Research the world is watching

By: Kim Latimer

Dr. John Rowlands has invented and patented a faster, higher-quality digital x-ray detector that is significantly better and less expensive than x-ray devices being used in hospitals now. His invention, called the X-ray Light Valve (XLV), promises to make digital x-rays more accessible to people in the Northwest, and eventually around the world. And, his XLV invention is garnering international attention.

"The idea is that the XLV technology would be used first in mammography as a faster, better, less expensive way to screen for breast cancer, and eventually that would expand to other medical imaging applications," says Dr. Rowlands.

Dr. Rowlands says the XLV allows x-ray images to be read off of a liquid crystal layer on a scanner similar to the common computer scanner. All that is required is conventional computer technology and a high-voltage power supply.

"Think of XLV like you would a digital camera," says Dr. Rowlands. "We've moved away from using film, now you can instantly see the image and you can make or manipulate multiple copies then send them via email," he explains. "XLV produces even higher quality digital x-ray images at much less cost than the present-day digital medical devices and these images can be manipulated and sent quickly."

"Right now we use costly, cumbersome machines to provide digital x-ray images. By comparison, XLV technology is a fraction of the cost to manufacture, it produces a better image, and it allows more people to have access to digital x-rays."

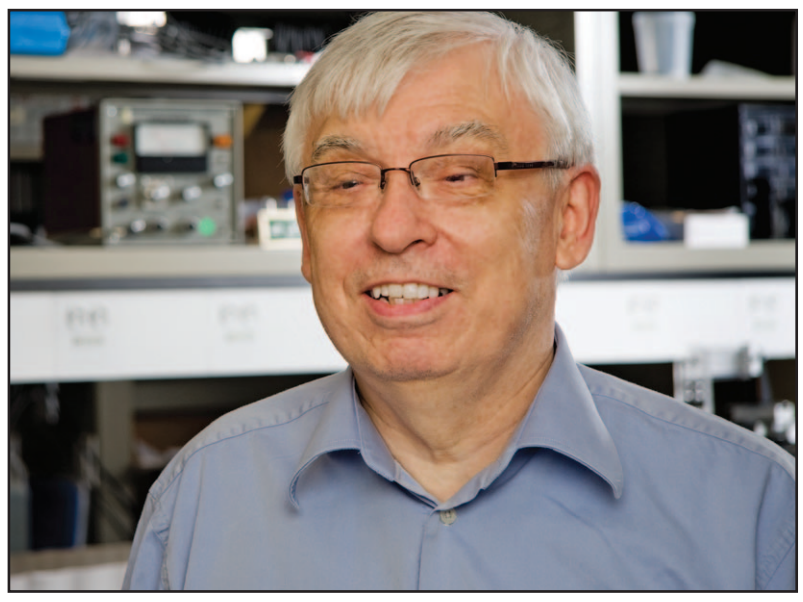
Dr. Rowlands is well known for his leading cancer research in medical imaging and physics. He has affiliations with several healthcare organizations as Founding Scientific Director of TBRRI, Adjunct Professor of Physics at Lakehead University, and Professor of Medical Biophysics at the University of Toronto. He is also a Senior Scientist in Imaging Research at Sunnybrook Health Sciences Centre in Toronto.

He says his goal is to use the technology first in rural Canada, and then expand into emerging markets making it available to other countries such as China and India, for example.

"When I travelled to India it had a profound impact on me," he recalls. "I have been working in this field for 30 years and this is an opportunity to provide x-rays to the masses, many of whom do not have access now."

"What I've done is taken a very simple piece of equipment and married it with a very sophisticated system," he explains. "Thirty years ago it would've been unthinkable to look at radiography images via computer, now we're moving at an exponential pace to improve those images."

It isn't his first ground-breaking invention. Dr. Rowlands' most significant contribution to research practice to-date is the advanced direct conversion flat panel detector used in digital diagnostic devices. It is now used around the world in digital radiography (digital medical images) and fluoroscopy (a continuous x-ray image on a monitor, like an x-ray movie).



Dr. Rowlands is leading cancer research in medical imaging and physics.

