

# INNOVATION150

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## Innovation150 Media Backgrounders



Canada



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## PERIMETER INSTITUTE FOR THEORETICAL PHYSICS

### ABOUT PERIMETER INSTITUTE FOR THEORETICAL PHYSICS

**It's a big universe. Fortunately we have big ideas.**

Practically every technology we use today – from computers to smartphones to lifesaving medical devices – emerged from breakthroughs in fundamental, curiosity-driven physics. At Perimeter Institute for Theoretical Physics, scientists pursue new breakthroughs in our understanding of the universe, from the smallest particle to the entire cosmos.

Founded in 1999 by smartphone pioneer Mike Lazaridis, Perimeter is a unique public-private endeavour recognized globally as a leader in fundamental science. As an international hub for theoretical physics, Perimeter is a key driver of the theory-to-experiment-to-commercialization ecosystem in Waterloo Region that is establishing the world's first “Quantum Valley” in Canada.

Perimeter attracts brilliant minds from across Canada and worldwide, and provides them with the freedom and resources they need to pursue breakthroughs in the most promising avenues of research. Their discoveries will create new knowledge and make possible the next wave of transformative technologies to further humanity.

#### **The most important scientific equipment: The human mind**

Great science belongs to everyone. Perimeter is committed to exceptional scientific training and educational outreach, from its onsite training programs for emerging physicists to its award-winning programming and resources for youth, teachers, and the general public:

- More than 5 million students have been engaged with Perimeter educational resources, thanks to Perimeter's growing coast-to-coast Teacher Network
- Perimeter's global network of educators spans over 30 countries and has trained 15,000+ teachers to date
- The 2013 BrainSTEM festival brought 25,000 youth and families to Perimeter, and the 2009 Quantum to Cosmos Festival was seen online by more than 1 million
- The Quantum Tamers, Perimeter's documentary about the quantum technological future, has been broadcast in more than 90 countries

Through the nationwide Innovation150 initiative, Perimeter aims to inspire and equip the next generation of innovators across the country by celebrating the power of critical thinking, creativity, and the big ideas that will change the future.



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## ABOUT ACTUA

### Investing in the Next Generation of Innovators

Actua is Canada's largest STEM outreach organization representing a network of university and college based members who annually inspires over 225,000 youth in 500 communities in hands-on science, technology, engineering and mathematics (STEM) experiences. Actua focuses on engaging underserved and underrepresented youth through customized national programs for girls, youth in remote and Northern communities, Indigenous youth, and youth facing socioeconomic challenges.

Actua's content is reflective of current innovations in STEM and focuses on building the attitudes, confidence and skills necessary for youth to thrive and be the innovators of tomorrow. Actua provides over 1 million hours of face-to-face programming each year to ensure youth are prepared to tackle the jobs of tomorrow.

Actua's National Programs include:

- **National Aboriginal Outreach Program:** Actua's National Aboriginal Outreach Program is a customized, community-based approach to engaging First Nations, Métis, and Inuit youth in locally and culturally relevant STEM education programs. Over the past twenty years, Actua has worked closely with hundreds of Indigenous communities and currently engages over 30,000 Indigenous youth each year. Actua has also developed strong connections with Indigenous educators and National Indigenous organizations like Indspire, the Aboriginal Human Resource Council, Inuit Tapiriit Kanatami (ITK) and others to ensure our model is culturally relevant and based on current best practice.
- **National Girls Program:** Actua's National Girls Program inspires young women to fulfill their role as leaders in STEM and encourages their engagement in STEM fields like engineering and computer science where women continue to be vastly underrepresented. Actua's network members engage thousands of girls annually in high-impact, all-girl programs including workshops, camps and clubs. These programs provide girls with safe spaces to design, build, experiment, and explore in an all-girls environment, with women role models and mentors who break down the still existing stereotypes about women in engineering and science.
- **Actua in the North:** Actua is committed to engaging youth from coast-to-coast-to-coast specifically reaching the hardest-to-reach communities in Canada. For the past fifteen years Actua has been a trusted and valued STEM outreach partner for dozens of communities across the Northwest Territories, Yukon Territory, Nunavut, Northern Quebec, and Labrador. Through Actua's Outreach Team, network members, and working with over 40 partnering northern communities, Actua engages approximately 5,000 northern youth a year. This includes hundreds of school workshops throughout the year and more than 30 weeks of summer camp





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as well as specialized teacher training. The programming includes customized content that showcases Northern science, traditional knowledge and Northern economic development opportunities.

- **Go Where Kids Are Program:** Actua's Go Where Kids Are program is a customized delivery model to engage new Canadians, at-risk youth, and other youth populations facing socio-economic challenges. The program recognizes that many youth do not have the opportunity to attend a STEM outreach program, even if the program is offered at no cost. In order to engage these hard-to-reach youth, Actua and its network members partner with youth serving organizations such as Family Resource Centres, immigrant community organizations, Boys and Girls Clubs, YM/YWCAs, and others who already have these youth engaged. This model allows Actua to annually engage over 30,000 underrepresented and underprivileged youth.
- **Codemakers:** Actua and Google have partnered to engage 100,000 youth in building digital skills that will move them from being consumers of technology to producers of technology. Codemakers is changing the way youth engage with computer science through the delivery of workshops, camps and clubs designed to have youth building new technology.

**Network Members:** Actua's network of members connects youth to postsecondary experiences and cutting edge research and innovations. Each year, across Canada, Actua employs 1,000 undergraduate students in science, technology, engineering and mathematics to deliver dynamic, hands-on experiences that inspire youth to imagine themselves as future innovators.

