CWSF 2016 - Montreal, Quebec

Devanshi Shukla

A Biosensor for the Detection of Microbial Contamination

Challenge: Environment
Category: Senior
Region: Waterloo-Wellington
City: Guelph, ON
School: Centennial Collegiate & Vocational Institute

Abstract: Many species of fungi release a microbial volatile compound called p-cymene, 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. Hence, if bioluminescence is produced, it serves as an indicator for fungal growth that is not yet visible.

Biography

Science is about asking questions, finding unknown paths and creating change - a notion that inspires me. Every year, millions of people get food poisoning - causing complications and negative effects to their health. One of the main reasons for this is because fungal contamination is not always visible. So this year, I worked on developing a sensor to detect fungal growth in food and the environment before visible signs are present. Furthermore, once fungal growth is detected, it could be inhibited by the release of plant volatile compounds which are effective anti-fungal agents. Aside from pursuing my research interests, I also love volunteering at the hospital and playing the piano! My advice for other students planning to do a project - think about the fact that the world's biggest problems can be solved by its smallest things.

Awards	Value
The Manning Innovation Achievement Award - Senior Sponsor: Ernest C. Manning Awards Foundation	$500
The Manning Innovation Achievement Award and $4000 Manning Young Canadian Innovation Award and also receive an additional $3000 towards their post-secondary education. Sponsor: Ernest C. Manning Awards Foundation	$4 000
Weizmann Canada Award for Scientific Achievement - Senior Sponsor: Toronto Research Chemicals and Weizmann Canada	$4 700
Excellence Award - Senior - Gold Medal Sponsor: Youth Science Canada	$250
Dalhousie University Faculty of Science Entrance Scholarship Senior Gold Medallist - $5000 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	$5 000
UBC Science (Vancouver) Entrance Award Senior Gold Medallist - $4000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	$4 000
University of Manitoba Entrance Scholarship Senior Gold Medallist - $5000 Entrance Scholarship Sponsor: University of Manitoba	$5 000
University of Ottawa Entrance Scholarship Senior Gold Medallist - $4,000 Entrance Scholarship Sponsor: University of Ottawa	$4 000
Western University Scholarship Gold Medallist - $4000 Entrance Scholarship Sponsor: Western University	$4 000
University of New Brunswick Entrance Scholarship Gold Medallist - $5000 Entrance Scholarship Sponsor: University of New Brunswick	$5 000
Total	$36 450

CWSF 2016 - Montreal, Quebec

John Fish

A Novel Method in Tree Biomass Calculation

Challenge: Innovation
Category: Senior
Region: Waterloo-Wellington
City: Waterloo, ON
School: Sir John A. Macdonald S.S.
Abstract: Monitoring tree growth is crucial in the understanding of 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.

Biography
My name is John Fish, and I'm a 16-year-old student in grade 11 from Waterloo, Ontario. I'm hugely passionate about a lot of things, but primarily I'm passionate about science, programming, running, and trees. Right now I'm the #1 ranked U18 runner nationally in both the 800m and the 1500m distances. I have released a number of apps with commercial success on both the Google Play store and Blackberry World, with iOS apps coming soon. This is my second CWSF, my first being last year where I attended for my project GPS Footprint. I'm a huge environmental advocate, and my previous projects have shown that: GPS Footprint, Timber (an award winning hackathon social network that was based on meeting people at trees), and now my current project which looks at measuring the biomass of trees using computer vision. At my Regional Fair, I won Best in Division for Engineering, as well as a variety of scholarships to local universities.

