



BRANCHING OUT

MINDFUEL ANNUAL REPORT 2015





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PSYCHOLOGY

KINETICS

MECHANICS

ELECTROMAGNETICS

THERMODYNAMICS

CRIMINOLOGY

BOTANY

ZOOLOGY

GEOLOGY

BIOCHEMISTRY

PHYSICAL THERAPY

AGRICULTURE

ARCHITECTURE

ARCHAEOLOGY

PHILOSOPHY

GEOCHEMISTRY



ASTROPHYSICS

METEOROLOGY

ELECTROCHEMISTRY

PALEONTOLOGY

COMPUTER SCIENCE

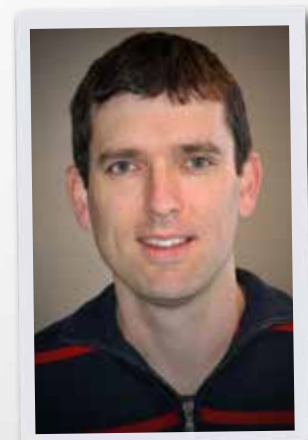
ANTHROPOLOGY

PERMUTATION & VARIATION

“The student-run high school iGEM team at the University of Lethbridge use synthetic biology to solve real-world problems such as human disease and environmental issues. Encouraged to take initiative in researching, planning, and engineering the students know that the possibilities are endless and get really excited about being able to direct their own experiments and do the science they want to do.

In order for us to train the next generation of enthusiastic scientists, it is important that they be exposed to opportunities to develop their scientific understanding. The funding program that MindFuel and geekStarter provide to the Lethbridge high school iGEM team has been invaluable to achieving this outcome.”

Dr. Brian Dempsey, Advisor to Lethbridge High School iGEM team, Lethbridge





INNOVATION & DIVERSIFICATION

“At my very first iGEM meeting my initial thought was that there was no way I would be smart enough to contribute anything to the group. However, I was overlooking the fact that not only was I one of the youngest people on the team, but also that there is more to iGEM than just science.

Thanks to the support of MindFuel and the geekStarter program, students like me are able to be exposed to advance STEM research and can experience rich learning that can be put towards helping improve the world by solving real problems.”

■ Ross Oliver, Lethbridge High School
iGEM participant, Grade 11, Lethbridge



INNOVATION AT MINDFUEL

PIVOTING, ADAPTING AND STAYING TRUE TO ITS MISSION

MINDFUEL'S SOCIO-ECONOMIC VALUE

MindFuel helps teachers teach and students learn by developing engaging and immersive programs. The organization ultimately supports Alberta's innovation agenda by working with industry to profile opportunities for diversification, STEM-based careers and post-secondary pathways. This work is reinforced through the development of frameworks for entrepreneurial-based educational experiences that are essential for us to maintain the quality of life we expect and to ensure the future is all that it can be. MindFuel reaches over 180 countries, and delivers millions of learning experiences each year.

MINDFUEL - PIVOTING, ADAPTING AND STAYING TRUE TO ITS MISSION

"Pivoting" occurs when organizations change the business model or make wholesale changes to a product line to enhance the creation of value. Four years ago, under the direction of newly appointed CEO Cassy Weber, and with the support and strategic direction of the Board of Directors, MindFuel's three current programs (Wonderville.ca, Edacity.ca and Ignition Pack) began the process of pivoting. At the same time the whole organization undertook a disruptive approach of adapting to ever-changing external influences by creating opportunities to move to a self-sustainable model.

Beginning with a classic business canvas, the entire MindFuel team participated in a facilitated activity to remove existing assumptions around program offerings and lay a foundation for examining the core of each program. From there, three-year forecast roadmaps, with clearly defined off ramps, were created and each program has been following those roadmaps for the past three years, pivoting to meet the needs of their audiences while remaining true to the organization's mission.

Since 2002, the Wonderville program has impacted millions of lives by inspiring students

to find a passion for STEM learning and careers. It contains hundreds of digital learning resources – animations, games, puzzles, quizzes, career spotlights, and much more that help teachers engage students with 21st century digital resources. When a revenue-generating opportunity was identified in the United States, the team made an impactful decision to pivot toward a social enterprise model.

