

NIKAYLA

WHO

Nikayla

WHERE

Consort, Alberta

WHEN

Team Consort School iGEM 2013 - 2015

WHAT

PROJECT ECOS - ENVIRONMENTAL CONTAINMENT SENSOR

Born and raised in Consort, Alberta, Nikayla didn't have much in the way of extracurricular activities, let alone extracurriculars in innovation and STEM in the village of just 726 people.

That all changed when her science teacher received funding from geekStarter, a Tech Futures Challenge MindFuel program, to kickstart an iGEM* chapter at the local K-12 school. The iGEM Foundation is an independent, non-profit organization dedicated to the advancement of synthetic biology, education and international competition, and the development of an open, collaborative, and cooperative community.

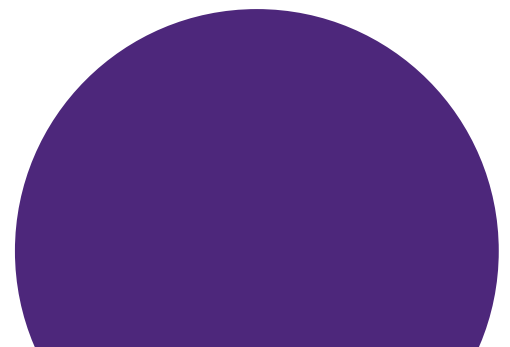
Nikayla and a group of other students in the area jumped at the chance to participate and quickly got to work solving issues in agriculture and oil and gas. The iGEM Foundation holds an annual competition at the Massachusetts Institute of Technology in Boston and their team was determined to make it.

The students developed a sensor to detect xylene (a naturally-occurring hydrocarbon in petroleum) in soil when land is reclaimed from the oil patch. The result was the creation of a modified E.coli (*Escherichia coli*) bacteria that fluoresces green when it comes into contact with oil. The potential for real world applications was clear. The team presented at the competition and ranked 5th worldwide!

WHY

"Being part of this team, I got to learn about things in high school that you don't normally get a chance to explore until you're doing your master's degree in university," explains Nikayla. *"MindFuel's program allowed me to engage in elite and advanced science on the back counter of our school science lab!"*

*iGEM is International Genetically Engineered Machine Foundation



CHRIS

WHO

Chris

WHERE

Lethbridge, Alberta

WHEN

Team Lethbridge High School iGEM 2012-2015.

WHAT

TREATING TYPE 1 DIABETES - A SYNTHETIC BIOLOGY APPROACH (2012) and PRODUCING OXYTOCIN (2013).

Before finding a passion for science and technology, Chris didn't think too much about what his life would look like after high school. While he was never a poor student, he struggled to find something that inspired him to immerse himself into thinking critically and working hard.

It wasn't until Chris joined his high school iGEM* team that things started to drastically shift for him. MindFuel supports students who work with the iGEM Foundation, an independent, non-profit organization dedicated to the advancement of synthetic biology, education and competition, and the development of an open, collaborative, and cooperative community. Each year, geekStarter, a MindFuel program, funds local iGEM teams as a way to inspire high school students to find a passion for STEM and innovation.

Some of the projects he's been involved in include developing a bacteria that produces insulin, creating bacteria that produces oxytocin (his team won first place at the iGEM competition that year), tackling the problem of antibiotics in the water supply, and combatting a parasitic mite of the honey bee.

Even after graduating from high school, Chris found a way to stay involved as a mentor for the next generation of STEM innovators. His sense of entrepreneurialism and curiosity led to the creation of a small business that works to bring sustainable bio pesticide to market that is good for the environment, agriculture, and the economy.

Chris will graduate from the University of Lethbridge with a degree in biology, and he plans to continue his studies in either engineering or business.

