Canada-Wide Science Fair **Fredericton**

Hadi Almalki, Senior, Innovation

Random Forest Classification of Histopathological Images

Histopathology is the study of manifestations of disease on a cellular level. This project involved the development of a pathological-aiding system that is able to classify images of histopathological tissue sample slides for purposes such as biopsy diagnosis. This is accomplished by using a combination of computer classifiers that have been trained on collections of labelled training samples.

Awards: Excellence – Silver Medal; Entrance Scholarships UNB $2500, Dalhousie $2500, UBC $2000, UOttawa $2000 and Western $2000.

Mary Clifford, Junior, Innovation

When Life Gives You Potatoes, Make Plastic

Plastic pollution is a major problem on land and also in our marine environment, affecting nearly 700 species in our oceans. The prediction is that by 2050 there will be more plastic than fish in our oceans. This project created bio-plastics from plants and tested the biodegradability to create a more environmentally friendly plastic, creating materials that will break down faster in landfill.

Awards: Excellence Bronze Medal; Entrance Scholarship Western $1000

Marina Ilyas, Intermediate, Innovation

Go Green, Drive Clean

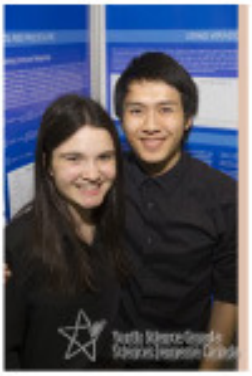
I developed a model to calculate, with high accuracy, the total fuel consumption of different routes for any given trip. This provides users with the most environmentally and economically-friendly route of the trip and implements an easy and straightforward method for users to reduce their fuel consumption, and sequentially lower the emissions being released into the atmosphere.

Yashvi Juneja, Junior, Environment

Cold Current Event: Predicting Changes in Ocean Circulation as Glaciers Melt

This project examined the effect of melting glaciers in the northern latitudes caused by global warming. Oil was used to mimic ocean water, and candle heat was used to create a density difference to create a current. To mimic melted glacier water, a hair dryer in its cold setting was used. Temperature fluctuations and changes in convection cell diameters over time were noted.

Awards: Excellence – Bronze Medal; Entrance Scholarship – Western $1000



Josh Lien and Oana Binder, Senior, Innovation

ViraDose: A Novel Application for Facilitating gene Therapy Dosing

Gene therapy is a treatment for genetic disorders that involves delivering correctional genes to a patient. We created an application that calculates a starting dose for gene therapy in humans and then uses the dose in mathematical models to predict a patient's response. We believe our app will assist in making gene therapy more viable in mainstream medicine.

Awards: Excellence Bronze Medal; Entrance Scholarships UOttawa $1000, Western $1000

Ayush Malhotra, Junior, Health

The Relationship Between Life Expectancy, GDP per capita and Obesity

Increasing numbers of people around the world are obese. This is extremely worrying as obesity is linked to multiple chronic diseases. Based on an analysis of 202 countries over 41 years, I find that as a country gets wealthier, men tend to become more obese while women's obesity rates decrease. These conflicting results offer new avenues for tackling obesity among men and women.

Sasha Seufert, Senior, Innovation

Delivery of DNA to Stem Cells via Nematocysts

Jellyfish possess millions of micro needle-like stinging cells imbedded in their tentacles, used to inject venom into their prey. I used these extraordinary cells to develop a simpler, inexpensive and less laborious gene-delivery device, capable of injecting DNA into a variety of stem cells, in a less invasive manner than current technologies.

Awards: Excellence – Silver Medal; Entrance Scholarships UNB $2500, Dalhousie $2500, UBC $2000, UOttawa $2000 and Western $2000.

Hardit Singh, Junior, Innovation

FoodSpec: A Multispectral Detector for Non-Destructive Testing of Food

Food waste is a major issue facing food retailers today with over 30% of produce wasted due to spoilage and rot. This project proposed and developed an innovative, low-cost multi-spectral sensor using light absorption of different wavelengths to predict shelf life. This allows for quantitative non-destructive testing of produce, allowing retailers to manage their inventory and reduce spoilage. The prototype costs 1/100th of commercial spectrometers.

Awards: Excellence Silver Medal; Entrance Scholarship Western $1000