



# Waterloo-Wellington Science & Engineering Fair

## 2018 Annual Report



*Your 2018 Delegation to the Canada-Wide Science Fair*

### **Good For All!**

A few years ago WWSEF was noted when ALL our finalists at the Canada-Wide Science Fair received an award, the first time anyone could remember such a result. Well, TA-DA, it happened again in May, for the third time! We all contribute to this – the young researchers, their families, teachers, judges, sponsors and volunteers. Our mission is to increase Canada's capacity for high-quality research – and that's what we do.

### **Of Course**

Sajeev Kohli was selected as 1 of 8 members for Team Canada for the Intel International Science and Engineering Fair. Sajeev is the latest of many WWSEF young researcher selected to represent Canada at international events.

Kohli was also the SW Ontario Biogenius winner, then the national champion, and in May Sajeev was the Grand Winner of the International Biogenius Awards.

His schoolmate, Advait Maybhate, has won several awards with WWSEF and the Canada-Wide Science Fair and now is a Schulich scholarship winner of \$80,000.

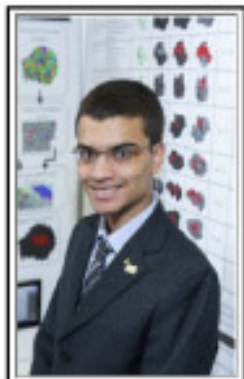
### **Adults Too**

Congratulations to Stefan Idziak, our Chief Judge. Stefan received a Distinguished Service Award from Youth Science Canada for his many contributions to youth science. Stefan is the ninth WWSEF Council member to receive this recognition.

### **EUCYS**

The European Union Contest for Young Scientists welcomes competitors from 38 countries – Europe and several guests including Canada. They recognize 3 First Prizes, 3 Seconds and 3 Thirds. In 2017 Canadians won 1 First and 1 Second; this year two Canadian science fair exhibitors won 2 of the 3 First prizes! We'll post information on their projects on our website.

# Canada-Wide Science Fair **Ottawa**

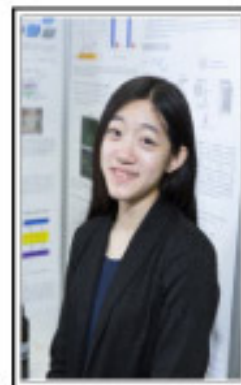


## **Advait Maybhate, Senior, Innovation**

Identifying the binding sites of ligands, which bind to proteins, is a crucial task. Understanding the shape and size of such binding sites allows for the creation of drugs that bind to these sites, preventing other ligands, potentially stopping the spread of diseases such as HIV. This project proposes a new geometry-based algorithm to tackle the challenge of identifying ligand binding sites with proteins. **Awards:** Excellence - Silver Medal; Entrance Scholarships: Carleton \$2000, Dalhousie \$2500, UBC Science \$2000, U of Ottawa \$2000, Western \$2000

## **Connie Cheng, Senior, Innovation**

A novel biologically inspired device that cleans waste products from the blood for people with kidney failure was created. Current hemodialysis devices are very expensive and too large to be portable. The new device is over 63 times more efficient at filtration, costs less than a dollar to make and fits in the palm of the hand. This innovation has the potential to revolutionize hemodialysis treatment. **Awards:** Excellence - Silver; S.M. Blair Family Foundation \$1000, Entrance Scholarships: Carleton \$2000, Dalhousie \$2500, UBC Science \$2000, U of Ottawa \$2000, Western \$2000

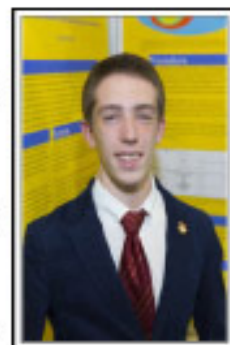


## **Adam Martinez, Intermediate, Environment**

Silver and copper ions are commonly used as antimicrobials in the cleaning and medical industries. However, there are medical and environmental concerns regarding their use, making detecting and quantifying these metals important. Two genetically-engineered bacterial biosensors which are able to detect and quantify a variety of silver and copper ions were developed and then assessed. **Awards:** Excellence - Gold Medal; Challenge - Gold Medal; Entrance Scholarship - Western \$4000