The pivot began with an online conversation with Wonderville users, exploring additional features and functionality that would enhance their experience beyond the current delivery of STEM-related content. Next, a study was conducted to understand product-feature bundles and price acceptance. And finally in-depth individual interviews were conducted with key decision makers at the school district level in Canada and the United States to understand acceptance and readiness for digital program delivery in the classroom.

The Wonderville team completed the third pilot of the enhanced Wonderville with teachers in California and Alberta in the winter of 2015. Each pilot provided valuable insights that were used to iterate on product development and help MindFuel create strong grassroots ambassadors from the pilot participants. The new learning platform was launched in March 2016, and features Wonderville Basic and Wonderville Enhanced product offerings.

The MindFuel team has taken a creative and innovative approach to moving forward by following steps similar to those of a high-tech start up. It has allowed the organization to quickly iterate and ultimately deliver a product that meets the needs of its stakeholders while still remaining true to inspiring a passion for STEM. The organization's goal is to achieve self-sustainability through recurring revenues for products and services, such as subscription revenues earned from Wonderville Enhanced, and one day to give back to other community organizations with similar missions.

LETTER FROM THE BOARD CHAIR AND CEO

For the past 26 years, MindFuel has supported initiatives across Alberta, Canada and the world that support the learners and innovators of tomorrow. The 2015-2016 year was no exception - we have continued to educate and offer youth the opportunities to find “a-ha” moments that inspire them to seek, to explore and to become passionate about science, technology, engineering and math. We are part of a large community that is dedicated to building the roots and foundation for a bright future full of innovative, world citizens who are confident in their skills and ability to change the world around them.

Supporting youth on this journey is critical to our future. Innovation capacity - a nation’s potential for output of breakthrough inventions and innovative developments - is critical to economic prosperity and building that capacity starts with our youth. We inspire students to discover their creative and innovative potential in classrooms and beyond.

Our work in the past year has been dedicated to growing our programs, nurturing our relationships, engaging with educators and students, and moving forward on our path toward self-sustainability. As a result, MindFuel delivered 34,416,169 impressions representing 13% growth; Wonderville delivered over 7,567,895 learning experiences representing 7% growth. Ignition Pack and Edacity reached over 5,000 students, representing 30% growth from the prior year. Finally, MindFuel surpassed 130,000,000 cumulative impressions since being established.

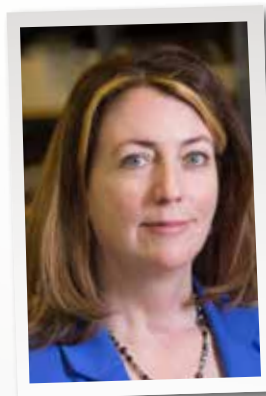
Highlights include the launch of a brand new Wonderville™ platform featuring Wonderville Basic, free model and Wonderville Enhanced, a subscription model that provides access to value-added services for teachers. The new Wonderville was piloted over the course of two years with 2,200+ students and over 150 teachers. Wonderville At Home will be introduced in 2016. Ignition Pack™ continued to receive positive feedback from the teacher community; and, for the first time MindFuel engaged corporate sponsorship partners to deliver 79 Ignition Packs into Alberta classrooms, reaching 4,296 students. Edacity™ impacted over a thousand teachers and students with STEM-based entrepreneurial learning to communities throughout Alberta through for-credit course work and competitions. In addition, MindFuel assumed responsibility for delivering Alberta Innovates-Technology Futures’ geekStarter program, which falls under the Edacity program umbrella, and engages middle and high school students who want to explore real-world science research.

It is impossible to capture on these pages everything that the MindFuel team has accomplished in the past year, but we hope we’re able to offer you a glimpse of our programs and the impact they have on Alberta’s students.

In closing, we would like offer sincere thanks to our teachers, students, partners, supporters and volunteers for an amazing year - it is for you and with you that we develop our programming. We invite you to join us for what we expect to be another exciting, accomplished year ahead.



Nancy Laird
Board Chair



Cassy Weber
CEO



MENTORING & VENTURING

“I have always had a deep interest in science; and it was my dream to do biomedical research eventually. However, at the time I thought big science discoveries and innovations only came from adult professionals in the frontlines of research, not from someone close to my age. It wasn’t until high school that I realized these opportunities were actually accessible when I found out about participating in the Sanofi Biogenius Challenge.

With MindFuel, I was able to find my mentor Dr. Gordon Chan and my graduate supervisor Cody Lewis. Ever since I have learned more about science than I had my whole life. Moreover, I was able to study a topic that I had been interested in for a long time as well.”