Scientists share research on the world stage

By: Maegen Lavallee

Scientists Dr. Oleg Rubel, PhD and Dr. Christopher Phenix, PhD of Thunder Bay Regional Research Institute (TBRRI) have been receiving a number of invitations to present and promote their research to health experts around the globe. They say the attention is vital to the development of future discoveries and funding opportunities for healthcare research in the region.

Dr. Oleg Rubel was invited to several top universities in Ukraine to speak to professors, students and executive representatives about TBRRI. Presenting to audiences of more than 200 people, Dr. Rubel had two objectives; fostering scientific collaboration and raising student awareness about educational opportunities at TBRRI and Lakehead University (LU). Born and raised in Ukraine, he says "it was a great honour to be asked to return to my home country and promote the amazing opportunities available here in Thunder Bay."

Dr. Rubel has been a scientist at TBRRI and adjunct professor of physics at LU since 2008. His research facilitates development of new technologies for radiation medical imaging, by gaining an understanding of the mechanisms responsible for a detectors performance through mathematical modelling. By collaborating with other scientists, the research aims to decrease the radiation dose to patients and lower the cost of imagers. Being published in high-ranked international journals has brought awareness to his research, but the contacts he established from his travels have drastically improved his scientific relationships.

"We are making remarkable advancements here at TBRRI, but research is not an individual discipline, we need to share our ideas and encourage strong students in order to enhance our position as pioneers and build the knowledge base in our area," says Dr. Rubel.

TBRRI Scientist, Dr. Chris Phenix, was recently invited to The International Chemical Congress of Pacific Basin Societies - one of the most prestigious chemistry conferences in the world.

Dr. Oleg Rubel recently returned from the Ukraine where he presented to hundreds of students and professors, raising awareness about educational opportunities at TBRRI and Lakehead University.

Colleague Dr. Christopher Phenix was also recently invited to give a talk at one the most prestigious and respected chemistry conferences in the world. The International Chemical Congress of Pacific Basin Societies takes place every five years in Honolulu, Hawaii and is organized by the Japanese, American and Canadian Chemical Societies. His presentation entitled "PET Imaging of Direct Enzyme Replacement Therapy" concerned his state-of-the art work using medical imaging to track medicine once administered inside the body. Growing up on a farm in Saskatchewan, Dr. Phenix has a unique perspective on education and international collaboration. "Despite the lure of oil money, I stayed in school because I enjoyed learning and have never regretted it," he says.

While obtaining his PhD in biological chemistry at the University of Saskatchewan and later his postdoctoral fellowship at UBC, he shared a lab with researchers from over 25 countries. "I realized that in addition to local collaborations, nurturing global partnerships is imperative to impactful scientific discovery" says Phenix.

A scientist at TBRRI and adjunct professor of chemistry at LU since 2009, Dr. Phenix has been developing new strategies towards personalized medicine by using nuclear imaging to evaluate patient biochemistry - enabling earlier diagnoses and assessment of therapy. Despite the extremely competitive environment of healthcare funding, he says the current recognition TBRRI is receiving goes a long way.

"As we continue to showcase our research talent and interests in Thunder Bay, and on an international scale, we will see an increase in funding and collaborative opportunities develop in the future."

Discovery Fund supports medical research in NWO

By Tracie Smith

An acorn, planted over 15 years ago, is growing into a mighty oak. Beginning in 1994, the Northern Cancer Research Foundation funded medical research through donations from the people of our community. Donor support helped equip a research lab, attract scientists and provide several grants that allowed scientists to investigate cancer treatments.

That support not only led to breakthroughs in cancer research, it also set the stage for the unprecedented growth of world-class medical research. Today, the Thunder Bay Regional Research Institute is gaining a global reputation as a centre for excellence in medical research and innovation.

Already, TBRRI is attracting numerous world-class scientists to conduct research. More will join them when the facilities are in place to support their work. Scientists across the globe seek out the right conditions that will ensure the continued progression of their research initiatives.

"That's why we've established the Health Sciences Discovery Fund," explains Brian McKinnon, Chair of the Thunder Bay Regional Health Sciences Foundation. "Through the Health Sciences Discovery Fund, we continue the honourable tradition of advancing world-class patient care and research here in Northwestern Ontario."

Northwestern Ontario is fast becoming known on a global level as a centre for excellence in medical research and innovation. The Health Sciences Discovery Fund allows everyone to be a part of it.

