

# CWSF 2008 - Ottawa, Ontario



## Chris Palmer, Pinky Langat

### Bright Future of Energy: Dye-Sensitized Solar Cells

**Division:** Health Sciences / Environmental Innovation

**Category:** Senior

**Region:** Waterloo-Wellington

**City:** Guelph, ON

**School:** Centennial Collegiate & Vocational Institute

**Abstract:** The efficiencies of various pigments and electrolytes were analyzed in dye-sensitized solar cells. The optimal pigment was found to be anthocyanin extract from red cabbage, and the most effective electrolyte was found to be a saturated solution of guanidine thiocyanate in water-free ethylene glycol. Investigations on possible effects of GFP as an antioxidant and accessory pigment and of DNA to facilitate electron transfer are continuing.

#### Biographies

Chris - I am currently a grade twelve student at Centennial C.V.I in Guelph, Ontario. My lab partner, Pinky Langat, and I competed in the Waterloo-Wellington Science and Engineering Fair and won the Award of Excellence, an Award of Merit, the Best of Engineering, a Gold Medal for Senior Engineering and the Hydro One Award. I am also heavily involved in music, playing drums in my high school symphonic and jazz bands and a jazz sextet outside of school. I rock climb, bike, hike and winter-camp. I am currently participating in a four course, full semester, intensive environmental and outdoor ed program that focuses on peak oil / climate change and issue...

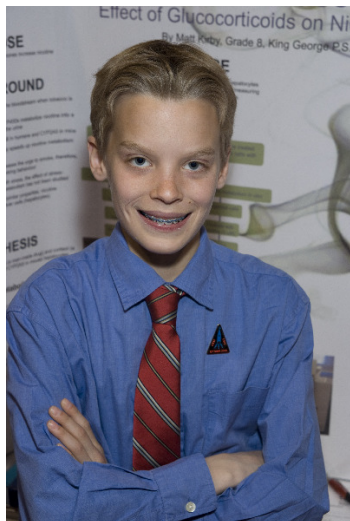
Pinky - My name is Pinky Langat, and I am a Grade 12 student at Centennial CVI. I am a Shad Valley Calgary alumnus and a current 2008 Loran Award Scholar. Some of my involvements include being a co-chair of the Guelph Youth Council, DECA Centennial Chapter President, an executive member of Centennial's social action club Global Outreach, a youth volunteer for Buddha's Light International Association of Toronto, and the Events Coordinator for the social awareness group Student Reach. I recently participated in Forum for Young Canadians, as I am very interested in world issues. I have performed in school drama, musicals, and dance productions. I also p...

#### Awards

#### Value

University of Ottawa Entrance Scholarship Senior Bronze Medallist - \$1000 Entrance Scholarship Sponsor: University of Ottawa	\$1 000
The University of Western Ontario Scholarship Bronze Medallist - \$1000 Entrance Scholarship Sponsor: University of Western Ontario	\$1 000
Honourable Mention - Engineering - Senior Sponsor: Youth Science Foundation Canada	\$100
Bronze Medal - Environmental Innovation - Senior Sponsor: EnviroExpo, Presented by VIA Rail Canada	\$300
<b>Total</b>	<b>\$2 400</b>

# CWSF 2008 - Ottawa, Ontario



## Matt Kirby

### Effect of Glucocorticoids on Nicotine Metabolism

**Division:** Life Sciences / None

**Category:** Junior

**Region:** Waterloo-Wellington

**City:** Guelph, ON

**School:** King George P.S.

**Abstract:** A glucocorticoid hormone such as dexamethasone (a man made drug) and cortisol (a natural hormone) released during stress increases the activity of an enzyme found in mouse hepatocytes that metabolizes nicotine. Low nicotine levels in the blood increases the urge to smoke. These enzymes are CYP2A5 in mice and CYP2A6 in humans.