Awards	Value
Excellence Award - Senior - Silver Medal Sponsor: Youth Science Canada	
Dalhousie University Faculty of Science Entrance Scholarship Senior Silver Medallist - $2500 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	$2 500
UBC Science (Vancouver) Entrance Award Senior Silver Medallist - $2000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	$2 000
University of Ottawa Entrance Scholarship Senior Silver Medallist - $2000 Entrance Scholarship Sponsor: University of Ottawa	$2 000
Western University Scholarship Silver Medallist - $2000 Entrance Scholarship Sponsor: Western University	$2 000
University of New Brunswick Entrance Scholarship Silver Medallist - $2500 Entrance Scholarship Sponsor: University of New Brunswick	$2 500
Total	$11 000

CWSF 2016 - Montreal, Quebec

Arjun Pandey

Cardiometabolic Effects of Dietary Probiotics and Gut Microbiota Supplementation

Challenge: Health
Category: Senior
Region: Waterloo-Wellington
City: Waterloo, ON
School: Waterloo Collegiate Institute

Abstract: Dietary probiotics are foods which contain high amounts of strains of "good" bacteria. This study evaluated the impacts of supplementing a cardiovascular diet with dietary probiotics over a 3 month intervention period in 80 essential hypertensive patients. Significant improvements were noted in numerous cardiometabolic parameters in individuals on the probiotic enriched diet in comparison to the current standard of care control diet.

Biography

My name is Arjun Pandey and I am a Grade 11 Extended French and AP Student at Waterloo Collegiate Institute. My research over the past 4 years has focused on cardiovascular disease, and has included abnormalities of circadian blood pressure patterns, pulmonary arterial hypertension, and most recently on the cardiometabolic effects of dietary probiotics. I have presented my previous research at international medical conferences including the American College of Cardiology and Canadian Cardiovascular Congress, and have published my research in peer-reviewed journals such as the British Journal of General Practice, and the journal Circulation. My hobbies and interests include debating, public speaking (in both French and English), basketball and soccer.

Awards	Value
Excellence Award - Senior - Silver Medal Sponsor: Youth Science Canada	
Dalhousie University Faculty of Science Entrance Scholarship Senior Silver Medallist - $2500 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	$2 500
UBC Science (Vancouver) Entrance Award Senior Silver Medallist - $2000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	$2 000
University of Ottawa Entrance Scholarship Senior Silver Medallist - $2000 Entrance Scholarship Sponsor: University of Ottawa	$2 000
Western University Scholarship Silver Medallist - $2000 Entrance Scholarship Sponsor: Western University	$2 000
University of New Brunswick Entrance Scholarship Silver Medallist - $2500 Entrance Scholarship Sponsor: University of New Brunswick	$2 500
Total	$11 000

Youth Science Canada
1550 Kingston Road. Suite 213
Pickering ON L1V 1C3
www.youthscience.ca / info@youthscience.ca
416-341-0040

CWSF 2016 - Montreal, Quebec

Owen Robison

Detection of DNA Integtration in Tardigrades after Anhydrobiosis

Challenge: Discovery
Category: Senior
Region: Waterloo-Wellington
City: Guelph, ON
School: Centennial Collegiate & Vocational Institute
Abstract: This project looks at the possible link between a process called anhydrobiosis and the uptake of foreign DNA. Upon subsequent rehydration after anhydrobiosis, tardigrades are exposed to plasmids that contain different promoters. I hypothesize that anhydrobiosis is linked to horizontal gene transfer. The experimental results showed that there may be some expression of foreign DNA from treated tardigrades.

Biography
My name is Owen Robison and I am in my senior year of high school. I attend Centennial CVI in Guelph. I am an athlete on the rugby team for my school. Go Spartans! I have been involved in my community assisting and promoting the Smile Train charity. I work out of my school's lab. If I'm not in the lab or at practice I'm at the gym engaged in my favourite hobby, weightlifting. Next year I will go off to either Western (UWO) or McMaster University for Molecular Biology and Genetics. Afterwards, I will pursue a DVM at the OVC in Guelph. During and after my post grad studies I want to work for a veterinary clinic with companion animals. My project deals with tardigrades which are microscopic invertebrates. I've always had an interest in these critters as they are hyped to be indestructible. The idea for my project came from the controversy in science magazines concerning tardigrades exhibiting high amounts of horizontal gene transfer.