■ Ruicen (David) He, Sanofi Biogenius Canada 2015-16 Regional Winner (Alberta), Grade 12, Edmonton

PROGRAM HIGHLIGHTS

A BRAND NEW WONDERVILLE

Wonderville gives youth the opportunity to discover and explore the world of STEM through engaging curriculum-aligned online activities, inspiring them to become tomorrow's problem solvers and innovators - life-long learners. A dynamic online portal with hundreds of resources for students such as games, videos and activities as well as lesson plans, assessments and classroom management tools for educators, Wonderville is designed to help students learn and teachers teach. We know not all students learn the same way, that's why we develop and share innovative alternatives to traditional STEM learning resources. Working in collaboration with skilled experts, Wonderville's resources present unbiased and accurate science information and are consistently tested with our target market to ensure their impact and effectiveness. Wonderville's games and activities are based on real-world problems that ask students to think critically, develop inspired solutions and fuel their curiosity.

Over the past three years, the MindFuel team has engaged students, teachers and school administrators to understand their needs in a digital platform. Through price modelling surveys, pilots, interviews and iterative development cycles, a new Wonderville has emerged. In addition to the content repository, the new Wonderville platform offers teachers a suite of resources that incorporate existing video and game content into customizable lesson plans and assessments. The new platform incorporates all video, games, animation and experiments from the basic Wonderville to users for free. The enhanced version of Wonderville includes value-added content at a monthly subscription for parents and teachers.

Funded by: Anonymous Donor, The Calgary Foundation, Alberta Innovates-Technology Futures, Government of Alberta



PILOT STATISTICS

Pilot teachers **160**

Number of schools **64**

Number of pilots **3**

17 Districts across Alberta, Wisconsin, California and Texas

Launched **March 2016**



IGNITION PACK PARTNERSHIPS

Ignition Pack brings classroom science to life with the resources educators need to teach a full unit of science for grades 4 through 9. A permanent classroom resource, Ignition Pack is a combination of engaging physical and digital learning resources that are designed to enhance the 21st century classroom. Students are encouraged to embrace their curiosity by way of creativity, critical thinking and experimentation through the over 40 resources and 25 hours of teaching material available in each pack.

Teachers who are looking for new resources to supplement their existing classroom materials, or new teachers who are searching for all the materials needed to teach an entire unit, Ignition Pack is a great solution.

Development of the Grade 8 Freshwater and Saltwater Systems Ignition Pack was completed in the 2015-16 fiscal year and is now added to the roster for distribution. Corporate sponsors see the value in delivering these hands-on and digital resources to classrooms throughout Alberta. To date, 79 Ignition Packs have been distributed to communities across Alberta, working to support teachers and engage with students.

Development Funded by: ConocoPhillips Canada, Syncrude Canada Ltd., Alberta Energy, RBC Foundation, Imperial Oil, TD Friends of the Environment, Scott and Anne Kirker.

Distribution Funded by: ConocoPhillips Canada, Rotary Club of Calgary, Rotary Club of Calgary West, Genome Alberta, Syncrude Canada Ltd.



IGNITION PACK STATISTICS

Students reached **4,296**

Teachers reached **77**

Distributed Grade 5 Wetland Ecosystems **41**

Distributed Grade 7 Interactions and Ecosystems **14**

Distribution Grade 8 Mix and Flow of Matter **14**

Distribution Grade 8 Fresh and Saltwater Systems **10**

Total kits **79 across Alberta**



Hands-on learning with Ignition Pack



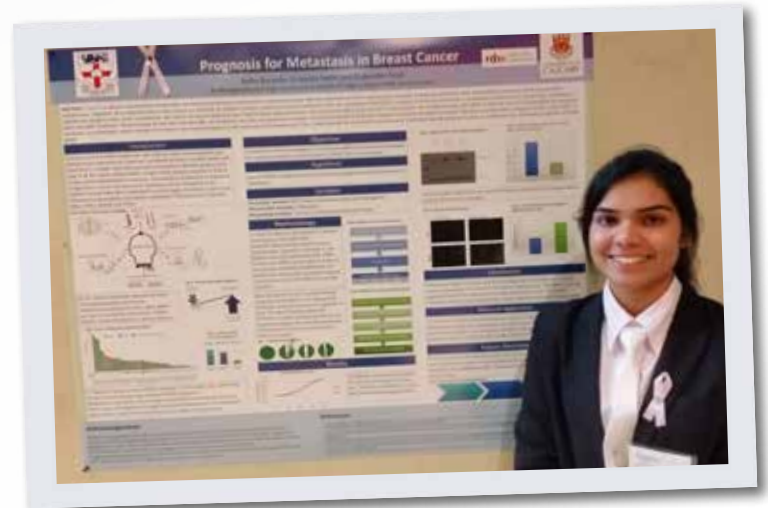
Grade 5 Wetland Ecosystems Ignition Pack