Donations provide the means scientists require to support their research: research and medical equipment, support staff and project funding.

Brian McKinnon says donations to the Health Sciences Discovery Fund allow scientists to expand their research and provide a very effective recruitment and retention tool.

Beyond that, donations to the Health Sciences Discovery Fund are an investment. "Gifts support a thriving research environment. And here in Northwestern Ontario, medical research is an important economic engine. Researchers bring with them grants, employment opportunities and millions of investment dollars," says McKinnon.

"We are committed to raising the funds needed to provide the seed money to sustain five years' research activity," McKinnon says. "This research, these scientists – they're integral to the future. Not only for the health of people around the world, but also for the economic health of our region. It is incredibly important. I encourage you to be a part of it."

To contribute, or to learn more, contact the Thunder Bay Regional Health Sciences Foundation at 807-345-4673 or visit www.healthsciencesfoundation.ca.

TBRRI attracts international students to Thunder Bay

By: Kim Latimer

Two international Master students from Mexico spent the past six months in Thunder Bay working with scientists at Thunder Bay Regional Research Institute (TBRRI). Carlo Moreno, 30 and Elisa Cepeda, 29, are both completing their Master of Instrumentation Engineering degrees with a placement at TBRRI.

"It's a different world from life in Mexico City," says Cepeda. "It means a lot to me to come and study under TBRRI scientists like Dr. Laura Curiel and Dr. Samuel Pichardo…I came here because these scientists are here."

Both Moreno and Cepeda come from the Universidad Nacional Autónoma de México (UNAM) or National Autonomous University of Mexico, a public university in Mexico City. UNAM has one of the largest enrollments, and is one of the most recognized universities in Latin America. It's renowned for programs in mathematics, physics, engineering, medicine, law, and architecture. It is also the only university in Mexico with alumni who are Nobel Prize laureates, including: Alfonso García Robles (Peace), Octavio Paz (Literature), and Mario Molina (Chemistry).

"UNAM is an excellent university, but it's better to go to another university to complete part of my Master degree," says Moreno. "I came to Thunder Bay because my supervisor at UNAM has good contacts with TBRRI scientists who also come from Mexico."

Dr. Gabriel Eduardo Sandoval-Romero, a National Researcher with a Master of Science and a PhD in Instrumentalist Engineering, supervises the students at the Centre for Applied Sciences and Technological Development (CCADET) at UNAM.

Pictured from left to right: Elisa Cepeda, Dr. Laura Curiel, Dr. Gabriel Eduardo Sandoval-Romero, Carlo Moreno, and Dr. Samuel Pichardo at the TBRRI facility in the ICR Discoveries Building on Munro Street.

CCADET's mission is to carry out original applied research, technological development and human resources in Mexico, by offering high-quality programs in cybernetics and systems, computing, science and technology, applied physics, electrical engineering, and mechanical engineering. The Centre also aims to contribute to technological innovation in Mexico.

Dr. Romero recently travelled to Thunder Bay to visit his students and his colleagues at TBRRI, including scientists Dr. Alla Reznik, Dr. Curiel and Dr. Pichardo. He says Thunder Bay is an attractive option for his students because some of the scientists at TBRRI speak fluent Spanish which helps them adapt and feel comfortable here.

"We see this as a real opportunity," says Dr. Romero, "The partnership between TBRRI and Lakehead University is an excellent one, and we are interested in UNAM partnering with TBRRI and Lakehead University to bring more Master and PhD students from Mexico for placements."

Others are interested too. Over the past year students from the Ukraine, Germany and France have worked at TBRRI. Scientist Dr. Alla Reznik has been teaching students in physics and bio-medical imaging, establishing a collaborative network between Lakehead University and TBRRI. She is also other attracting interest from research institutes in North America and Japan.

She says there is a need to attract bright, motivated students from many fields including physics, engineering, and biology. She says the multidisciplinary training is necessary for scientific advances in medicine.

"Students who work with us have the opportunity to specialize in healthcare oriented physics and engineering. They also to learn about how they can contribute to this rewarding, fast-paced field," says Dr. Reznik.

Material has been provided by Thunder Bay Regional Health Sciences Foundation and its partners.