CWSF 2015 - Fredericton, New Brunswick

Nikhil Patil

Beta Cells' Ability to Secrete Insulin under Glucotoxic Conditions

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

Abstract: Despite obesity being correlated with diabetes, there is yet to be conclusive evidence regarding what links the two together. Beta cells' ability to secrete insulin was diminished after exposure to hyperglycemic conditions. Glucotoxic states are likely to be induced in obese patients who are developing type 2 diabetes. It was found that glucose toxicity could be a significant factor connecting obesity with type 2 diabetes.

Biography

My name is Nikhil Patil and I am a grade 10 student attending Waterloo Collegiate Institute. I have participated in science fair twice previously (grades 7 and 8), reaching CWSF both times and winning a bronze and silver medal. I play rep soccer for Waterloo as well as participate in many school extracurricular activities (debate, science club and orchestra). I have always had a passion for science and biology in particular, however I was unable to conduct cellular experimentation. I would like to pursue a career in the medical field. I was drawn towards research relating to type 2 diabetes after becoming aware of some shocking statistics indicating the increasing prevalence of obesity and type 2 diabetes at a young age. I believe that increased knowledge is the first step towards the development of an effective treatment or cure. My research aimed to determine a potential linking factor between obesity and type 2 diabetes. I would like to continue research on glucose toxicity along with extending my project to include experimentation in a clinical setting. My advice to anyone participating in science fair is to manage their time well, as even simple tasks can take a significant amount of time.

CWSF 2015 - Fredericton, New Brunswick

Kimia Raahemifar, Rishika Geda

Binaural Beats: Bio-feedback Via Brainwave Entrainment

Challenge: Discovery
Category: Intermediate
Region: Waterloo-Wellington
City: Waterloo, ON
School: Waterloo Collegiate Institute

Abstract: This project explored immediate influences of binaural beat stimulation on brain bioelectrical signals and mood. Thirty participants were exposed to beta frequencies with a difference of f=30 Hz. EEG data showed that the entrainment increased the participants' awareness rates immediately after exposure to binaural beats?an effect that persisted even after the stimulus had been removed, opening numerous pathways for innovation based on this research.

Biographies

Kimia - Kimia Raahemifar. Likes: debating, piano, art, history, literature, pragmatism, the Last of Us (yes, the zombie video game). I spend my time on my school work, taking on multiple leadership roles in extracurricular activities, and exercising. I've won various awards in public speaking, although my writing isn't nearly as strong. In the future, I hope to master both forms of communication - perhaps even in different languages. My partner, Rishika, and I were thinking of on-call workers and how vital their level of awareness is. This, in turn, inspired a question - is there a novel and natural approach that could profoundly affect our brainwave...
Rishika - I am a Grade 10 student in the Pre-Advanced Placement program at Waterloo Collegiate Institute. I'm very interested in research in the fields of neuroscience and life science. This year for science fair, my partner Kimia and I explored the immediate influences of binaural beat stimulation on brain bioelectrical signals and mood. My dream is to study medicine and specialize in surgery. Apart from the sciences, I have a great passion for law, history, and politics; these interests also come in handy for another passion of mine?competitive debate. Music is also a big part of my life?I enjoy singing, playing violin, and I'm currently comp...

Awards	Value
Excellence Award - Intermediate - Silver Medal Sponsor: Youth Science Canada	
Western University Scholarship Silver Medallist - $2000 Entrance Scholarship Sponsor: Western University	$2 000
Total	$2 000

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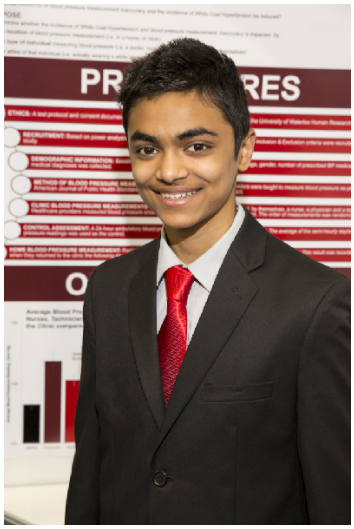
CWSF 2015 - Fredericton, New Brunswick



Arjun Pandey

Determinants of the Accuracy of Blood Pressure Measurement: A Novel Strategy

Challenge: Discovery
Category: Intermediate
Region: Waterloo-Wellington
City: Waterloo, ON
School: Waterloo Collegiate Institute

Abstract: My project aims to develop a more effective strategy for blood pressure (BP) measurement to reduce the risk of erroneous readings and conditions like White Coat Hypertension. Specifically, I tested the impact of the type of individual measuring BP, their attire, and the location of BP measurement on the accuracy of readings and the incidence of Isolated Clinic and White Coat Hypertension in 106 volunteers.