#### Biography

My name is Matt Kirby. I was born in Montreal on March 18, 1994. I am in grade 8 at King George Public School in Guelph. I am an honour roll with an 89% average. I enjoy swimming and volleyball. I play on a competitive 14U volleyball team (Guelph Hornets). I have all bronze qualifications of lifeguard, in the near future I plan to be a qualified Red-Cross lifeguard or instructor. I am also interested in music, I play the flute at the Tritone Music Center. I am also interested in biochemistry. I received a gold medal, best of life science, best written report, OAML award, and award of merit at my regional science fair (WWSEF). For my future post secondary plans, I plan to enter a university and study biomedical research. Throughout the hard work in the lab during the past year, I have come to a conclusion that it is my goal to help society's need and awareness in medical research.

#### Awards

#### Value

The University of Western Ontario Scholarship Silver Medallist - \$1500 Entrance Scholarship Sponsor: University of Western Ontario	\$1 500
Silver Medal - Health Sciences - Junior Sponsor: Canadian Institutes of Health Research	\$700
Total	\$2 200

# CWSF 2008 - Ottawa, Ontario



## Zach Elgood

### How Much N<sub>2</sub>O is in Your H<sub>2</sub>O?

**Division:** Engineering & Computing Sciences / None

**Category:** Junior

**Region:** Waterloo-Wellington

**City:** New Hamburg, ON

**School:** Courtland Avenue Senior P.S.

**Abstract:** This project examines nitrous oxide, nitrate and ammonium concentrations in municipal and private drinking water supplies. The highest concentrations of nitrous oxide, a potent greenhouse gas, were found in municipal groundwater supplies. The data suggests that the potential release of nitrous oxide, from certain municipal water supplies, could be equivalent to 50% of the flux from a nitrogen limited forest.

#### Biography

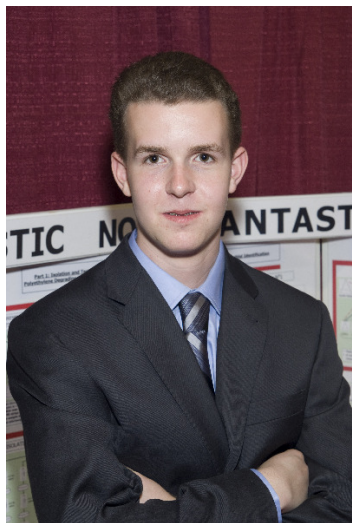
Hi, my name is Zach Elgood. I am 14 years old and attend grade 8 at Courtland Public School in Kitchener, Ontario. My interests are varied and include the sciences, writing and music. I enjoy playing the clarinet, bass clarinet and tenor sax in our school bands, and if not there, I might be found at Karate, playing chess or buried in a good book. I am thrilled to be making a second trip to the CWSF. Last year's fair in Truro was an experience I will never forget. In the future I plan to study quantum physics and my dream is to hold a position at the Perimeter Institute.

#### Awards

#### Value

Honourable Mention - Earth & Environmental Science - Junior	\$100
Sponsor: Petro-Canada	
<b>Total</b>	<b>\$100</b>

# CWSF 2008 - Ottawa, Ontario



## Daniel Burd

### Plastic Not Fantastic

**Division:** Biotechnology / Environmental Innovation

**Category:** Senior

**Region:** Waterloo-Wellington

**City:** Waterloo, ON

**School:** Waterloo Collegiate Institute

**Abstract:** Plastic bags, made from polyethylene, are very popular in our daily lives and have a harsh environmental impact on our ecosystems. Two microbial strains belonging to the genus *Sphingomonas* and *Pseudomonas* were isolated from a soil microbial consortium and their ability to degrade polyethylene was investigated.

