



# INNOVATIS

## Photodynamic Therapy a Bright Reality in Cancer Treatment

Physician-Researcher and Photochemist share \$100,000 EnCana Principal Award



Dr. Roy Pottier and Dr. James Kennedy, 2007 Principal Award Recipients

Apply cream. Shine light. These are the instructions for ALA-photodynamic therapy, a 20-year veteran in the fight against skin cancer. Photochemist Roy Pottier and physician-researcher James Kennedy discovered the therapy's underlying process while searching for photoactive chemicals to use in cancer treatment. For their pioneering work, the two have received the \$100,000 EnCana Principal Award.

The researchers teamed up in 1979 in Kingston, Ontario, where Pottier was a professor with the Royal Military College of Canada and Kennedy was a practicing physician and professor with Queen's University.

When Dr. Pottier first heard his colleague's "bright" idea to use the body's own chemistry to kill unhealthy cells, he was, admittedly, "a bit

skeptical."

The compound 5-aminolevulinic acid (ALA) is a precursor of heme, which forms part of hemoglobin and other important proteins. In the cells of the body, ALA converts to a more complicated building block called protoporphyrin. Protoporphyrin is a photosensitizer, which, once activated by light, creates damaging, reactive forms of oxygen. Dr. Kennedy reasoned that applying ALA to the skin followed by treatment with the right wavelength of light would kill cells in the treated area.

Initial tests included some self-experimentation on the part of Dr. Kennedy, who tried the procedure on selected areas of his own skin. Auspiciously, he experienced no hair loss or scarring, common side effects of ionizing

*continued on page 2...*



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Principal Award

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### Inside this issue:

Digital Communications Get  
Boost from Waterloo  
Researcher  
Page 2

Mercury Emissions Monitor  
Receives \$10,000 Award  
Page 3

Leading Electronic Patient  
Care Reporting System Wins  
\$10,000 Award  
Page 4

## Digital Communications Get Boost from Waterloo Researcher's Data Compression Innovations



*\$25,000 Manning Award of Distinction goes to Dr. En-hui Yang*

The University of Waterloo's Dr. En-hui Yang has won a \$25,000 Manning Award of Distinction for his inventive solutions for data compression. He is Co-founder of SlipStream Data Inc., now a subsidiary of the Ontario-based company, Research in Motion. Many of SlipStream's products are the direct result of Dr. Yang's theoretical work on data compression.

"Once I developed a new theory and really appreciated its beauty," said Dr. Yang, "I asked myself, how do I make it practical?" Today, more than 2200 Internet Service Providers in over 50 countries use his technologies to speed digital communications.

Dr. Yang continues to add to his series of file-shrinking and network optimizing solutions, which speed tasks such as web browsing or checking e-mail with portable communications devices such as smart phones and lap tops.

Effective data compression makes data transfer more efficient, explained Dr. Yang, adding that one benefit is the lower bandwidth needed for smooth Internet sailing. In addition, with improved efficiency, less power is used, thereby extending the life of batteries for portable communications devices.

"Dictionary-based" data compression technology works by eliminating redundancy in information, essentially by creating and using a list of abbreviations. But older means of data compression cannot keep pace with the speed required for multimedia communications. Dr. Yang's methods, however, take data compression one fundamental step back, by also compressing the rulebook used to decode compressed data. Commercial applications of his lossless data compression algorithms bring back Word documents, banking information and other text files exactly as they were.

With his colleagues at SlipStream, Dr. Yang has also developed methods for "lossy" compression, used to shrink audio or visual information.

It's satisfying to see his technologies commercialized, he noted: "It's not only results on paper." He added that the Manning Innovation Awards send a message to Canadians about the importance of innovation.

**CanWest Global Communications Corp.**  
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*...continued from page 1*  
 radiation treatment. By 1987, sure of the ALA treatment's safety and efficacy, he began to treat patients using ALA in a cold cream and a 500-Watt slide projector as a light source.