Biography

My name is Arjun Pandey. I am a grade 10 Extended French student at Waterloo Collegiate Institute, in Waterloo Ontario. For the past few years, I have been researching cardiovascular diseases including Pulmonary Hypertension, Nocturnal Blood Pressure Patterns and, most recently, White Coat Hypertension, a condition where individuals have high blood pressure in doctors' offices but normal blood pressure while going about their daily activities. I came up with the idea for my project during a visit to the dentist. I noticed I felt more anxious around the dentist rather than the dental hygienist and thought about how this might affect my blood pressure. From there my research has expanded to a large clinical trial with over 106 participants. My past research has been published in the Canadian Journal of Cardiology, the British Journal of General Practice, the Journal for Student Science and Technology, and the Canadian Young Scientist Journal and was featured in the Pulmonary Hypertension Association of Canada's magazine "Connections," and CTV's Canada AM. I presented my research with a Highlighted & Moderated Poster and Oral presentation at the Canadian Cardiovascular Congress, and with two poster presentations at the American Heart Association's Lifestyle and Epidemiol...

CWSF 2015 - Fredericton, New Brunswick

Devanshi Shukla

Evaluating antimicrobial plant-derived compounds

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

Abstract: Observing the inhibition of bacterial communication in V. fischeri, seen as decreased luminescence, provides a new method to screen for effective antimicrobial plant-derived compounds. Various compounds in Holy Basil were isolated using HPLC, and screened for their effectiveness. The same was done for its essential oils, but without contact. Interestingly, the volatile compounds are more effective antimicrobials than the compounds which were isolated.

Biography

I remember learning about antibiotic resistant bacteria in biology class, and how big of a problem it is in the world of medicine. At the same time, more and more Natural Health Products are being discovered as potential inhibitors of these supernatural bacteria. But how do we know what's the best product? I wanted to find out a way to easily screen various plant-derived compounds in order to limit down to the most effective one! For the future - I would like to research further to make a product that can be used for sterilization, easily limiting contamination through the use of volatile oils. For other students - think about the fact that the world's biggest problems can be solved by its smallest things. I absolutely love science (favorite class at school!) and doing research which is what I want to do when I'm older.

Awards	Value
Excellence Award - Senior - Bronze Medal Sponsor: Youth Science Canada	
University of Ottawa Entrance Scholarship Senior Bronze Medallist - $1000 Entrance Scholarship Sponsor: University of Ottawa	$1 000
Western University Scholarship Bronze Medallist - $1000 Entrance Scholarship Sponsor: Western University	$1 000
Total	$2 000

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CWSF 2015 - Fredericton, New Brunswick

John Fish

GPS Footprint: A Modern Approach to Emissions

Challenge: Innovation
Category: Intermediate
Region: Waterloo-Wellington
City: Waterloo, ON
School: Sir John A. Macdonald S.S.

Abstract: Carbon dioxide is the most radiative forcing greenhouse gas, and is commonly released through transportation. To measure these transportation carbon dioxide emissions, a phone application was created that combines GPS data with the fuel economy of multiple methods of transportation. Accurate data presented in a meaningful manner should act as an incentive to lower a person's carbon dioxide emissions.

Biography

My name is John Fish, and I'm a 15 year old student in grade 10 from Waterloo, Ontario. A major passion of mine is running, and my primary race distances are 400m and 800m. I won a provincial track gold medal twice and a bronze medal three times. Another major passion of mine, which led to my science fair project, is programming. I've released five apps on the Blackberry World and Google Play store, one of which is called "GPS Footprint" and is the basis for my science fair project. A talk with my brother about using computer science to help the environment provided the inspiration to create this app/project. I want to pursue this field in the future, and be able to combine STEM with environmental issues. At my regional fair I won a gold medal as well as best in division for earth and environmental science.

