



# INNOVATIS

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Innovation Awards



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## Young Canadian Innovation Awards Program Celebrates 10th Anniversary



Janice and Patricia Cuthbert: Young Canadian Award winners

In 1992, Janice and Patricia Cuthbert, from Winnipeg, were among the first recipients of the Manning Young Canadian Innovation Awards — a new awards program designed to recognize the outstanding achievements of high-school science fair contestants.

For the Cuthbert sisters, aged 17 and 18 at the time, their winning project, ‘Salads in Space,’ resulted in a \$2,000 award and a trip to Calgary to be formally recognized at the Manning Foundation’s annual awards dinner.

“We were quite proud to be the first female recipients...it meant a lot to be recognized,” says Patricia in a recent telephone interview.

The Cuthbert project won the award by developing a process and a product that would allow astronauts to grow fresh vegetables in space.

Today, the two sisters continue to pursue their interests in plant breeding, a topic that has interested them since a neighbour first dared them to find and collect double petunia seeds.

Thanks to that early encouragement,

including the Manning Young Canadian Innovation Award, both Patricia and Janice have now completed Master’s degrees in Canola Breeding and Pathology from the University of Manitoba.

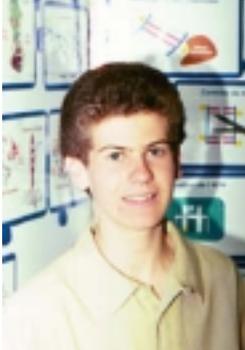
In addition, Janice recently won the \$120,000 Peter Dyck Fellowship to pursue her PhD studies in cereal breeding and pathology.

Now in its tenth year, the Young Canadian Innovation Awards program continues to celebrate the ingenuity and resourcefulness of young people across the country.

Using the Canada-Wide Science Fair as a source of potential award winners, candidates follow a process that begins with regional competitions, proceeds to the national science fair and finally culminates with the Manning Foundation’s annual awards dinner.

As always, the Young Canadian Innovation Award winners provide a magical touch to the dinner as they enthusiastically describe outstanding innovations well beyond the caliber expected from high school students.





☑ *\$4,500 Winner*  
**JEAN-PHILIPPE  
DEMERS**  
*for his project  
Genes: What a  
Puzzle!*



☑ *\$4,500 Winner*  
**GEOFF OLYNYK**  
*for his project  
REALE Global  
Warming  
Solutions.*

## Genes: What a Puzzle!

### Jean-Philippe Demers

Jean-Philippe Demers, from Marcellin-Champagnat Secondary School, St. Athanase, Quebec has been honoured with a \$4,500 Manning Young Canadian Innovation Award as well as the bronze medal in the senior division of the Life Sciences Division.

Demers' investigations centered on the influence of cytosine methylation on the suppression or activation of genes in cells.

"I wanted to know why there are different cells in the body...since disease is often a result of bad gene expression," said Demers.

Gene expression is regulated by proteins which attach to a promoter or suppressor DNA region of a gene, thereby regulating how much that gene actively participates in the metabolism of a cell.

Demers' project demonstrated that gene expression is strongly influenced by the degree to which cytosine bases are methylated in DNA.

Through a series of ingenious experiments, Demers showed that when cytosine becomes methylated, gene expression is greatly diminished.

However, as somewhat of a surprise, Demers also discovered that under certain experimental conditions, methylation may actually increase gene expression to a level which far exceeds that usually observed.

Ultimately, Demers hopes that his research will prove useful not only in treating cancer but in also changing the perspective of how illness occurs.



## REALE Global Warming Solutions

### Geoff Olynyk

Geoff Olynyk, a Grade 11 student at Aldershot High School in Burlington, Ontario, returned to the Canada-Wide Science Fair this year with further enhancements to his REALE global warming management system.

Olynyk's project captures CO<sub>2</sub> from industrial sources before the gas is emitted to the atmosphere, thereby preventing further global warming.

In addition to winning a \$4,500 Manning Young Canadian Innovation Award, Olynyk also won

the gold medal in the senior category of the Engineering Division as well as two other special awards totaling another \$1,500.

"I developed my process to sequester, or lock up, carbon dioxide from products of combustion. My pilot plant replicates the natural weathering process that occurs between certain rocks and atmospheric CO<sub>2</sub> over thousands of years," said Olynyk.

Olynyk's project also works by using a common industrial byproduct — blast furnace slag.



Olynyk predicts that, with modifications the process could be cost-effective for other real applications.

"It may be possible to put a CO<sub>2</sub> scrubber on top of a smokestack," said Olynyk.

Ultimately, his work may result in a unique approach to strategies suggested by the Intergovernmental Panel on Climate Change.



☑ *\$4,500 Winner*  
**ROBYN MALER**  
*for her project,  
Wavelets and  
Brain Rhythms.*



☑ *\$4,500 Winner*  
**OLEG SHAMOVSKY**  
*for his project,  
Anomalies of  
Aluminum.*

## Wavelets and Brain Rhythms

### Robyn Maler

North Dundas District High School OAC student Robyn Maler, from Morrisburg, Ontario, won \$4,500 as a Manning Young Canadian Innovator, and a silver medal in the senior category of the Computer Technology Division.

Maler's work on the enhanced analysis of brain rhythms through electroencephalograms (EEGs) also resulted in two additional awards with a total value of \$750.