Awards	Value
Challenge Award - Discovery - Senior Sponsor: Youth Science Canada	
Excellence Award - Senior - Silver Medal Sponsor: Youth Science Canada	
Dalhousie University Faculty of Science Entrance Scholarship Senior Silver Medallist - $2500 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	$2 500
UBC Science (Vancouver) Entrance Award Senior Silver Medallist - $2000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	$2 000
University of Ottawa Entrance Scholarship Senior Silver Medallist - $2000 Entrance Scholarship Sponsor: University of Ottawa	$2 000
Western University Scholarship Silver Medallist - $2000 Entrance Scholarship Sponsor: Western University	$2 000
University of New Brunswick Entrance Scholarship Silver Medallist - $2500 Entrance Scholarship Sponsor: University of New Brunswick	$2 500
Total	$11 000

CWSF 2016 - Montreal, Quebec

Allison Cai

Influence of Habitat on Cellobiase Activity in Mushrooms

Challenge: Energy
Category: Intermediate
Region: Waterloo-Wellington
City: Guelph, ON
School: Centennial Collegiate & Vocational Institute

Abstract: Cellulosic ethanol is a biological fuel which can offer a more environmentally-friendly alternative to fossil fuels. However, this biofuel is disadvantageous as cellulose must be broken down in an inefficient process to create it. The purpose of this research was to evaluate the potential of using the cellobiase enzyme in mushrooms as a catalyst for cellulose degradation, presenting the possibility of more efficient biofuel production.

Biography
Allison is a grade 10 student studying at Centennial CVI in Guelph, Ontario. She thoroughly enjoys learning at school, and has received awards such as "Top Academic Student" and "Top Science Student". At a young age, Ally believed (and still believes) that "science holds the secrets of the universe". Needless to say, she is captivated by science and its endless possibilities. Aside from doing science fair, participating in Science Olympics, and being a part of Science Club, she is also extremely passionate about music and volunteering. Everyday Ally looks forward to playing piano, and plans to achieve her Grade 10 Royal Conservatory of Music certification this year. She also prides in being a trombonist in an orchestral ensemble and her school's Jazz Band. Ally takes pleasure in improving her school by being a member of Academic Council and Environmental Council. Her favourite part of the week is when she volunteers at the hospital. Nothing is more satisfying to Ally than seeing the smile of a patient. However, the hospital also exposes her to the struggles of many. It is because of this, that Ally's greatest aspiration is to channel her passion for science in a way which can help people.

Awards	Value
Australian National Youth Science Forum Award - Intermediate Sponsor: National Youth Science Forum Australia	$1 000
Excellence Award - Intermediate - Bronze Medal Sponsor: Youth Science Canada	
Western University Scholarship Bronze Medallist - $1000 Entrance Scholarship Sponsor: Western University	$1 000
Total	$2 000

Sam Orend

Temperature Manipulation Desalination

Challenge: Innovation
Category: Intermediate
Region: Waterloo-Wellington
City: Kitchener, ON
School: Cameron Heights C.I.

Abstract: 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.

Biography

My name is Sam Orend and I am 14 years old. I currently attend Cameron Heights Collegiate Institute as a grade nine, International Baccalaureate student. Outside of school, I play many sports including: volleyball, basketball, but, most notably, table tennis. In fact, I have the opportunity to go the International Children's Games in Taiwan, this summer, as part of Canada and Kitchener-Waterloo's table tennis team. Aside from sports, I consider myself a STEM innovator of sorts. I love attempting to solve some of the most complex challenges we face in daily life: as per my current project of desalination for the developing world. I decided to pursue this project, and, really, challenge these issues in general as a method of trying to help those who do not have the luxury of everything I may take for granted. In the future I plan to continue working with such issues, and really try to make an impact on how such matters are viewed and dealt with. My advice to anyone currently developing their project, or planning to, would be to really buy into what you are doing -- be excited and use your skills to help you along the way.

CWSF 2016 - Montreal, Quebec

Adam Martinez

The Effects of Nanosilver on the Ionic Silver Resistant Plasmid (pMG101)

Challenge: Health
Category: Junior
Region: Waterloo-Wellington
City: Conestogo, ON
School: Centennial P.S.

Abstract: Ionic silver is an effective antibacterial agent. However, certain bacteria have developed a resistance to ionic silver. This project's goal was to study whether nanosilver particles, another form of silver, can inhibit the growth of ionic silver resistant bacteria. The results contradicted the hypothesis. Additionally, a control showed that ionic silver at 1mM increases the growth of resistant bacteria, a result with important medical applications.