CWSF 2015 - Fredericton, New Brunswick

Sajeev Kohli

R.E.D.M.A. - Residential Emergency Detecting Multifunctional Apparatus

Challenge: Innovation
Category: Junior
Region: Waterloo-Wellington
City: Waterloo, ON
School: Kitchener Waterloo Bilingual School
Abstract: R.E.D.M.A is an innovative system that allows homeowners to monitor the environmental conditions of their property in real-time via a Smartphone from any remote location. The system also transmits e-mail alerts in the event of a basement flood or fire. The prototype implementation of the system has a demonstrated accuracy in excess of 99%.

Biography
My name is Sajeev Kohli and I am an eighth grade student in Waterloo, Ontario. I have developed an innovative system that allows homeowners to monitor the environmental conditions of their property in real-time from remote locations via a smartphone mobile application and website. The system detects water, smoke, and high temperatures and transmits e-mail alerts indicating the possibility of a flood or fire to system users. Outside of science fair, I tutor younger schoolmates in French and mathematics. I have also won multiple regional and provincial speaking competitions and have been ranked in the top 5% of all competitors in the Canada-wide advanced mathematics competitions. I am an avid reader and enjoy playing the piano. I am also passionate about science and aspire to someday become a doctor and improve the quality of life of all my patients.

Awards	Value
Canadian Artificial Intelligence Association Award - Junior Sponsor: Canadian Artificial Intelligence Association	$500
The Dr. Lisa Su Award - Junior Sponsor: Advanced Micro Devices (AMD)	$500
Excellence Award - Junior - Silver Medal Sponsor: Youth Science Canada	
Western University Scholarship Silver Medallist - $2000 Entrance Scholarship Sponsor: Western University	$2 000
Total	$3 000

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CWSF 2015 - Fredericton, New Brunswick

Ashna Jain

The 3rd Wheel

Challenge: Innovation
Category: Junior
Region: Waterloo-Wellington
City: Guelph, ON
School: John Galt Public School
Abstract: The 3rd Wheel bicycle enables children in developing countries to attend school by reducing their time spent transporting water by eight times. A cost-effective, sustainable solution was designed by considering the type of bicycle, the container size, shape and material, and the attachment location of the container to the bicycle. Using the principles of physics, including forces and work, an optimal design was determined.

Biography

Ashna Jain, a grade 7 student at John Galt Public School, Guelph, Ontario, is inspired to make a positive difference in the world. Her inspiration is derived from her travels to over 40 countries worldwide and by being a part of Free the Children, a global organization that focuses on ending inequality in the world. Ashna is a leader in her school and is heavily involved in a variety of activities from initiating and being editor of a first ever school newspaper, to helping run a pizza business, to participating in sport teams and committees. She has been honored the Grade 6 Valedictorian Award, OPC's Principal's Award for Student Leadership and a Free the Children Recognition. Ashna aspires to be an engineer or architect designing sustainable solutions for developing countries. This year was her first experience at a science fair. Ashna designed an affordable, sustainable water carrying bicycle system, called the The 3rd Wheel, that enables children in developing countries to attend school by reducing their time spent transporting water by eight times. Stories from Free the Children inspired her project, and as a next step she plans to create a business case for its implementation.

CWSF 2015 - Fredericton, New Brunswick

George Utsin

ThermIS: Automation of Viral System Detection

Challenge: Innovation
Category: Senior
Region: Waterloo-Wellington
City: Waterloo, ON
School: Waterloo Collegiate Institute
Abstract: ThermIS is an automated system to detect symptoms of viral infections. ThermIS passively and non-intrusively detects whether or not an individual is a possible carrier during an influenza outbreak, given that fever is a common symptom of many viruses and infections. This system can be useful in optimizing airport security, with potential applications in medicine as well.

Biography
My name is George Utsin and I'm a grade 12 student at Waterloo Collegiate. I am looking forward to my post-secondary education at the University of Waterloo for Software Engineering. The inspiration for this project came from my interest in computer vision and my passion for creating.

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

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