



# Waterloo-Wellington Science & Engineering Fair 2016 Annual Report



Your

*delegation to the 2016 Canada-Wide Science Festival in Montreal.*

It is interesting how project topics have evolved over the years as different issues come to the fore. It is also noteworthy how often the more developed projects are congruent with the communities' research milieu.

For example, Raymond Wang of Vancouver won the top prize at the Intel International fair (1500 exhibitors representing more than 40 countries) with a project on microbial fuel cells. He showed that the theoretical energy output from biosolids (sewage sludge) in fuel cells could provide enough electricity for all. Raymond worked on this for 4 years.

Our junior exhibitors learned about biosolids in the afternoon. Biosolids from Waterloo Region are trucked away - to landfills near Petrolia, to land reclamation near Sudbury, and a limited amount on agricultural land outside the Region.

The recognition our entries in the national championship follows, but we're also pleased with the 3000 or so young researchers who worked on their projects for their school fairs.

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## Canada-Wide Science Fair

# Montreal, QC...



**Devanshi Shukla, Guelph. Senior, Environment**

### **A Biosensor for the Detection of Microbial Contamination**

Many species of fungi release p-cymene, a volatile compound, before the fungal growth is visible. *P. putida* cells were transformed with a plasmid containing a promoter that is only activated in the presence of p-cymene, which allows the transcription of a gene cluster that produces bioluminescence. If bioluminescence is produced, it indicates a fungal growth not yet visible.

**Awards:** Manning Innovation Achievement Award \$500, Manning Young Canadian Innovation Award \$4000 + \$3000, Weizmann Canada Award \$4750, Gold Medal \$250, Entrance Scholarships: Dalhousie, U of Manitoba \$5000; Western, UBC and U Ottawa \$4000

**John Fish, Waterloo. Senior, Innovation**

### **A Novel Method in Tree Biomass Calculation**

Monitoring tree growth is crucial in understanding plant diseases and carbon dioxide regulation. Through a novel method in computer vision research, samples of huge numbers of trees can be monitored in a timely manner with a high degree of accuracy.

**Awards:** Silver Medal, Entrance Scholarships: Dalhousie \$2500; UBC, U Ottawa and Western \$2000



**Arjun Pandey, Waterloo. Senior, Health**

### **Cardiometabolic Effects of Dietary Probiotics and Gut Microbiota Supplementation**

This study evaluated supplementing a standard cardiovascular diet with dietary probiotics, foods with high amounts of strains of 'good' bacteria, over a 3-month period in 80 essential hypertension patients. Improvements were noted in numerous cardiovascular parameters compared to those on the standard in care diet.

**Awards:** Silver Medal, Entrance Scholarships: Dalhousie \$2500; UBC, U Ottawa and Western \$2000

**Owen Robison, Waterloo. Senior, Discovery**

### **Detection of DNA Integration in Tardigrades after Anhydrobiosis**

This project looked at a possible link between anhydrobiosis and the uptake of foreign DNA. Upon subsequent rehydration, tardigrades were exposed to plasmids that contain different promoters. There may be some horizontal gene transfer indicated by the expression of foreign DNA from treated tardigrades.

**Awards:** Senior Challenge Award - Discovery, Silver Medal, Entrance Scholarships: Dalhousie \$2500; UBC, U Ottawa and Western \$2000





**Alison Cai, Guelph, Intermediate, Energy**

**Influence of Habitat on Cellobiase Activity in Mushrooms**

Cellulosic ethanol is a biological fuel that can offer a more environmentally-friendly alternative to fossil fuels. This project evaluated the potential of using the cellobiase enzyme in mushrooms as a catalyst for cellulose degradation to create the fuel.

**Awards:** Australian Youth Science Forum Award \$1000, Bronze Medal, Western University Entrance Scholarship \$1000

**Sam Orend, Kitchener. Intermediate, Innovation**

**Temperature Manipulation Desalination**

Many individuals in developing nations lack access to drinkable water. Desalinating ocean water can help remove salt and convert undrinkable water to a drinkable state. The aim of this innovation project was to create a small scale, practical, desalination technology which people from developing nations could use to create their own clean drinking water



**Adam Martinez, Conestogo. Junior, Health**

**The Effects of Nanosilver on the Ionic Silver Resistant Plasmid**

Certain bacteria have developed a resistance to ionic silver, an effective antibacterial agent. This project studied whether nanosilver particles can inhibit growth of ionic silver resistant bacteria. The results contradicted the hypothesis, a result with medical implications.

**Awards:** Junior Challenge Award – Health, Gold Medal (\$250), Western University Entrance Scholarship \$4000

**Ruth Meyer, Waterloo. Junior, Innovation**

**The Impact of Modelled Exit Signalling Behaviour on Other Drivers In Roundabouts**

There are many inconsistencies in the ways people enter, navigate and exit a roundabout. This project examined the impact of correct exit-signalling on the behaviour of other drivers. Modelling correct exit-signalling leads to a significant increase in this behaviour by others.

**Awards:** Bronze Medal, Western University Entrance Scholarship \$1000



**Ashok Pandey, Waterloo. Junior, Health**

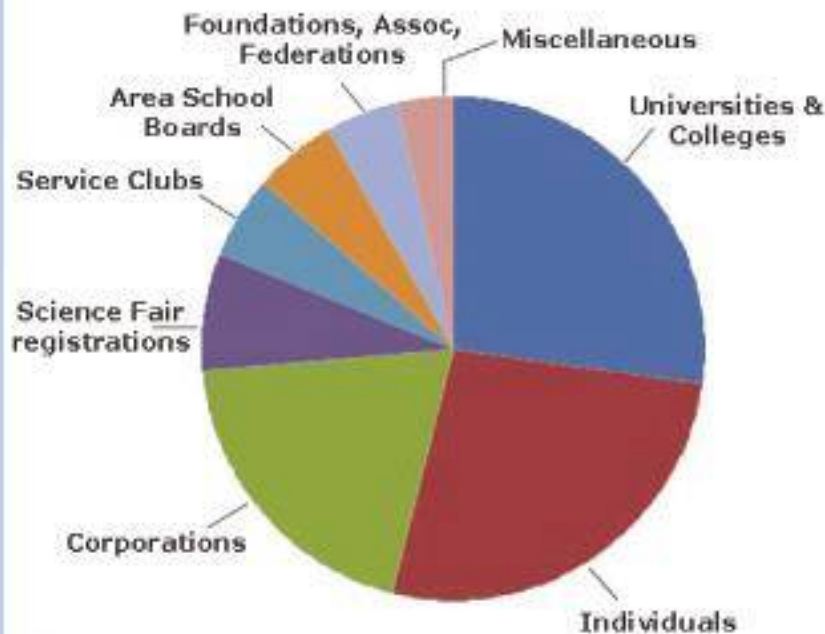
**The Impact of Restorative Yoga and Stretching on Blood Pressure and Heart Rate**

In a comparison of the efficacy of stretching, restorative yoga and quiet relaxation on blood pressure, restorative yoga was more effective immediately after intervention, and only intervention to have persistent benefits a day later.

**Awards:** Bronze Medal, Western University Entrance Scholarship \$1000

# 2016 Financials

## 2016 Revenue



## 2016 Expenses