WHY

"Getting involved in MindFuel projects showed me that I don't have to wait for approval or direction," Chris says. "It made me more interested in showing initiative, taking a risk, figuring things out for myself. I have a lot of ideas and I'm not sure which one I'll ultimately pursue. I'd like to have my hands in as many things as possible – law, science, medicine, agriculture. All I can tell you is that I aspire to make meaningful change in a responsible and sustainable way."

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TALIA



WHO

Talia

WHERE

Canmore, Alberta

WHEN

Team OLS Canmore iGEM 2015-2016

WHAT

BreaKerS - BREAK DOWN OF HAIR IN WASTEWATER TREATMENT FACILITIES AND FEATHER WASTE IN THE POULTRY INDUSTRY

After seeing an odd cartoon series in her town's local newspaper designed to educate residents about common items causing damage to the municipality's sewer system, Talia quickly got to thinking about why things like hair in the sewer system creates costly issues.

She rallied a team of other STEM and innovation minded students to find the answers. Hair is made of a fibrous protein called keratin that takes an average of seven years to break down, and they discovered the existing solutions to dispose of it are not good for the environment.

They decided to look for an alternative solution for this real-world problem; a way to break down keratin that would not damage the environment. The result: they created an enzyme that both breaks down the keratin protein AND produces a useful protein product.

Based on her experience with MindFuel's project-based learning, she was influenced to apply to universities with similar iGEM programs (also supported by MindFuel) so that she could continue to be a part of cutting-edge research. The iGEM Foundation is an independent, non-profit organization dedicated to the advancement of synthetic biology, education and competition, and the development of an open, collaborative, and cooperative community.

By being part of iGEM and receiving mentorship and support from MindFuel, Talia found a love for innovation, writing and public speaking and hopes to build a career in science through law or broadcast journalism.

WHY

"These are not single-faceted projects," explains Talia. *"We're not solely focused on the science. We learn about the ethical implications of our projects. We learn to do presentations, fundraising, lab work, project management, websites, and learn to work as a team."*



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EMILY & DAVID

WHO

Emily and David

WHERE

Calgary, Alberta

WHEN

Team Calgary iGEM 2012-2013

WHAT

DETECT AND DESTROY: BUILDING FRED AND OSCAR

Meet Emily and David! They're the co-founders of FREDsense, a technology that provides fast and accurate measurements of chemicals in water. FRED (Field Ready Electrochemical Detector) is groundbreaking technology that was born from a geekStarter-funded project.

In 2011, Emily and David's team developed a bacteria sensor that could detect chemicals in the tailing ponds and clean up the oilsands. *"We developed something that solves an important everyday problem,"* David explains. *"People have to know what's in their water before they can do something about it."*

The following year, their team went a step further, expanding the technology so that the bacteria could not only act as a sensor to detect chemicals in the water, but it could also turn some of those harmful compounds into useful hydrocarbons. As they neared graduation, David and Emily wanted to commercialize their work.

"iGEM had just created an entrepreneur division of the competition. We thought, 'we have this interesting technology, we've won all these awards, what do we want to do with it?'" says Emily.

Emily and David created a business plan, entered the iGEM competition and won the top prize in their division! The iGEM Foundation is an independent, non-profit organization dedicated to the advancement of synthetic biology, education and competition, and the development of an open, collaborative, and cooperative community.

They're now business partners at FREDsense, have an office and lab and a team of 10 full time employees. Their groundbreaking technology has gone further than the oil sands, and they now focus their marketing on wastewater remediation and water treatment companies.

David and Emily's geekStarter years helped them develop the skills needed to manage a team, be resourceful and run a successful, high-tech startup company.



Image:
FREDsense

WHY

"MindFuel's geekStarter buys into the creativity of people. It gives young scientists an opportunity to be wildly creative and allows outstanding hands-on education in solving real-world problems with technology," David says. *"It throws you into a real startup culture where you have to learn to be good at all aspects of developing a science idea – lab work, computer design, visual arts, fundraising, communication, and marketing. It's proof that a small group with a good idea can generate a big impact on the world."*

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