



Waterloo – Wellington Science & Engineering Fair 2009 Annual Report

Growing the Future

The 2009 WWSEF hosted 342 exhibitors with 241 projects, more than any recent year. 308 were recognized with awards and prizes totalling \$24,250.

Exhibitors came from 29 schools and 5 independent entries. 2 schools joined us for the first time. 350 students from 4 schools visited the fair in anticipation of 2010.

A housebound boy was judged using Skype internet video technology. He won an award.

13 new donors added their support. We will send more exhibitors to the 2010 Canada-Wide Science Fair.

All 268 junior exhibitors learned about alternate energy possibilities through workshops and a short tour to Waterloo's largest wind turbine and a geothermal supply company.

68 intermediate and senior exhibitors visited either UW or UG to discuss research ideas, and attended a Perimeter Institute presentation on the physics behind much of our technology.

Waterloo-Wellington Abroad

MILSET expo-sciences internationale, Tunisia

Eddie Kim, Bryan Hatton and Hillary Dawkins were selected as members of the Ontario delegation to attend in July. (Hillary's research partner Susie Pan was unable to attend.) MILSET is non-competitive and welcomes 1200 exhibitors from 75 countries. The Canadian delegation was awarded the "Best Delegation" award for their enthusiasm, courtesy and project excellence.

Intel ISEF

Zach Elgood caused a bit of a stir with his Third Place Grand Award at the Intel International Science and Engineering Fair in Reno, Nevada in May. This Fair, essentially the US Open, welcomes 1000 secondary students from all 250 US regional fairs and 47 other countries. There is no distinction for the exhibitor's age or grade. As a Grade 9 student, Zach was perhaps the youngest award winner. His project, "*In-Stream Bioreactors: N₂O Producers*" was in the Environmental Management division.

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Canada-Wide Science Fair

Winnipeg...



Eddie Kim and Bryan Hatton won the Gold Medal in Senior Computing and Information Technology with their project "*Watching Evolution*". In addition to the \$1500 prize, and the Actuarial Foundation of Canada Special Award of \$1000 for their statistical work, they each received \$30,000 in scholarship offers from 4 universities. They used an original computer program to simulate the process of evolution by natural selection, and determine how environmental parameters affect the evolution of populations. The organisms chosen for the populations were mechanical pendulum-clocks, modeled as matrices of heritable data. The results supported the model of punctuated equilibrium, and also determined how changes in environmental factors affected the evolution of populations.



For their project "*Extending the Lifespan of Dye-Sensitized Solar Cells*", Hillary Dawkins and Susie Pan earned 3 awards and \$900; Bronze Medal in Senior Environmental Innovation, an Honourable Mention in Senior Engineering and a Manning Foundation Innovation Award. They received scholarship offers from 2 universities. They investigated possible methods to prolong the operational lifespan of dye-sensitized solar cells. Benzoic acid was used to inhibit bacterial growth on the natural plant dye, and sealing agents were used to prevent the evaporation of liquid electrolyte. Benzoic acid was found to have a positive effect on red cabbage dye, depending on several factors. All tested sealing agents extended the lifespan.



Stephanie Chan's project *"Power Your Car From Your Table"* earned her a Silver Medal in Intermediate Automotive and a Bronze Medal in Biotechnology and Pharmaceutical Science. In addition to the \$1000 prize money, Stephanie received a university entrance scholarship offer. Her project used industrial organic waste (apple pomace, pineapple peel and core, potato peel, overripe banana) to produce a commercially viable biofuel using *Saccharomyces bayanus* yeast. Each feedstock was compared in terms of ethanol yield and the cost-effectiveness of production. Potato peel yielded the most ethanol, but apple pomace was the most cost-effective due to the cost-limiting factor of starch-converting enzymes.

Brian Krug's project *"Herbal Products May Alter Drug Metabolism"* earned a Bronze Medal in Intermediate Health Science (\$300) and a scholarship offer. Brian used a luciferase transcription assay to determine the effects of herbal products on hepatic CYP3A4 gene transcription. The enzyme CYP3A4 is involved in the metabolism and therapeutic outcome of 50% of pharmaceutical drugs. Several products altered gene activity, suggesting they could interfere with the success of drug therapies when consumed simultaneously.



