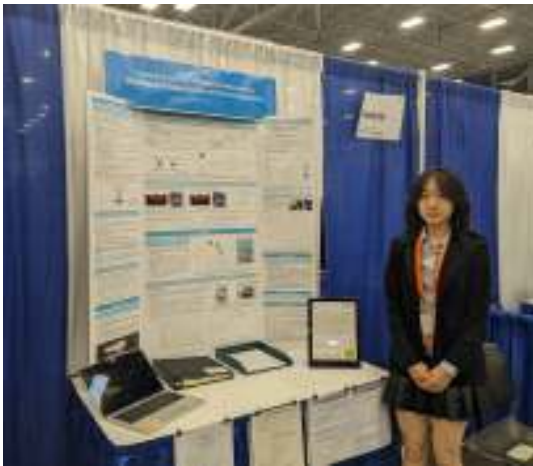


# Going Further- Beyond WWSEF

## Team Canada International Science & Engineering Fair Dallas



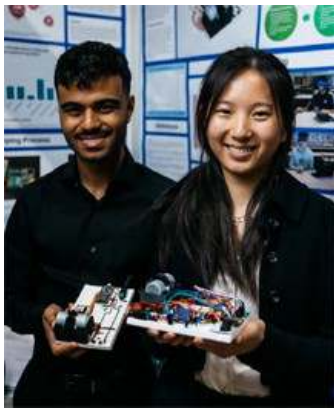
Cindy Cheng

### **A Sweat Lactate & Tissue Oxygen Sensor for Hypoxia**

Hypoxia is insufficient tissue oxygenation that can lead to tissue damage and organ failure. A wearable non-invasive integrated device was developed consisting of two main components: a chemical lactate biosensor and optical electronics that read out both tissue oxygenation and the colourmetric sweat lactate change. The device can be applied in post-operative care, detecting sepsis, and measuring endurance in athletes. It could facilitate cost-effective and sustainable healthcare to under-resourced regions and populations

Awards: 4<sup>th</sup> Biomedical Engineering

## Canada-Wide Science Fair Edmonton



Katelyn Wu & Moulik Budhiraja

### **Nail Braille: A Novel Approach Towards Braille Education**

This project designed, 3D printed and tested a new device that allows visually impaired individuals to self-learn braille. The developers aim to fight the global braille literacy crisis by using an approach that is low-cost and accessible to the visually impaired population.

Awards: CWSF Excellence - Gold; **Platinum Best Senior Project – Innovation**; Youth Can Innovate, \$8K; Challenge Award, Digital Technology, Senior; SM Blair Family Foundation. Scholarship offers (each): \$32K

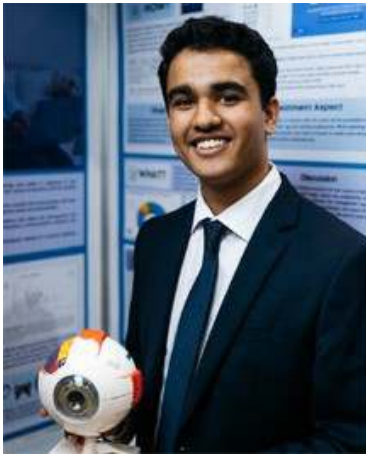


Gurnoor Kaur

### **MalaScope: A Deep Learning Enabled Lensless Microscope for the Rapid Detection of Malaria**

Malaria kills hundreds of thousands of people annually. MalaScope offers accurate, accessible, and affordable testing by using low-cost lensless microscopes and deep-learning algorithms. The use of imaging of stained blood smears and convolutional neural networks resulted in an accuracy of over 98% in identifying infected red blood cells. A second feature distinguished healthy from infected cells, eliminating staining.