Biography
My name is Adam Martinez and I am a grade 8 student from Waterloo, Ontario. My main interests are in the fields of Microbiology and Pure Mathematics. I also like studying foreign languages. I am currently studying Japanese. Other hobbies include fish breeding and playing the piano and violin. I also enjoyed playing Macbeth in a school play this year. I am really excited to be attending the National Science Fair this year!

Awards	Value
Challenge Award - Health - Junior Sponsor: AstraZeneca Canada	
Excellence Award - Junior - Gold Medal Sponsor: Youth Science Canada	$250
Western University Scholarship Gold Medallist - $4000 Entrance Scholarship Sponsor: Western University	$4 000
Total	$4 250

CWSF 2016 - Montreal, Quebec

Ruth Meyer

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

Challenge: Discovery
Category: Junior
Region: Waterloo-Wellington
City: Waterloo, ON
School: Centennial P.S.

Abstract: One only needs to drive a short distance within Waterloo Region to notice many inconsistencies with the way people enter, navigate through and exit a roundabout. Through observation, this project examined the impact of modelled correct exit-signalling on the behaviour of other drivers in roundabouts. Data collected clearly supports that modelling correct exit-signalling leads to a significant increase in this behaviour by other drivers.

Biography

I am a grade 8 student at Centennial P.S in Waterloo, Ontario. When not observing the behaviour of drivers in roundabouts, I can be found reading, sketching, figure skating or playing the piano or my bass clarinet. The inspiration for my project developed over time from listening to all of the conversations about correct driving behaviour my parents are having with my newly licensed 16-year-old brother. We live fairly close to a series of 6 roundabouts and we navigate through them often. I became fascinated with the lack of consistency drivers show when entering and exiting roundabouts. I am thrilled to be sharing my findings about the impact of modelled driving behaviour on other drivers at the Canada-Wide Science Fair. I am curious to further explore if the small-scale changes I observed due to modelled exit signalling could perhaps snowball and lead to a positive change in the culture of roundabout driving in Waterloo Region and beyond.

Awards	Value
Excellence Award - Junior - Bronze Medal Sponsor: Youth Science Canada	
Western University Scholarship Bronze Medallist - $1000 Entrance Scholarship Sponsor: Western University	$1 000
Total	$1 000

CWSF 2016 - Montreal, Quebec

Ashok Pandey

The Impact of Restorative Yoga and Streching on Blood Pressure and Heart Rate

Challenge: Health
Category: Junior
Region: Waterloo-Wellington
City: WATERLOO, ON
School: Centennial P.S.

Abstract: Hypertension is a leading cause of heart disease. Lifestyle interventions may improve blood pressure. I compared the efficacy of stretching, restorative yoga and quiet relaxation on blood pressure. Restorative yoga was more effective at reducing blood pressure immediately after the intervention and was the only intervention to have persistent benefits twenty four hours later, suggesting it may be an effective treatment for hypertension.

Biography
My name is Ashok Pandey and I am a grade eight student at Centennial Public School in Waterloo, Ontario. My research this year is on the impacts of restorative yoga and stretching on blood pressure and heart rate. I interests include the pursuit of science and social justice as well as community involvement. I have participated in regional science fairs and competitions but this is my first time at the CWSF. Science has always been a passion for me, and I enjoy learning and exploring. I also believe in social engagement, and uplifting those in need. To try to help engage youth in my community with social justice, 4 years ago, my brothers and I created a charity called Child2child. We have done several fundraisers including a food drive for our local food bank, raising money for disaster relief after a typhoon in the Philippines, and raising money for Mother Theresa's Orphanage in India. We also travel to this orphanage in India each summer for a month to teach orphans and street children. To my fellow CWSF finalists, good luck!

Awards	Value
Excellence Award - Junior - Bronze Medal Sponsor: Youth Science Canada	
Western University Scholarship Bronze Medallist - $1000 Entrance Scholarship Sponsor: Western University	$1 000
Total	$1 000