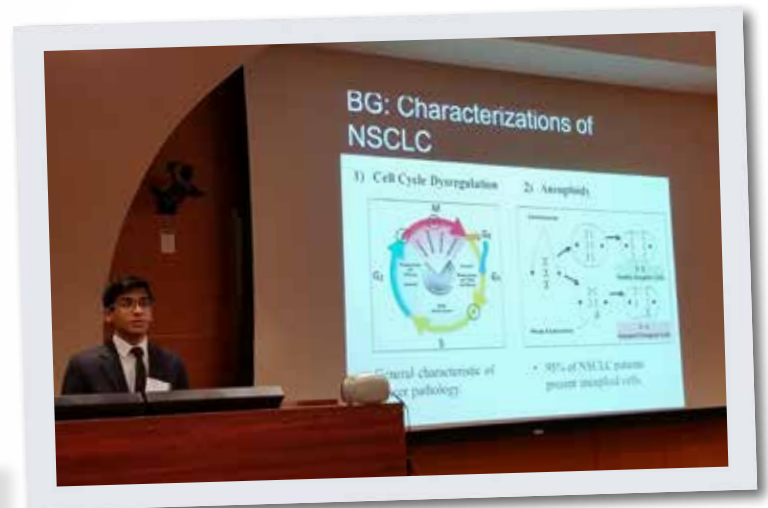
EXPANDING EDACITY

Edacity is MindFuel's hub for science-based innovation and entrepreneurialism. We knew it was nearly impossible to address the creativity, ingenuity, and advances being made in STEM fields without including entrepreneurial spirit. Through in-class course resources, week-long summer camps, mentorship connections, and entrepreneurial-inspired events, Edacity students develop critical thinking skills and understand what it means to be innovative.

Education today is increasingly looking to promote real-world problem solving, cross-curricular connections, and critical thinking. Edacity brings these concepts together through a variety of experiences (Edacity Innovation Bank, Mentor Connections, geekStarter and Sanofi Biogenius Challenge) and events. The Innovation Bank consists of three for-credit course resources to address Alberta Education's Career and Technology Studies (CTS) courses - CTS 1010 (Dream It!), CTS 2010 (Build It!), CTS 3020 (Expand It!). We still focus on teenagers about to embark on exciting post-secondary and career paths, and we still tie knowledge and curiosity into all that we do.



A proud participant of the Sanofi Biogenius Canada Competition



An insightful presentation from one of the Sanofi Biogenius Competitors

EDACITY CTS PILOT STATISTICS

Students reached **226**

Teachers reached **22**



The geekStarter program keeps students captivated

MENTORING & VENTURING

"I was blown away with one activity in the Edacity course that emphasized "fail fast." Students were expected to complete a task and learn from their mistakes rather than spend many hours perfecting something that will never be perfect. The course is structured to support a blended experience of student learning that maximizes engagement and the emphasis was on the doing and improving - not on the pass or fail.

My students went from not knowing what a business model canvas was, to self-criticizing their own efforts in a process-driven model of continual improvement. Edacity's entrepreneurial bootcamp represents an innovative approach to teaching entrepreneurship that this country requires."

■ Luc Arvisais, Teacher, Our Lady of the Snows Catholic Academy, Canmore



WELCOMING GEEKSTARTER TO MINDFUEL

MindFuel, through its partnership with Alberta Innovates-Technology Futures (AITF), assumed responsibility for delivering the geekStarter program to high school and university students in Alberta. geekStarter engages students in solving authentic problems and building solutions based on cutting-edge science, technology, engineering and mathematics fields such as synthetic biology, nanotechnology, robotics, and machine learning. The project-based learning experience culminates

in prestigious international competitions and events, where students share their research and innovations with other young scientists as well as with leaders in STEM. geekStarter is student-driven, hands-on research and innovation projects that offer immersive cross-disciplinary learning experiences that leave an enduring impact on all participants.