The novel approach succeeded so well, explained Dr. Pottier, because the body recognizes ALA as natural. In contrast, the body tries to rid itself of artificial drugs. Furthermore, malignant and pre-

malignant cells preferentially accumulate protoporphyrin, the photosensitizer, and thus become prime targets for ALA-photodynamic therapy.

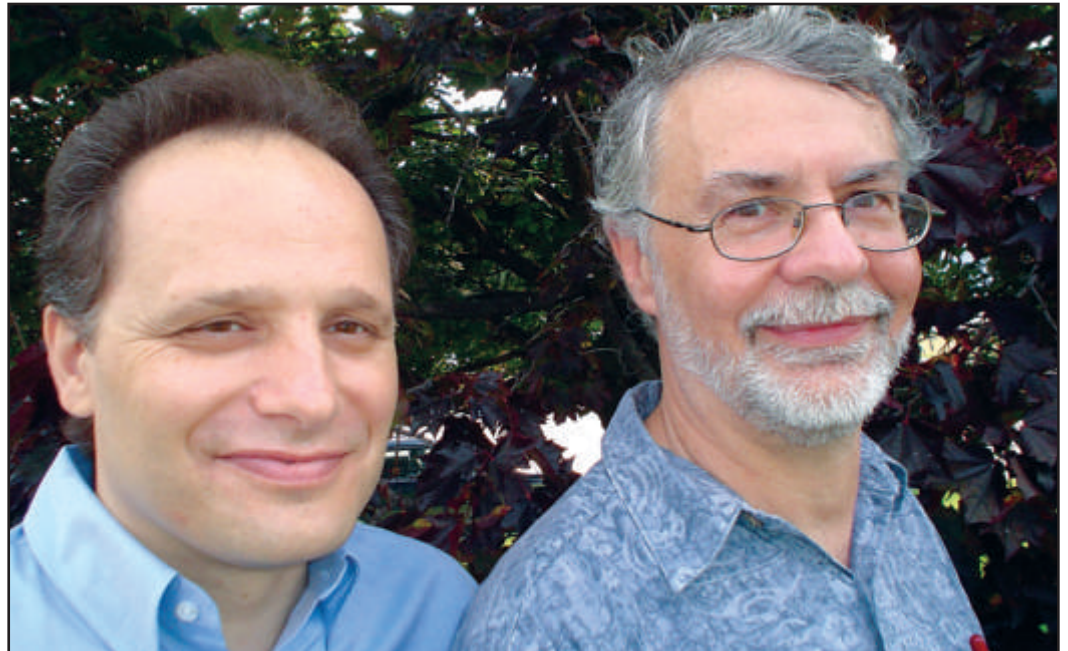
The treatment, licensed to DUSA Pharmaceuticals, Inc.®, has been used successfully to treat over 300,000 cases of the pre-cancerous skin condition, actinic keratosis. DUSA® also markets a related product for persistent acne.

Though recently retired, both Drs.

Pottier and Kennedy are excited about the therapy's potential applications. Researchers are currently investigating the use of ALA-photodynamic therapy for various cancers and skin conditions, as well as infections caused by bacteria, fungi or parasites.

Receiving the Manning Principal Award is a fulfilling way to finish a career, noted Dr. Pottier. "(We're) in good company now," he said.

## Mercury Emissions Monitor Yields a \$10,000 Manning Innovation Award



*Frank Schaedlich and Daniel Schneeberger*

### Sponsored by the Arthur J. E. Child Foundation

*The late Arthur Child was one of the founding Trustees and long-time Treasurer of the Ernest C. Manning Awards Foundation*

Frank Schaedlich and Daniel Schneeberger have won a \$10,000 Manning Innovation Award for their revolutionary work on mercury monitoring, culminating with the Tekran® Series 3300 Mercury Continuous Emissions Monitor (CEM). The CEM operates automatically, 24/7 to detect various forms of mercury in smoke stack gas, a particularly difficult task given the cocktail of emissions.