Sofia Oke and Noorain Shethwala presented *"Chemotherapy Drugs: Less is More"*. They were awarded an Honourable Mention in Senior Biotechnology and Pharmaceutical Science. Their fellow exhibitors awarded them the Senior Petro-Canada Peer Prize for their innovative and 'cool' project. They examined the use of BAX tumour suppressor gene and adenovirus as chemosensitizers to induce apoptosis in colon cancer cells, thereby reducing the dosage of chemotherapy drug given to patients. They were able to conclude that the transfection of pEGFP-BAX worked best with the BAX (-/-) genotype, and the Adenovirus was effective in the (+/-) genotype. Thus, chemotherapy side effects can be lowered.

Daniel Moholia presented *"Wind Turbines"*. His project studied on the effect of blade material, pitch, and length on voltage output.

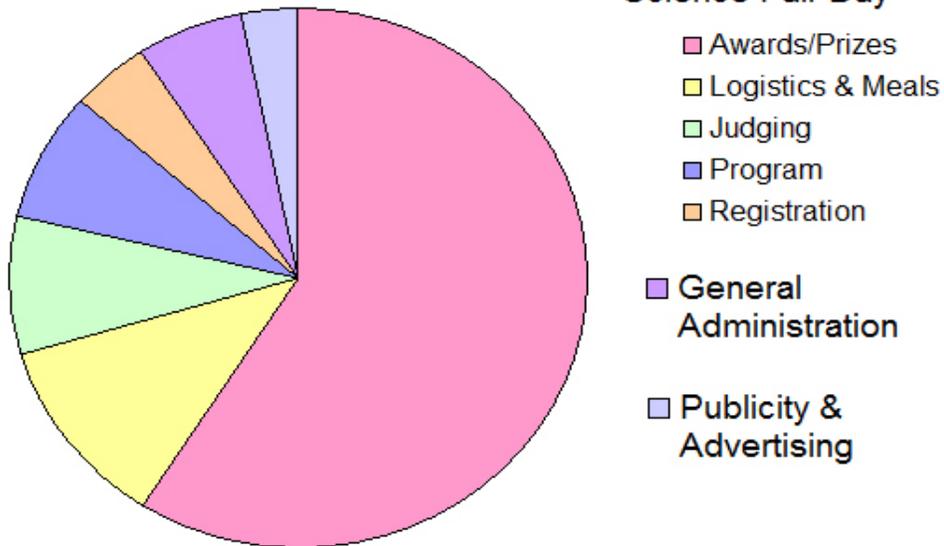


I think that science fair projects help students become better scientists & better thinkers, because it emphasizes the search for new knowledge.

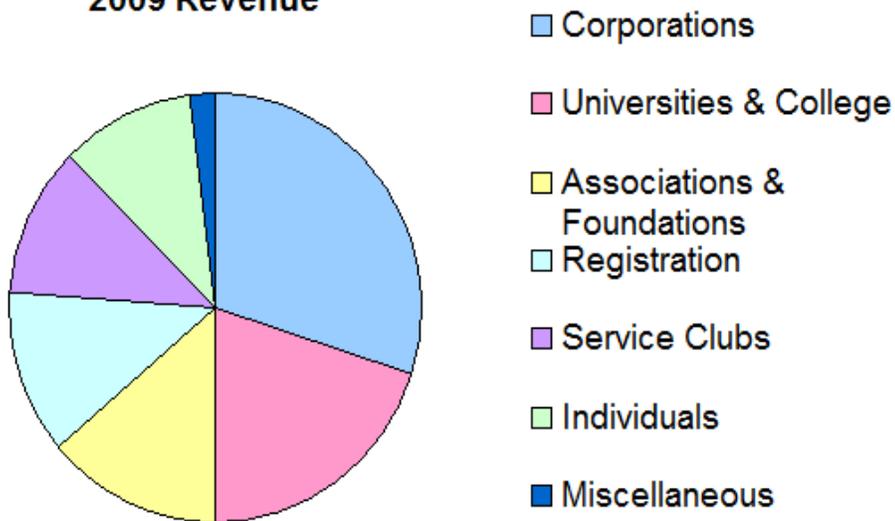
-Eddie Kim

2009 Financials...

2009 Expenses



2009 Revenue



Youth Science Canada
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WWSEF is affiliated with Youth Science Canada