## **Zachary Trefler, Senior, Information**

Voice-recognition systems powered by machine learning are widely used to secure critical data, e.g. on smartphones and in banking systems. But can they be fooled? This project revealed a critical vulnerability: adversarial machine learning techniques can generate convincing audio prints. I then introduced a novel method for voice recognition systems to flag fake data, thus reducing the risk. **Awards:** Excellence - Bronze Medal; Challenge Award - Senior, Information; Canadian Acoustical Society Award - Senior \$1000; Entrance Scholarships - Carleton \$1000, U of Ottawa \$1000, Western \$1000





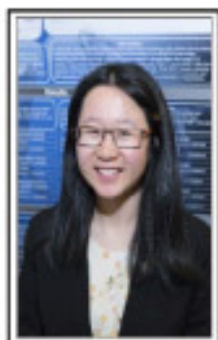


### **Holden Ford, Junior, Energy**

In 2016 Canada burned more than 16 billion liters of diesel, just one of many non-renewable fossil fuels. Because of the environmental implications associated with burning fossil fuels, it's important that an alternative fuel source be found. This project explored the viability of biodiesel as an alternative fuel source. It considered fuel efficiency and economy, and observed emissions from a variety of biodiesel fuel blends. **Awards:** Excellence - Bronze; Entrance Scholarship - Western \$1000

### **Ashok Pandey, Intermediate, Health**

Cardiovascular events are the leading cause of death worldwide. Exercise can improve heart health. This project looked at the efficacy of yoga incorporated into an exercise program on global cardiovascular risk. It found that yoga intervention was significantly more effective than the standard exercise program. If these results are validated, yoga may represent an opportunity to enhance the efficiency of standard cardiovascular rehabilitation/prevention programs. **Awards:** Excellence - Silver; Entrance Scholarship -Western \$2000



### **Angela Zhang, Senior, Environment**

Anthropogenic (human-caused) noise is a major problem in oceans, affecting the behaviour of marine life by masking sounds used for communication and causing stress levels to increase. This has been shown to lead to mass strandings in some whales. This project involved predicting the presence of whales in a certain location at a certain time given past records of whale ID tagging, for re-routing ships. **Awards:** Excellence - Bronze Medal; Entrance Scholarships Carleton \$1000, U of Ottawa \$1000, Western \$1000

### **Hadi Almalki, Intermediate, Innovation**

Developing a method of recognizing the species of bird calls and song using a computer algorithm allows for remote tracking bird migration in a scalable and timely manner. In comparison to traditional (visual) methods of tracking birds, this approach allows for more accurate study of bird species behaviour and more effective identification of changes in environmental factors such as climate by analyzing shifts in migration patterns. **Awards:** Excellence - Bronze Medal; Entrance Scholarship - Western \$1000