Awards: CWSF Excellence - Gold; Canadian Artificial Intelligence Assn., Youth Can Innovate. Scholarship offers: \$9K



Ashish Chettimada

**ReAlign: A Novel Solution for the Early Detection and Management of Amblyopia**

Amblyopia (lazy eye) affects about 400 million people worldwide. It is a type of neurodevelopmental disorder that is the largest threat to the vision of children. This project developed ReAlign, a web application, to diagnose and treat amblyopia using advancements in technology. By combining personalization and games, the app creates an engaging experience for children of all ages.

Awards: CWSF Excellence - Gold; SM Blair Family Foundation. Scholarship offers: \$9K

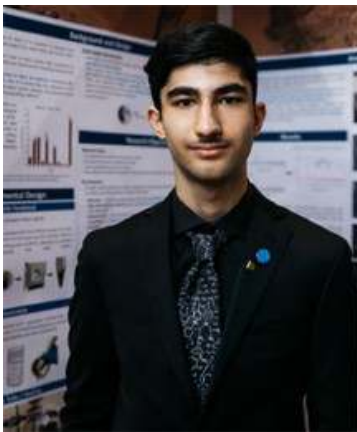


Roocha Shukla

**The Power that Brings Flowers**

This project focused on protecting plants from temperature fluctuations and increasing flowering by using electrolyzed seaweed extract. The efficiency of the seaweed extract was increased through electrolyzation, while optimizing application-based extract concentrations, inducing more flowers and made the plants more resilient to cold stress.

Awards: CWSF Excellence - Bronze. Scholarship offers: \$2.5K

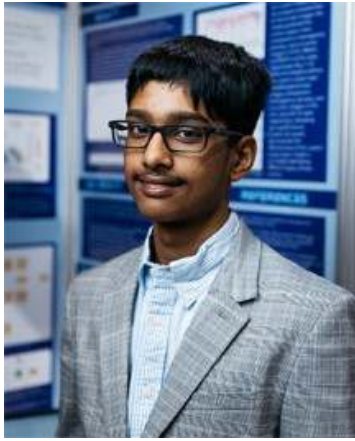


Hooman Reza Nezhad

**From Dust to Habitation – Molten Salt Electrolysis for the In-situ Reduction of Martian Regolith**

The complexity of missions to Mars prompts the need for In-Situ (on-site) Resource Utilization processes. This project involved the development of a molten salt based electrochemical cell in breaking down Martian soil (regolith), successfully producing oxygen and pure metals/alloys while resulting in a 550°C reduction in temperature from current techniques. The process enables resource production anywhere on Mars with fewer consumables from Earth.

Awards: CWSF Excellence - Silver; Nanotechnology for Sustainable Society. Scholarship offers: \$11.5K



Safwan Hussain

**Building a Multiclass Brain Tumor Classification Model using a Convolutional Neural Network (CNN)**

This project developed a multiclass brain tumor classification model using a convolutional neural network to aid diagnosis of brain tumors, particularly in areas with limited access to medical professionals. The model was trained on an MRI dataset and successfully identified four different brain tumor types with high accuracy. Rapid identification can reduce diagnostic time and workload for doctors, allowing effective treatment to their patients.

Awards: CWSF Excellence Bronze. Scholarship offers: \$2.5K



Charlie Martinez

**The Metallic Havoc: How Heavy Metals Select Antibiotic-Tolerant Microbiomes.**

This project examined the potential role of a heavy metal pollutant, silver nitrate, in exacerbating antibiotic resistance. Bacteria from a rural stream were exposed to  $\text{AgNO}_3$  for 18 days, after which their resistance to four widely-used antibiotics was tested. Bacteria exposed to  $\text{AgNO}_3$  demonstrated a heightened resistance to chloramphenicol, an antibiotic utilized worldwide.

Scholarship offer: \$1K



Jasmine Schneider

**Biochar Modified with Water Softener Brine Rinse for Phosphate Removal**

Phosphate pollution contributes to harmful algal blooms. This project aimed to make biochar, a super adsorbent material with few unfavourable features, better-suited for removing phosphate from water. The project investigated whether modifying the biochar with water softener brine rinse could improve its performance and compared it to mussel shell biochar.

Scholarship offer: \$1K