

# *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*