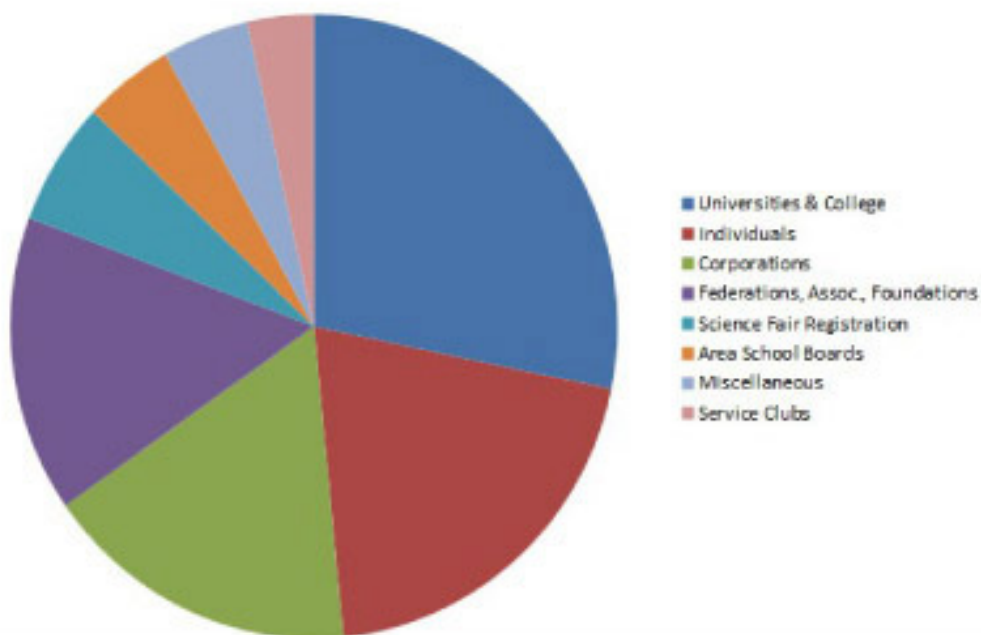


### **Sasha Seufert, Intermediate, Innovation**

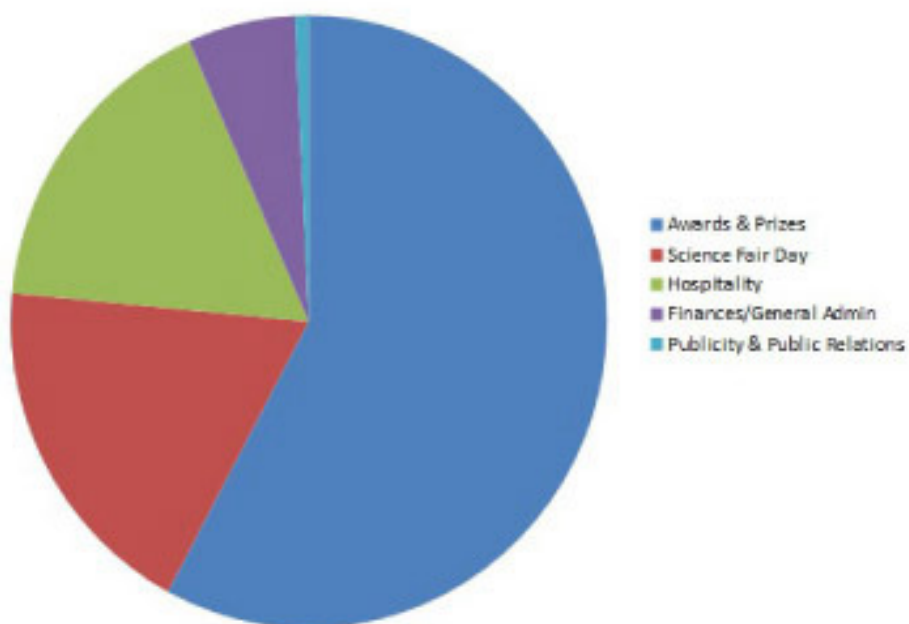
Jellyfish possess millions of micro-needle-like stinging cells embedded in their tentacles, often used to inject venom into their prey. The goal of the project was to determine whether or not these stinging cells can be used to deliver DNA into water bears, a micro-organism of great interest to the scientific community. This fast and low-cost injection method would help scientists study the unique genomic makeup of water bears. **Awards:** Excellence - Bronze Medal; Entrance Scholarship Western \$1000

# •2018 *Financials*

## Revenue



## Expenses



Visit us on the web at [www.wwsef.ca](http://www.wwsef.ca)



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WWSEF is affiliated with Youth Science Canada