Funded by: Alberta Innovates-Technology Futures



Students enjoying the geekStarter program at Ted Harrison School



geekStarter brings students together at Ted Harrison School



geekStarter engages students at Central Memorial High School

SANOBI BIOGENIUS CANADA

For over two decades, the Sanofi Biogenius Canada (SBC) program has nurtured young minds and fostered great talent for the future, challenging high school students to carry out ground breaking research projects in the field of biotechnology. MindFuel has coordinated the program for Alberta competitors for the past two years, matching students with local mentors, giving them hands-on research experience in a professional lab setting.

For the 2015 competition, MindFuel had 16 participants. Out of the 16 competitors from across Alberta, Ruicen (David) He, a grade 12 student from Old Scona Academic High School in Edmonton, emerged as this year's Alberta winner. David's project sought to find treatment for Hutchinson-Gilford Progeria Syndrome (HGPS) – a disease that causes extreme premature aging.

Funded by: Partners In Research, Monsanto, Resverlogix, Genome Alberta, University of Alberta Faculty of Medicine and Dentistry, Alberta Womens' Science Network

SANOBI STATISTICS

Number of proposals	21
Number of students	15
Mentors	19
Teachers	11
Institutions	3
Event attendees	60

OTHER PARTICIPANTS' PROJECTS AND AWARDS

- Astha Burande, winner of the “Best Presentation” award and second overall in the competition, researched a potential treatment for breast and prostate cancer through the creation of drugs that can target cancer cells.
- Faris Fazal, a 14-year-old Calgary student was the winner of the “Most Commercially Viable” award and ranked third overall for exploring the side effects of painkillers on cognitive function in the hopes of decreasing their side effects.
- Sunand Kannappan, was ranked fourth place for her project that was looking to find a treatment for a common and fatal form of lung cancer.
- Rowan Lind, ranked fifth with her project researching a way to create a treatment for Alzheimer's disease.
- Timothy Fu, won the award for “Best Poster,” for his project that was trying to find a treatment for breast cancer.

These award-winning ideas were developed by the students and assistance was provided from local universities to turn the ideas into reality.



This year's winner of the Sanofi Biogenius Canada, Alberta region, Ruicen (David) He



Participants of the Sanofi Biogenius Canada, Alberta region



ATTENTIVE OBSERVATIONS

“Only some of us are lucky enough to know that there are superior learning resources out there like MindFuel’s programs. For me, Ignition Pack provides a condensed version of reliable information that allows me to get the most out of a subject and accelerate my learning. With the Ignition Pack lessons, I found that I was motivated to listen to as opposed to just hearing, which ended up having a long-term beneficial affect by fully developing and enhancing my knowledge of the subject.”

Emily Evans, Ignition Pack student user, Grade 8, Calgary



HOUR OF CODE

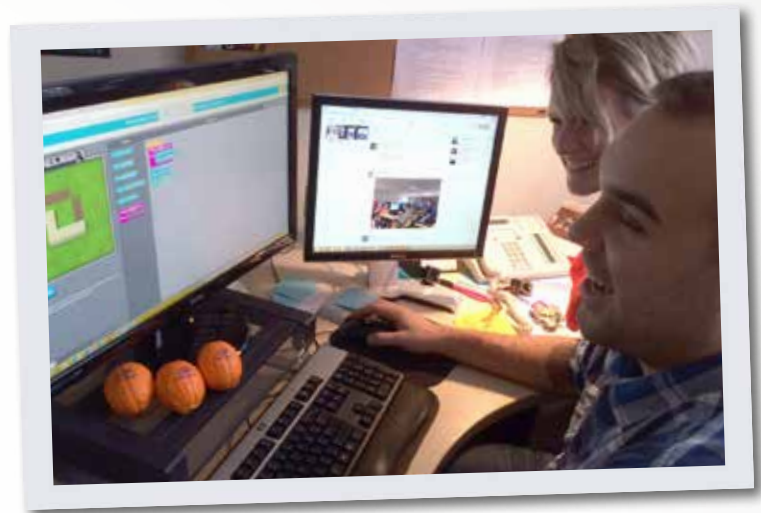
MindFuel, in collaboration with Cybera and Partners in Research, organized a global online coding experience with over 2,500 participants in schools throughout Canada, the United States, Russia, United Kingdom and Germany. Students interacted online with our partners from Cybera, who spoke passionately about their love of coding in their careers. The students then participated in a facilitated 40-minute exploration of how to code a “Minecraft” adventure - an activity that overwhelmingly resonated with the students, as well as their teachers.

