FOR RELEASE

Three BC science fair regions win *Youth Can Innovate* Awards at 2017 Canada-Wide competition

REGINA, SK (Friday May 19, 2017) – Four finalists with three projects from the Vancouver, South Fraser, and Vancouver Island Regional Science Fairs earned more than $9,500 in *Youth Can Innovate* awards for their year-long efforts to investigate societal problems and develop innovative solutions through Science, Technology, Engineering, and Mathematics (STEM) in the 56th Canada-Wide Science Fair, held this year on the University of Regina campus. The *Youth Can Innovate* Awards are sponsored by the Calgary-based Gwyn Morgan & Patricia Trottier Foundation.

"One of the key goals of our Foundation is to encourage and support Canadian students in STEM," said Gwyn Morgan in announcing the inaugural winners of the 2017 *Youth Can Innovate* Awards. "We want to champion Canada's young innovators and shine a light on their work by encouraging them and providing financial support. They're Canada's future," said Patricia Trottier. More than 440 STEM students from schools across Canada presented 390 projects.

The three British Columbia projects winning *Youth Can Innovate* Awards are:

Grade 11 students Charles Wang, and Spencer Zezulka are sharing one of four top *Youth Can Innovate* Senior category cash awards ($8,000). They have returned to the national competition representing the South Fraser Regional Science Fair. Wang, from Semiahmoo Secondary School, and Zezulka, from Elgin Park Secondary School, both in Surrey, developed a prototype for solar-powered production of clean fuel by the fermentation of a bacteria Clostridium acetobutylicum. "The need for a source of clean energy is pervasive. Our project seeks to use biosystemic manipulation of a photosynthetic biomass source and a metabolizing agent to produce carbon-neutral fuel," the team explained. With further refinement to their initial research, Wang and Zezulka believe possible applications could include atmospheric cleansing by sequestration of carbon dioxide, or even the production of return fuel for future travel to Mars.

Chaim Weizmann, the first president of Israel, discovered the process of Acetone Butanol Ethanol (ABE) fermentation carried out by this type of bacteria. The pair also found that a group at the University of California Berkeley discovered a catalyst that can synthesize various hydrocarbons, using these three components. Despite the benefits of producing useable biofuel and other hydrocarbons, the system is expensive to develop and maintain. A key issue is that C. acetobutylicum is an obligate anaerobe so it cannot survive when exposed to oxygen; a special chamber is required to grow the bacteria in a low oxygen environment, which can be expensive to construct and maintain. The pair suggests that their technique could be a viable method for hydrocarbon production on Mars where the atmosphere contains little oxygen, perfect for the growth of C. acetobutlyicum without the need for a specialized chamber. They identified that the need for a carbon source is another contributor to the high maintenance cost and investigated the use of algae as a carbon source to drive the fermentation process. Algae are fast-growing, resilient and a renewable carbon source, using the sun's energy to produce sugars. This means that the system is essentially a solar-powered system. The two constructed a device that they called "Big Bertha," which facilitates algae growth, bacterial growth (by mimicking Mars' environment) and the fermentation process. They demonstrated the effectiveness of the device to produce clean biofuel and hope to improve yields with future optimizations. The pair believe their invention could one day be integral to a future mission to colonize Mars.

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Yimeng Li, a Grade 9 student at Sir Winston Churchill Secondary School in Vancouver won a Gold medal and a $750 Intermediate *Youth Can Innovate* Award. She enjoys working in many fields of applied science such as electricity, chemistry, and microbiology – and then integrating these fields to create new innovations. After learning about the increase in copper discharge as a result of improperly treated industrial wastewater, she thought that it would be interesting to create an inexpensive, economical, and environmentally-friendly system that can remove metal ions without any energy or resource input. She built a self-sustaining system capable of removing metal pollutants, powered only by yeast. "I enjoy converting even the simplest concepts to applications in our growing society. I studied many aspects of the three fields, as well as circuit design and programming to build a lot of the equipment used in my research, including incubators, and drip-feed systems," explained Yimeng. Her project involved designing a circuit to harness electrons produced during the respiration of microbes to power the cathodic reduction reaction of copper ions, meaning the copper ions were able to gain the electrons produced by the microbes. Through a series of catholyte measurements indicative of copper concentrations, evidence of copper recovery was successfully demonstrated, without an external energy source.

Nattan Telmer, a trilingual grade 9 student at Arbutus Global Middle School in Victoria, received one of the four $750 Intermediate *Youth Can Innovate* awards. His project uses thermal electric generator (TEG) technology to extend the operational life of tracking sensors that provide key information about sea lion life history, which is needed for conservation efforts, as sea lions have been listed as an endangered species. The TEGs exploit the temperature differential between a sea lion's body and the surrounding air or water to power the sensors indefinitely. The technology continuously tops up the charge of a sea lion tracker, with one side heated by the sea lion's warmth and the other side cooled by marine waters. In these conditions, the TEG apparatus can generate twice the energy consumed by a commercially available tracker, potentially extending operational life indefinitely. Telmer notes that this technology could help improve our understanding of the decline in sea lion populations. Telmer competes in soccer, racquet sports and sailing.

Youth Can Innovate awards, with a total cash value of $41,000, are offered to students competing at Canada's annual national science fair. This year, 242 finalists at the junior, intermediate and senior levels nominated their projects for evaluation. The 2017 recipients were selected by Canada-Wide Science Fair judges. More information about *Youth Can Innovate* and profiles of 2017 recipients, can be found at **Facebook/YouthCanInnovate**, Twitter: @youthcaninnovate, and www.youthcaninnovate.ca.

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For media information, photos, and to interview winners: Rosemarie Enslin (403) 630-8421, enslin@enslinpr.com, @RosemariePRyycT

About The Gwyn Morgan & Patricia Trottier Foundation: The Gwyn Morgan & Patricia Trottier Foundation is a family foundation based in Calgary, Alberta. Established in 2005, it focuses on education, wellness initiatives and leadership development. In education, the Foundation gives priority to initiatives that encourage and support students pursuing STEM (Science, Technology, Engineering, and Mathematics) careers. The Foundation's STEM support currently includes 20 recently established *Youth Can Innovate* awards, which are given annually to 16 innovative projects at the Canada-Wide Science Fair; Camosun College's Empowering Women In Trades Program; the Gwyn Morgan **Be An Engineer** bursaries awarded annually at 15 Canadian universities and the Gwyn Morgan Centennial Bursary.