a fly in my soup



Is your water contaminated with insecticides? Researchers at the University of Guelph have developed a paper-based sensor that can detect organophosphates (a common insecticide ingredient) quickly and inexpensively. C4 POP funding will allow the researchers to conduct stability and sensitivity tests, a key step in attracting commercial partners.

Knowing left from right

Distinguishing the left shoe from the right shoe is a challenge for many preschoolers. Like shoes, many chemical compounds also have left and right variants. Generally, the two variants exhibit different chemical properties. Unfortunately, manufacturing only the left- or right-handed version is often challenging. Researchers at the University of Waterloo have discovered a biocatalyst for the production of these chiral compounds, and with the help of C4 POP funding, they are developing an expression system and testing its stability.

Going online for sales

When McMaster University researchers wanted to assess the exercise habits of people with spinal cord injuries, they found there was no standard measurement, so they created their own. Now their tool, the Physical Activity Recall Assessment for Spinal Cord Injury, is fast becoming a standard. C4 POP funding will help them create an electronic version of the tool to market globally. ☒

Open or Closed? Exploring Software Commercialization

What happens when you ask one of the leading proponents of open source software commercialization a simple question? You get 12 more questions — all guaranteed to help you better understand your options.

Open or Closed? was the question C4 posed to Greg DeKoenigsberg, Senior Community Development Manager for Red Hat, one of the world's leading providers of Linux and open source technology. C4 wanted to help software businesses and academics understand the business model implications of choosing open source or proprietary/closed source strategies for software commercialization.

Greg DeKoenigsberg's 12 Questions

1. Do you want to create perfect software?
2. Do you want to create modular software?
3. How open do you want to be?
4. Who are your lead users?
5. Is your user base heterogeneous or homogeneous?
6. Fail properly?
7. Do you want to get rich or make a living?
8. Where will you find talent?
9. Do you have a leader?
10. Will your software outlive you?
11. Are you creating intellectual property or intellectual capital?
12. Are you part of the software industry or a software society?

DeKoenigsberg responded with a dozen questions of his own (see sidebar). These questions prompted attendees to consider their strategies and goals. His pithy questions, such as “Hetro or Homo?” and “Will your software out live you?” drew out the distinctions between the open source and proprietary software.

For example, “Hetro or Homo” looked at the challenges of a heterogeneous user base compared to a homogeneous user base. His conclusion was that the more heterogeneous your user base, the more

your software will benefit from the community input of an open source model.

DeKoenigsberg's dynamic and thought provoking lecture started a half-day session devoted to software commercialization. It was attended by approximately a hundred members of the software community from across Southwest Ontario, ranging from start-up companies to academic researchers to economic development representatives.

DeKoenigsberg was followed by a presentation on the legal issues to consider in commercializing software by Anthony de Fazekas of Miller Thomson LLP.

The morning closed with a panel discussion between three Ontario companies each using proprietary, open source and hybrid strategies. Moderated by Evan Leibovitch, Director of CLUE-Canadian Association for Open Source, the panel focused on the business implications and experience of open source.

Panelist Tom Lee of Maplesoft indicated that even a proprietary software company, such as Maplesoft, has to take account of the open source movement and learn how to co-exist with it. He pointed to aspects of Maplesoft's that are “somewhat open” as examples of Maplesoft's adaptation to the growing open source movement. He was joined by Perry Roach, CEO of Netsweeper and Jonas Brandon, Director of Business Development for ePresence.

Attendees concluded the session with a vigorous round of questions for the speakers. At the close of the forum, it was clear that many had an expanded understanding of the implications of open source on software commercialization.

Speakers' presentations are available on the C4 website at: www.c4ontario.ca/news-room/press-releases/software-wrap-up.