HOUR OF CODE STATISTICS

Number of participants **2,500**

Number of participating sites **48**

Largest participating site **260 students**



Two of MindFuel's team facilitating the Hour of Code

IMMUNITY ATTACK AT BEAKERHEAD

Beakerhead is a five-day mash-up of science, art and engineering that takes over Calgary every September. MindFuel, in partnership with Alberta Innovates-Technology Futures, created a large-scale obstacle course called Immunity Attack, where over 650 members of the public became allergens infecting the human body. Based on the Wonderville game Allergy Invaders, the “allergens” entered a giant nose and crawled through blood streams to successfully infect the body. They then had to fight their way through T-cells and B-cells to join the rave happening inside their victim’s body and reach the final stages of expulsion from the body.

Over 60 volunteers gave up their weekends and evenings, spending over 1,200 hours to create this gigantic science spectacle. Thank you to everyone who made science come to life with us at Beakerhead 2015 and made the event such a resounding success!

Funded by: Alberta Innovates-Technology Futures

BEAKERHEAD STATISTICS

Volunteers **60+**

Obstacle course runs **814**

Public attendance **650**



Entrance through the “giant nose” during the Immunity Attack obstacle course at Beakerhead 2015

MINDFUEL REACH

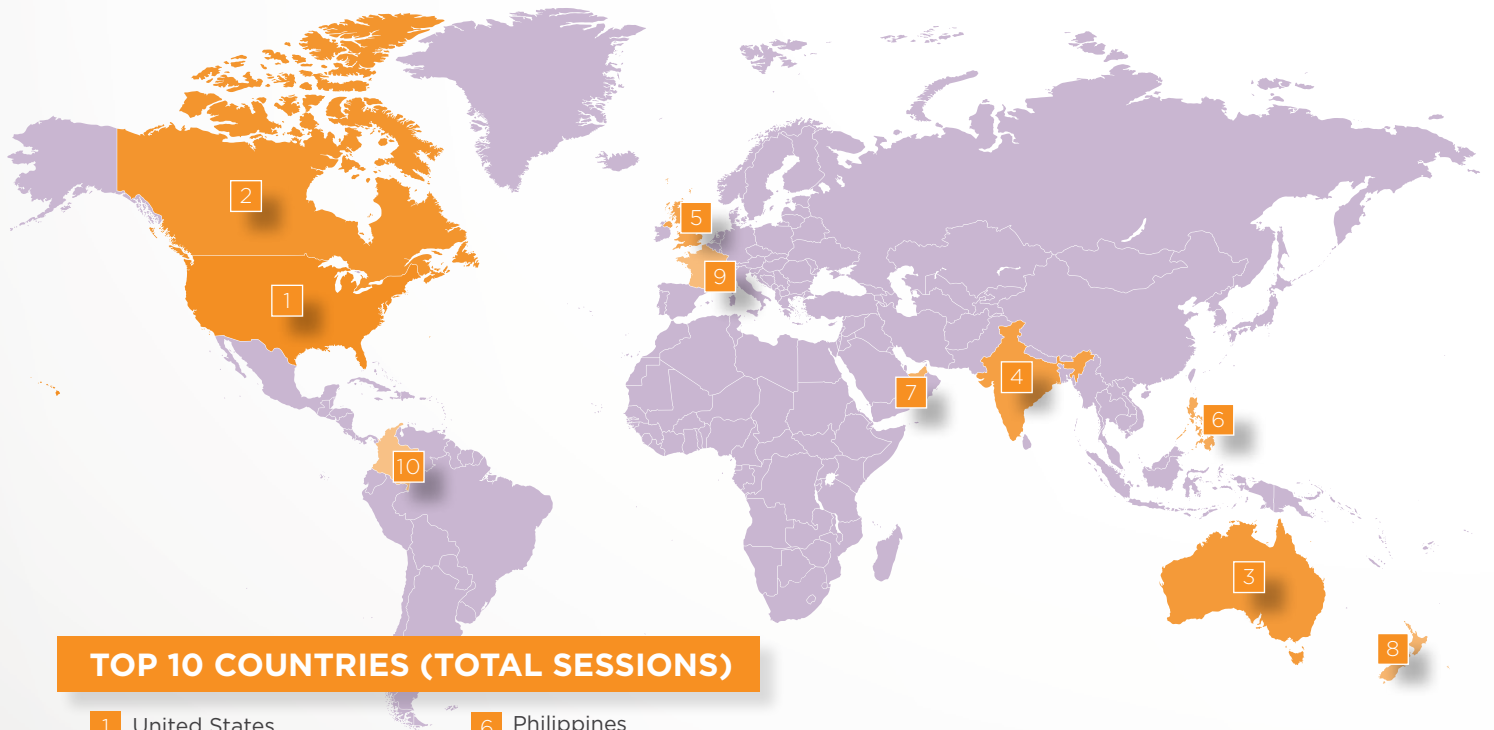
GLOBAL SUMMARY

	2014-2015 CUMULATIVE	2015-2016 CUMULATIVE	YOY % GROWTH
Impressions	30,481,443	34,416,169	13%
User Experiences*	12,302,751	12,543,902	2%
Learning Experiences**	7,054,129	7,572,447	7%

Lifetime Total impressions for MindFuel: **132,163,888**

* User Experiences are individual interactions with MindFuel or MindFuel programs

