



# INNOVATIS



## Manning Science Fair Winners Aim High

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Innovation Awards



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Each spring, the Canada-Wide Science Fair is held in a different city, bringing together science enthusiasts from coast to coast.

This year, the fair was held at the University of Saskatchewan campus in Saskatoon from May 11-19, 2002.

The science fair featured 337 projects, involving 436 students from across the country. Students competed in three divisions: Junior (grades 7 and 8), Intermediate (grades 9 and 10) and Senior (grades 11, 12, OAC and CEGIP).

In total, there were 59 senior high school projects self-nominated for the Manning Awards, which are co-sponsored by EnCana and Petro-Canada.

Of those 59 projects, eight were selected to receive a Manning Innovation Achievement Award



*Don Park, Executive Director of the Manning Awards Foundation and Farhad Seif, Petro-Canada representative and President of the Youth Science Foundation, congratulate Terri Lynn Paulson, one of eight Manning Award winners at the Canada-Wide Science Fair held recently in Saskatoon, Saskatchewan.*

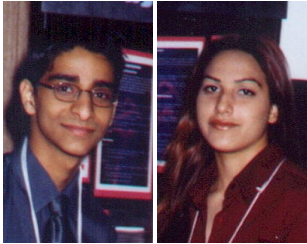
of \$500 which was presented at the CWSF Award Ceremonies.

In addition, the top four projects will receive a \$4,000 Young Canadian Innovation Award, bringing their prize winnings to

a total of \$4,500.

These additional awards will be presented at the Manning National Award Ceremonies in the fall of 2002.

Congratulations to all our winners!



**Mahvish Jafri and  
Faizal Ismail  
\$4,500 Winners**



**Russ Dickson  
\$4,500 Winner**

## Plasma May Hold Key to Drag Reduction

### Aerodynamic Research

Mahvish Jafri and Faizal Ismail, two 17-year-old students at Toronto's Marc Garneau Collegiate Institute, have earned awards totaling close to \$20,000, including the \$7,500 EnCana Corporation "Best of Fair Award" for their work on analyzing aerodynamic drag.

Mahvish and Faizal's project entitled *Boundary Layer Acceleration* hypothesized that by acceler-

ating surface fluid, drag would be reversed.

Using a revolutionary approach, founded on a number of known principles, the team first studied the effect of boundary layer acceleration and then chose plasma to accomplish this.

"A radio frequency glow discharge plasma, developed in 1995, had been observed to accelerate a fluid at its bounding surface. A similar device was constructed and modi-

fied to optimize acceleration effects," the students explained to the rounds of judges visiting their exhibit.

The team conducted three wind tunnel tests that successfully demonstrated superior aerodynamic properties, reducing drag by 31 percent.

## Computer Simulates Immune System

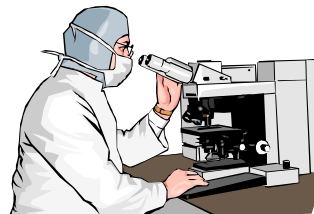
### Antibodies Modeled

Russ Dickson, a grade 12 student representing the Niagara Regional Science Fair, won a \$4,500 Manning Young Canadian Innovation Award for his project entitled *Simplification of Antibodies via Computer Program*.

Dickson's program is designed to improve the efficiency of immune system studies by helping researchers understand the connection between antibodies and

foreign particles known as antigens.

Since an antibody may bind to an antigen depending on its shape, this proc-



ess can be explored through computer simulation.

Dickson's program,

written in "C" language, contains a database of all amino acids and their functions as well as the code that adds bonding angles and connectivity.

Dickson says that research in this field of study is so cutting edge and specialized that a commercial computer program has not been released.

As a result, his program already is being employed in the field of theoretical molecular biochemistry at Brock University.

## Please Note New Contact Information for The Manning Innovation Awards

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



## It's a Small, Small World

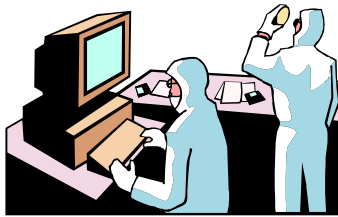
### Micro-Assembler Created

Dan Carew, 19, and Adam Panter, 17, are both students at Central Secondary High School in Fenelon Falls, Ontario.

Their science fair project, entitled *Moving Molecular Mountains*, succeeded in creating a new tool useful in the field of Micro Electrical Mechanical Systems (MEMS). And, the project also succeeded in winning a \$4,500 Manning Young Canadian Innovation Award.

Currently, methods of assembling MEMS rely on physically lifting and ma-

nipulating each microscopic piece into place, a technique that will prove more difficult as components continue to shrink in size and increase in complexity.