### Biography

My name is Daniel Burd, a grade 11 student at Waterloo Collegiate Institute. I performed my first "science" experiment involving planting and observing growth of different types of tomato seeds on the balcony of our apartment in Waterloo eleven years ago. Since that time, the ideas and concepts behind the way things work have constantly aroused my interest and have posed numerous questions for me to consider. At school, I am on ABCD Student Council, Charity Controller, Environment club, a peer tutor, and Norse Star newspaper. When I was five years old, I started to play the piano and I have completed my grade 8 piano and grade 2 rudiments at the RCM. Currently, I am learning improvisation and jazz. My jazz music role model is Oscar Peterson. I am a member of Nordic Skiing club, ROW swimming club and Waterloo Tennis Club where I am training for tournaments. I am a volunteer at K-W Science and Technology Children's Museum. I help organize heritage events in K-W area and I run a charity dog-walking business in my neighborhood for people with disabilities. I fluently speak English, French and Russian and I enjoy spending free time with my friends.

### Awards

### Value

Awards	Value
The Manning Innovation Achievement Award Sponsor: Ernest C. Manning Awards Foundation	\$500
Dalhousie University Faculty of Science Entrance Scholarship Senior Gold Medallist - \$4000 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	\$4 000
NSERC Undergraduate Student Research Award - Senior Gold Medallist Sponsor: Natural Sciences and Engineering Research Council of Canada (NSERC)	\$5 625
UBC Science (Vancouver) Entrance Award Senior Gold Medallist - \$4000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	\$4 000
University of Ottawa Entrance Scholarship Senior Gold Medallist - \$20,000 Entrance Scholarship (\$5,000 each year for 4 years) Sponsor: University of Ottawa	\$20 000
University of Ottawa Entrance Scholarship Senior Silver Medallist - \$3000 Entrance Scholarship Sponsor: University of Ottawa	\$3 000
The University of Western Ontario Scholarship Gold Medallist - \$2000 Entrance Scholarship Sponsor: University of Western Ontario	\$2 000
The University of Western Ontario Scholarship Silver Medallist - \$1500 Entrance Scholarship Sponsor: University of Western Ontario	\$1 500
Silver Medal - Environmental Innovation - Senior Sponsor: EnviroExpo, Presented by VIA Rail Canada	\$700
Gold Medal - Biotechnology & Pharmaceutical Sciences - Senior Sponsor: Rx&D Health Research Foundation	\$1 500
EnCana Platinum Award - Best Senior Project Sponsor: Encana Corporation	\$5 000
EnCana Best in Fair Award Sponsor: Encana Corporation	\$10 000
<b>Total</b>	<b>\$57 825</b>



## CWSF 2008 - Ottawa, Ontario



### Lawrence Xie

#### Prime Probability Paradox Through Parity!

**Division:** International / None

**Category:** Senior

**Region:** Waterloo-Wellington

**City:** Guelph, ON

**School:** Centennial Collegiate & Vocational Institute

**Abstract:** By considering the relationship between sets of prime numbers and even numbers in the natural number set, this study investigates the probability of a randomly selected number being prime. The probability determined through this analysis was then compared with the results from a computer program. This study offers a new approach to understand the distribution of prime numbers through the Fundamental Theorem of Arithmetic.

#### Biography

My name is Lawrence Xie. I am a grade twelve student at Centennial Collegiate Vocational Institute in Guelph, Ontario. Although this is my first and possibly only time attending CWSF, I have had an interest in mathematics for quite some time. I have frequently performed well on numerous math and physics contests as well as completed Advanced Placement exams in calculus and physics with a top level of 5. Aside from academic studying, I also enjoy running. I am a member of my school's cross-country and track teams. Moreover, I am also an accomplished pianist, having completed my ARCT in June, 2007. Coming June, I will be competing in the Kiwanis Music Festival Provincial Finals. Next year I plan on either majoring in Math at University of Waterloo, or Engineering Science at University of Toronto.

# CWSF 2008 - Ottawa, Ontario



## Mackenzie Carter

### The Coanda Conundrum

**Division:** Health Sciences / Automotive

**Category:** Intermediate

**Region:** Waterloo-Wellington

**City:** Maryhill, ON

**School:** St. John's-Kilmarnock School

**Abstract:** My project tested the amount of lift produced using the Coanda Effect. Using variable airspeeds from a leaf blower, I could determine the amount of lift produced by different curved foils. I found that the tighter the radius of curvature the more lift produced.