** Learning Experiences are direct interactions with a MindFuel Learning Resource



TOP 10 COUNTRIES (TOTAL SESSIONS)

- | | |
|------------------|------------------------|
| 1 United States | 6 Philippines |
| 2 Canada | 7 United Arab Emirates |
| 3 Australia | 8 New Zealand |
| 4 India | 9 Spain |
| 5 United Kingdom | 10 Colombia |

CANADA SUMMARY

2015-2016 CUMULATIVE

User Experiences	4,203,533
Learning Experiences	1,605,046

REACH - ALBERTA

Learning experiences - 1,120,266

REACH - FRANCOPHONE

Learning experiences - 62,248

OUTREACH + COMMUNITY ENGAGEMENT

We couldn't do what we do without our community. It takes countless volunteers, subject matter experts and partnerships to help us create excellence in all our programs and activities.

OUTREACH STATISTICS

Partnerships	22	Subject Matter Experts hours	188
Volunteers	3,220+	Events attended	47
Volunteer hours	5,600+	Alberta Communities Reached	85
Subject Matter Experts	36		

OUR SUPPORTERS

Many thanks to our dedicated funding partners and donors, including those who have remained anonymous; we would not be the organization we are without your support.

GOVERNMENT SUPPORTERS



TRANSFORMER



CHAMPION



Anonymous Donor

ENERGIZER



COLLABORATOR



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Bliss Aime
Brent Bawel
Canada Online Giving Foundation, Anonymous (9)
Gwen Cowan
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Praxis

Sanofi Biogenius Canada
STEM Learning Lab
TEC Edmonton
Telus Spark
Telus World of Science
University of Alberta
University of Calgary, Schulich School of Engineering
University of Calgary, Werklund School of Education
University of Lethbridge
Waterloo Global Science Initiative
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James (Jim) Gray, Founding and Honourary Chair