Greg DeKoenigsberg speaking at *Open or Closed?*

Patents Recently Issued to C4 Members

Methods and Compositions for Inhibiting Thrombogenesis

Canadian Patent 2,217,054

Reduction of Iron Ore in Ore/Coal Mixtures

Canadian Patent 2,254,220

Arborescent Thermoplastic Elastomers and Products Therefrom

China Patent ZL 02811035.8

Fluidization Additives to Fine Powders

China Patent ZL 03816550.3

Method and System for Optimizing Dose Delivery of Radiation

U.S. Patent 7,529,339

Novel Inducible Genes from Alfalfa and Methods of Use Thereof

U.S. Patent 7,329,798

Method of encapsulating hydrophobic alcohols in polyurea capsules and particles

Australian Patent 2003232543

Methods and Compositions for Inhibiting Thrombin Generation at the Surface of Cells Within an Atherosclerotic Plaque

U.S. Patent 7,524,826

Method and System for Optimizing Dose Delivery of Radiotherapy

U.S. Patent 7,496,173 B2

Reduction of Sperm Sensitivity to Chilling

Canada Patent 2,304,197

Biofuel Cell

India Patent 227974

Novel HIV Vaccine

Europe Patent 1,105,498

C4 POP funding helps establish market for *DQEPro*

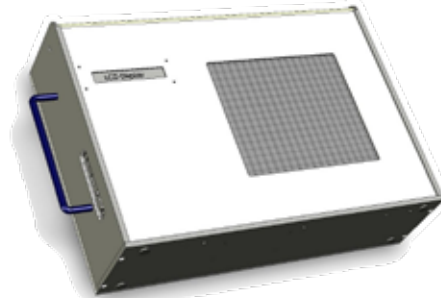
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Once he developed the system, Cunningham began to work with business development officer Sandy Vascotto with *WORLDDiscoveries*, the umbrella technology transfer office for Robarts Research Institute, the University of Western Ontario, and Lawson Health Research Institute.

"We quickly realized that this was a great opportunity. There was a strong demand from X-ray equipment manufacturers, and more importantly, there was the potential to sell to X-ray equipment users, such as hospitals," recalls Vascotto.

The biggest challenge was overcoming the natural skepticism of users who are typically highly trained. Vascotto and Cunningham quickly realized that nothing short of a multi-site trial proving the *DQEPro's* effectiveness would suffice. This solution left them in the classic catch-22

of commercialization: they didn't have the funds for a study, without which they'd never generate sales, so Vascotto turned to C4 for Proof-of-Principle Funding.



Engineering drawing of the *DQEPro*

"That funding really made all the difference," says Vascotto. "We were able to engage industry leaders and the Food and Drug Administration in the U.S. in a rigorous study to demonstrate the compli-

ance of *DQEPro* measurements with industry standards. This really helped pave the way for market acceptance."

Today *DQEPro* is the only instrument on the market that provides an alternative to manual measurements. *WORLDDiscoveries* has established a start-up company, *DQE Instruments*, to manufacture and sell the *DQEPro* globally. The company has already sold one unit and hopes to sell several more by year-end.

"By funding this study, C4 helped not only to get our first sale, but the study also has expanded our tangible market," says Vascotto. "By proving that DQE measurements can be done quickly, inexpensively and accurately by hospital X-ray quality assurance and safety offices, this study has made it feasible for regulators to consider post installation DQE testing, creating a much larger market for the *DQEPro*." ☒



Ontario Premier Dalton McGuinty visits the C4 kiosk in the Ontario Pavilion at BIO 2009 along with then Minister of Research and Innovation, John Wilkinson. Pictured (left to right): Sue Bennett, John Wilkinson, Elsie Quaite-Randall, Sheldon Smart, Dalton McGuinty, and Olga Petrik.

On the Road with C4

C4 had a busy spring promoting inventions and discoveries from our partner institutions at industry events. C4 members presented technologies at OCE Discovery in Toronto, Tech Connect in Houston, and the BIO World Congress in Montreal. C4 also joined the Ontario Pavilion at BIO this year in Atlanta

In recessionary times, tradeshows are a cost effective way for C4 to meet partners and potential licensors, laying the ground work for future sales. As tradeshow veteran Ling Ting, a business development manager at *WORLDDiscoveries*, notes, business development is long-term endeavor. For example, he recently signed a technology that can predict the likelihood of and risk associated with preeclampsia. He made his initial contact with the licensor at BIO 2007.

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The Stepping Stone is produced by C4, Southwest Ontario's technology transfer community. Questions regarding C4 may be directed to:

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