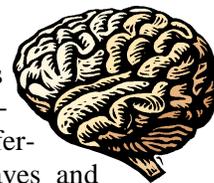
"Using recently developed mathematical models called wavelets, I discovered a novel way to analyze EEGs," says Maler.

While current analysis methods are subjective and often fail to fully extract

small waves, Maler's wavelet analysis extracted a variety of different types of sleep waves and also facilitated the detection of various abnormalities.

"A commercial version would easily diagnose sleep disorders and diagnose and help treat epilepsy. It might even be adapted to operate in real time on mobile patients," explained Maler.

To test her research, Maler used EEGs supplied by an anonymous patient from an Ontario sleep clinic to perform her revolutionary wavelet analysis.



## Anomalies of Aluminum

### Oleg Shamovsky

Oleg Shamovsky was named a \$4,500 Manning Young Canadian Innovator for his project on the anomalies of the electrolytic oxidation of aluminum.

In turn, his project was also awarded a gold medal in the senior category of the Physical Sciences Division.

Shamovsky's research uncovered unexpected behaviour in the oxidation of aluminum, a phenomena that could influence biochemical processes and represent an important concept in modern organic and pharmaceu-

tical chemistries. Shamovsky also feels his work may contribute to a new technology of recycling aluminum or its extraction from various alloys. In addition, he also believes the life expectancy of electronic components may also increase.

"This is a new way of thinking about inorganic reactions and materials," said Shamovsky.

A graduating student at Holy Cross Catholic Secondary School in Kingston, Ontario, Shamovsky intends to



pursue further studies at M.I.T., to secure a career that combines both chemistry and electrical engineering.

**The Manning Innovation Awards**, named in honour of the late Ernest C. Manning, former Alberta premier and Canadian senator, was incorporated as a not-for-profit society in 1980 to stimulate, encourage and reward deserving Canadian innovators for their personal accomplishments that have widespread social and economic benefit to Canada.

The annual program continues today with a \$100,000 Principal Award, a \$25,000 Award of Distinction, two \$5,000 Innovation Awards and the \$20,000 Young Canadian Innovation Awards program, shared among eight exhibits selected from entries in the senior division of the national Canada-Wide Science Fair.

**We're On The Web**  
[www.manningawards.ca](http://www.manningawards.ca)



## \$500 Manning Innovation Achievement Winners

### DNA Research

John Fraser and Andrew Smith from Toronto's Northern Secondary School teamed up to develop a novel approach to DNA computer programming, earning themselves a \$500 cash prize from the Manning Awards Foundation and a senior bronze medal in the Computer Technology Division.

"DNA-computing is a new technology, in which most experiments focus on solving specific mathematical logic problems," said Fraser and Smith.

Using innovative molecular biological techniques, their project explored DNA-computing by simulating baseball. Smith and Fraser's project modeled the runs-per-inning distribution of baseball teams, determined by their on-base percentages, to establish the viability of DNA computing as an alternative medium to electronic based systems.

Ultimately, the experiment explored biases in DNA-computer programming and demonstrated the effectiveness of the simulation.

### Agricultural Waste Plan

Gibson Gervais, from Sandwich Secondary School in LaSalle, Ontario, also won \$500 as a Manning Innovation Achievement Winner for his work on recycling agricultural and industry waste to create a bio-engineered soil supplement.

"Matryoshka is my plan for an environmentally responsible waste management system for recycling swine farm waste water and waste solids from the pulp and paper industry using steam explosion technology," explained Gervais.

Gervais suggests that the process can successfully address three main problems of existing swine wastewater disposal practices — raw waste spreading on farmland, large volumes of water required, and

odor protection. As well, it can provide an ecologically responsible method of recycling swine barn water and carbon-rich pulp and paper waste materials.

### Glue from the Garden

Sophie Lee and Iris Liu, two Grade 11 Sir Winston Churchill Secondary School students from Vancouver, BC, won a \$500 Manning Innovation Achievement Award as well as the silver medal in the senior division of the Biotechnology category.

Sophie and Iris teamed up to develop Slu-Glue, a commercially viable adhesive created from the slime of garden slugs.

The students designed a procedure for its extraction, and then analyzed strength, composition, biodegradability, cost and customer appeal in comparison with other conventional glues. They also studied the impact of Slu-Glue production on slug behaviour.

The conclusion was that the product could be economically viable and an environmentally-friendly alternative to conventional adhesives if sold as a specialty glue.

### Intelligent Prosthetic Hand

Grade 12 Silver Heights Collegiate student Nishanth Jayaranjan, from Winnipeg, Manitoba, won a \$500 Manning Innovation Achievement Award for his unique Voice-Activated Intelligent Prosthetic Hand.

This project incorporated voice-activation, temperature sensitivity and rotational flexibility that enabled the prosthetic device to more closely resemble a real hand. Voice-activation software replaces push buttons used in his earlier prototype and heat sensors automatically trigger object release, much like a real hand. Future plans for the device will focus on creating pressure sensors that will deliver the appropriate 'grasp' for objects being picked up.

*During the time that Einstein was active as a professor, one of his students came to him, noting that "the questions of this year's exam are the same as last years!"*

*"True," Einstein said, "but this year all the answers are different."*