SCHOLARSHIPS

James (Jim) Gray Scholarship Fund, \$5,000

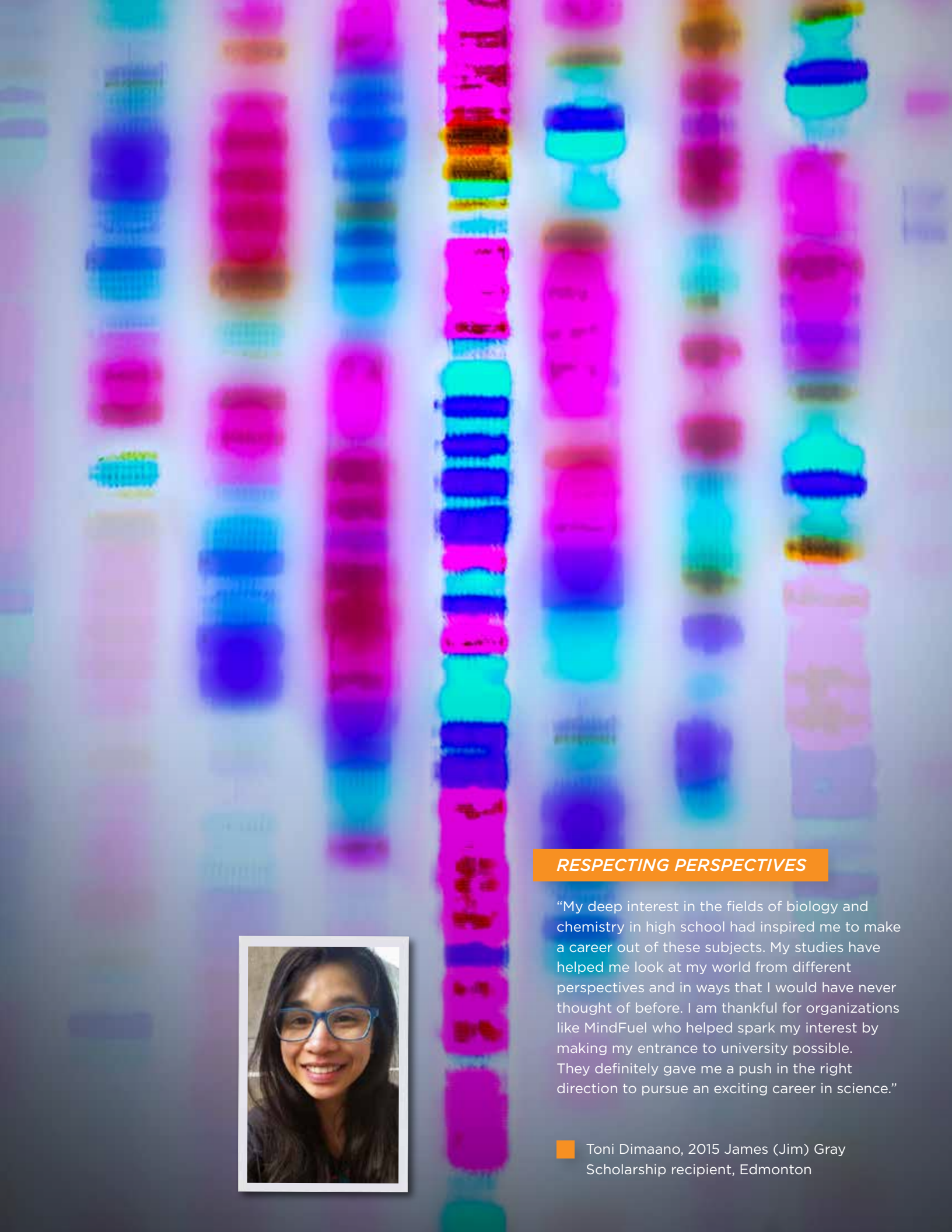
Recognizes an individual who is passionate about innovation in areas of STEM and who is accepted into STEM-related study at an Alberta-based post-secondary institution.

Anne Tingle Scholarship Fund, \$2,500

Recognizes an individual who is passionate about science and who is accepted into an undergraduate degree program in either science or science education at an Alberta-based post-secondary institution.

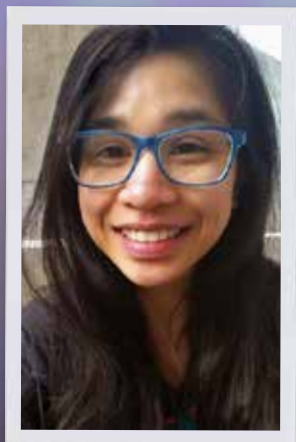
Dr. Arlene Ponting Scholarship Fund, \$2,500

Recognizes an individual who is passionate about science and technology and who is accepted into an undergraduate degree program in either science or technology at an Alberta-based post-secondary institution.



RESPECTING PERSPECTIVES

“My deep interest in the fields of biology and chemistry in high school had inspired me to make a career out of these subjects. My studies have helped me look at my world from different perspectives and in ways that I would have never thought of before. I am thankful for organizations like MindFuel who helped spark my interest by making my entrance to university possible. They definitely gave me a push in the right direction to pursue an exciting career in science.”



■ Toni Dimaano, 2015 James (Jim) Gray Scholarship recipient, Edmonton



WWW.MINDFUEL.CA