### Biography

My name is Mackenzie Carter and this is my first time at attending the Canada-Wide Science Fair. I build and fly model airplanes as a hobby. I am on the varsity soccer team at my school and I am a competitive Alpine snowboard racer. This year I trained with the Ontario Snowboard Club and represented Ontario at the Canadian Junior National Snowboard Championships. I have won best of fair at my school science fair for two years. During the summer I work as a soccer referee and kiteboard.

### Awards

### Value

The University of Western Ontario Scholarship Bronze Medallist - \$1000 Entrance Scholarship Sponsor: University of Western Ontario	\$1 000
Bronze Medal - Automotive - Intermediate Sponsor: AUTO21	\$300
Bronze Medal - Engineering - Intermediate Sponsor: Youth Science Foundation Canada	\$300
<b>Total</b>	<b>\$1 600</b>

# CWSF 2008 - Ottawa, Ontario



## Jeff Graansma

### The Pandemic Ventilator

**Division:** Health Sciences / None

**Category:** Senior

**Region:** Waterloo-Wellington

**City:** Kitchener, ON

**School:** Forest Heights Collegiate

**Abstract:** During an influenza pandemic, the need for ventilators may greatly exceed supplies. Triage protocols implemented by governments determine who will get access, and who will die if denied. It will not be possible to construct enough commercial ventilators in time once a pandemic begins. This project constructs and tests a ventilator made from industrial components that will be available even after a pandemic has started.

#### Biography

I was born and grew up in Kitchener Ontario. I go to Forest Heights Collegiate Institute. I am currently employed part time as a Lifeguard and Swimming Instructor for the city of Kitchener. Some of my hobbies and interests include computers, mountain biking, go-carting, automation and robotics and exploring the outdoors. I enjoy problem solving. I spend my summer at Pointe au Baril boating, fishing, water skiing, and swimming. I volunteer in my community through my workplace by teaching disabled children to swim. I am active in my church youth group by helping at the food bank, roadside cleanup, home repair projects and youth mission trips. I have acquired much experience communicating with people and the community. I would like to go into post secondary education in the industrial automation field.

#### Awards

#### Value

Engineers Without Borders - Canada Award Sponsor: Engineers Without Borders - Canada	\$1 500
Honourable Mention - Engineering - Senior Sponsor: Youth Science Foundation Canada	\$100
<b>Total</b>	<b>\$1 600</b>

## CWSF 2008 - Ottawa, Ontario



### Devin Howard

#### You are Not a Beautiful and Unique Snowflake

**Division:** Life Sciences / Environmental Innovation

**Category:** Senior

**Region:** Waterloo-Wellington

**City:** Elora, ON

**School:** St. John's-Kilmarnock School

**Abstract:** Malcolm Gladwell's "The Tipping Point" explains how fads are really social epidemics, and can be analyzed in the same way that diseases can be analyzed. There are three rules that govern an epidemic's spread, and understanding those rules can help one to understand social science. I used a controlled computer model to measure the effects of simultaneous social epidemics on a small community of people.

#### Biography

I am a grade 12 student and am planning on attending University of Waterloo next year for a new program known as the Bachelor of Knowledge Integration. I have always been interested in more than just math, science, or the arts, and since discovering Knowledge Integration I've gotten a lot of pleasure from finding problems and ideas that don't fit within one discipline. My science fair project definitely reflects that. I play soccer and track and field at school, and have participated in two school choirs as well as the school play and debate club for the past three years. I am an avid programmer, reader, and actor. I have acted in historical walking tours in my hometown of Elora, Ontario for six years. I hope that success in science fair and school can help me get the a well-rounded and comprehensive education in a variety of fields. I am a fanatical environmentalist, and I know that if I want to help solve world issues, I won't be able to do so from the limited perspective of just one discipline.