Mr. Schneeberger said that he and Tekran® Co-founder Schaedlich are honoured to receive an award from a Canadian foundation, adding that the recognition from outside the mercury-testing community is especially gratifying.

Mercury contamination of air, water and soil is a serious health concern, even at low levels. When governments began to make mercury-monitoring a priority in the early 1990s, available testing methods were cumbersome, time-consuming and unable to detect mercury at very low concentrations. It was Tekran®'s Total Mercury Analyzer that made testing ultra-sensitive and automatic, with results every few minutes. As a consequence, scien-

tists no longer had to analyze air samples in an ultra-clean lab.

The breakthrough technology allowed Canadian scientists to recognise the extent of mercury contamination in the Arctic. In fact, when scientists discovered how much mercury was falling out of the Arctic sky during springtime, they thought their monitoring systems were failing. "It took us over a year to actually convince everybody that the numbers were correct," said Mr. Schaedlich.

More recently the innovators developed a mercury-monitoring system that can distinguish among different forms of mercury in power plant emissions. "There's a lot of nasty stuff in smoke stack gas," said Mr. Schaedlich, adding, "it's basically like trying to find a needle in a haystack."

The Nanticoke Generating Station in Ontario and Poplar River Generating Station in Saskatchewan are two of many coal-fired plants that use the Tekran® Series 3300 CEM. The US Environmental Protection Agency has tested the CEM and purchased several units, and hundreds of power plants in the United States will soon be using it.

We're on the web:  
[www.manningawards.ca](http://www.manningawards.ca)

## Leading Electronic Patient Care Reporting System Wins \$10,000 Award

Christopher D. McNamara is the visionary and lead architect of Siren ePCR™ Suite, the most used electronic pre-hospital patient care reporting system in the world. His computerized system, which replaces the unwieldy paper forms that paramedics and other first-responders must otherwise deal with, has won him a \$10,000 Manning Innovation Award.

The Siren ePCR™ system includes a rugged tablet computer with a touch screen that paramedics can easily use at the scene of an emergency or in the back of an ambulance while attending to a patient. An easy-to-navigate user interface allows paramedics to efficiently complete patient care reports and other essential forms.

“Paramedics don’t like filling out paperwork,” notes Mr. McNamara, adding that it is not unusual for paramedics to jot notes on their gloves or a pillowcase, and to complete patient care reports only after arriving at the hospital. Instead of getting back out on the road, ambulances are in stasis until the paperwork is done.

A long-time medical first responder with several volunteer organizations, Mr. McNamara recognized a critical, global health care need for a real-time, electronic documentation system. While completing his Bachelor of Arts degree at the University of King’s College and Dalhousie University, Nova Scotia, he began developing his idea. Upon graduating in 1998, the 23-year-old McNamara founded Medusa Medical Technologies in order to further develop and commercialize his innovation.

By 2003 Medusa had joined forces with Medtronic Physio-Control Inc.—



*Christopher D. McNamara*

the US company that pioneered defibrillation technology—in order to market and develop electronic patient data systems. More recently Medusa has partnered up with Computer Sciences Corporation of California to install Siren ePCR™ Suite in 60 percent of ambulances in England.

The potential for the technology to improve patient care and increase operational efficiency is significant, given that the Siren ePCR™ system can be linked to hospital databases, 911 dispatch systems, electronic health records, and drug and protocol databases. Medusa has had positive feedback from Siren ePCR™ users in North America and the United Kingdom, who report that paramedics’ documentation has improved, thereby increasing quality assurance and opportunities for medical research. Emergency doctors are also better prepared to receive patients, because they are receiving legible and complete documentation.



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**\$10,000 Manning  
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### Manning Innovation Awards

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*Established in 1980, the Ernest C. Manning Awards Foundation was named in honour of, and under the patronage of, a statesman whose own innovative ideas provided much inspiration during half a century of public service.*