As a result, the MEMS industry is currently developing complex three-dimensional construction machines created from silicon, which will require in-

novative methods of manufacture.

That's where Carew and Panter's micro-assembler comes in. They were able to synthesize a suspension of microscopic magnetic particles and then manipulate them into a predetermined position — successfully placing sand particles on the head of a pin using an applied magnetic field.

While the team is pleased with the results, they're convinced that further research will improve the accuracy of the micro-assembler, the ease of use and the process itself.



**Dan Carew and  
Adam Panter**  
\$4,500 Winners



**Jean-Philippe  
Demers**  
\$4,500 Winner

## When Cells Go Bad

### Gene Expression Studied

Attending Collège Édouard-Montpetit in St-Athanase, Québec, Jean-Philippe Demers has again been selected as a \$4,500 Manning Young Canadian Innovation Award winner for the second year in a row.

His genetics-related project explores the possible causes of defective cell division by observing and studying changes in the molecular components of the chromatin.

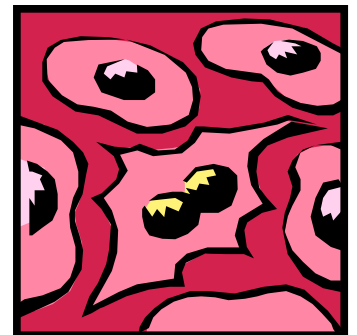
Understanding the balance between suppression

and promotion of gene expression is of primary importance in the origin of many diseases and is the subject of much research in the fields of neurobiology and neurochemistry.

One area of study is the control of the regulation of chromosome condensation — which is key to a healthy cell cycle.

Demers was able to demonstrate how hystone phosphorylation is closely related to chromosome condensation changes.

Once the different causes of chromatin



modifications are known, it will be possible to stop the progression of diseases associated with dysfunctional cell division.

As a young scientist, Demers has shown a high degree of scientific skill and sophistication, and his successful medical experiments will help to advance our understanding of genetic expression.



## \$500 Manning Innovation Achievement Award Winners

**Nadia Saidani and Mélanie Ranieri**    **Vladic Lavrovsky**

As a senior team from Laval's École St-Maxime, Nadia Saidani and Mélanie Ranieri were recognized for their work in developing a new shoulder harness that helps joint rehabilitation by easing pain and facilitating more effective physiotherapy.

Normally, an individual who suffers from a joint injury feels a great deal of pain and stiffness in the shoulder, and physiotherapy is often recommended to increase mobility.

Nadia and Mélanie built an innovative strap that stops the shoulder blade from movement during exercise stretches, thereby making the stretches more effective while also eliminating the need for a physiotherapist to restrict blade movement.

**Terri Lynn Paulson**

Terri Lynn Paulson, a Grade 11 student at Foam Lake Saskatchewan Composite High School, developed a user-friendly interactive computer program entitled *Water Analysis Wizard*. It helps farmers interpret specific water analyses, thereby ensuring enhanced herbicide efficacy in their agricultural operations.

Spray water quality is a major factor affecting herbicide use but, despite extensive research regarding this topic, Terri Lynn could not find a definitive guide to help a producer interpret a specific water analysis.

Her program addresses four general categories where water quality may actually be working against the full effectiveness of a herbicide. These categories include bicarbonate properties, hard water, pH factors and iron.

Vladic Lavrovsky, a Grade 11 student at Calgary's Queen Elizabeth High School, addressed the feasibility of applying various enzymes to enhance oil recovery by efficiently reducing oil viscosity.

Entitled *Enzyme Catalysis Methods for In-Situ Hydrocarbon Recovery*, the project demonstrated that certain microorganisms could successfully metabolize smaller chain length hydrocarbons. Vladic examined the feasibility of two particular enzymes — Lignin Peroxidase and Alcohol Dehydrogenase.

While he cautioned that the studies were preliminary, the project clearly demonstrated the merits of further researching this method of oil recovery.

**Richard Miron and Alex Omiccioli**

OAC students at North Bay École Secondaire Catholique Algonquin, Richard Miron and Alex Omiccioli have developed a chironomid deep-basin sampler which was used to analyze the presence of chironomids in a basin at Trout Lake.

The team project is a European approach to monitoring water quality that works by examining the midge fly larvae that live in the sediments of lakes prior to emerging in the spring.

The results of their efforts support consideration by the City of North Bay in relocating its existing municipal water intake to the basin, thereby providing a substantial reduction in filtering costs.

In addition, this approach may meet all of the Ontario Drinking Water Objectives, ensuring a safe water supply for area residents.

*“Science is a great game. It is inspiring and refreshing. The playing field is the universe itself.”*

— *Isidor Isaac Rabi (1898-1988)*

*U. S. physicist and Nobel prize winner in 1944.*