**Actua's Funders:** Actua partners with leading corporations, foundations and governments to support the delivery of programs across Canada. Actua's top national funders include Suncor, Google Canada, GE Canada, the Government of Canada and NSERC.



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## ABOUT THE INSTITUTE OF QUANTUM COMPUTING AT THE UNIVERSITY OF WATERLOO

### Harnessing the Quantum world for transformative technologies

Quantum technologies are poised to transform how we live, work and play. At the Institute for Quantum Computing (IQC) at the University of Waterloo, theoretical and experimental research drives breakthroughs in understanding and harnessing the ultimate power of nature for transformational technologies. Sparked by the vision of Mike Lazaridis, IQC's mission is to develop and advance quantum information science and technology through interdisciplinary collaboration at the highest international level.

Founded in 2002, IQC was launched as a private-public partnership between the University of Waterloo, the private sector, and federal and provincial governments to foster pioneering research into the next great technological revolution – the quantum age. Located in Waterloo, Ontario, Canada, IQC is transforming the Waterloo Region into the Quantum Valley of Canada. So far, IQC has spurred six startup companies and five members hold almost 40 patents and licenses. Quantum technologies are already emerging.

### Areas of research

IQC attracts the world's top experimentalists and theorists and provides them with cutting-edge infrastructure, collaborative opportunities and the intellectual freedom necessary for breakthroughs to happen. Powerful new research advances are being made in the fields of quantum computing, communications, sensors and materials. IQC fuels a research environment unlike any other, with more than 200 researchers spanning seven academic departments across the Faculties of Engineering, Science and Mathematics.

### Scientific Outreach

IQC's training and outreach opportunities foster scientific curiosity and discovery among students, teachers and the community. Through public lectures, community events, open houses, summer schools for young students, conferences, publications and social media, IQC connects global audiences with the science and research happening at the forefront of the quantum information revolution.

- Last year IQC reached over 5,000 people – youth and adults - personally through workshops, seminars, talks, summer schools, public talks, school visits and special events
- Nearly 10,000 engaged people make up IQC's online social network
- Over 5,100 people downloaded IQC's first ever educational game application, *Quantum Cats*

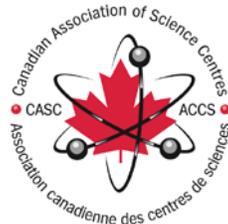
### Quantum: The Exhibition

Through the Innovation150 initiative, IQC will launch a fully bilingual, interactive, traveling exhibition sharing the wonders of the quantum world and the emerging quantum technologies that will shape our future. This 4,000 square foot exhibition will travel to science centres across Canada launching at THEMUSEUM in downtown Kitchener in October 2016. For more information, visit [quantumexhibit.ca](http://quantumexhibit.ca).



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## ABOUT THE CANADIAN ASSOCIATION OF SCIENCE CENTRES

The Canadian Association of Science Centres (CASC) is a national platform for Canada's Science Centres and informal science engagement. Founded in 1985, the association was created with a goal to create synergy among Canada's science centres and science-related museums, to assist in finding solutions to the challenges faced by these important public institutions, and to provide a single voice before government.

We represent 50 Science Centres, Museums and Planetariums across Canada that attract 8 million visitors annually, of which 6 million are adults. The workforce across our membership represents more than 2,000 science communicators and support staff in addition to more than 10,000 volunteers. Most of our members are registered charities or not-for-profit organizations.

The Canadian Association of Science Centres mission is to build capacity for its members to inspire a creative and prosperous Canada through science and technology engagement. CASC has a solid background in managing peer review panels and granting programs that foster excellence on behalf of its members and partners.

### Professional Development & Networking

The collective workforce of Canada's Science Centres includes more than 2,000 science communication and support professionals as well as an estimated 10,000 volunteers.

One of CASC's top priorities is providing professional development and networking opportunities to this varied workforce across Canada.

Annually in the spring, CASC and a host Science Centre stage a three-day conference featuring keynote speakers, concurrent sessions delivered by peers and opportunities to share best practices in science communication and program delivery. Throughout the year, CASC provides several webinars and workshops on a wide variety of topics that meet the needs of different professions within Science Centres.

### The CASCADES

Each year at the national conference, CASC presents awards to outstanding people and programs from the previous year, including awards for large and small Science Centres for Best Exhibit or Show and Best Program. Individual awards are given to individuals that have demonstrated outstanding leadership, "Making a Difference" and career achievement.





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## Research

The Canadian Association of Science Centres regularly conducts research based on the needs of the membership. Past research includes benchmark studies, participation in the “Science Culture: Where Does Canada Stand” study by the Council of Canadian Academies and literature reviews with a Canadian perspective.

## Science Odyssey

Beginning in 2016, CASC will partner with CASC members and NSERC to celebrate Science Odyssey, a national-wide week of celebrating Science and Technology with a strong social media message and a series of science-based activities for people of all ages.

## Science in Canada’s North

From 2012 through 2015, the W. Garfield Weston Foundation provided funding to connect researchers in the Canadian Arctic with Canada’s Science Centres. Participating members created events like Science Cafés, Arctic festivals, school programs, family festivals, teacher workshops and online talk shows to bring to the forefront the current research happening by Canadian researchers in the far north. Thousands of Canadians of all ages were able to connect directly with Arctic scientists in very meaningful ways that showcased research on beluga whales, polar bears, science and Arctic societies, climate change and so on.

## Science Interns Outreach Project

In 2010-11 CASC managed the Science Interns Outreach Project on behalf of Natural Resources Canada under the Government of Canada’s Career Focus program, which provided funding to organizations to support 38 early career scientists in research and development.



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CANADA SCIENCE AND TECHNOLOGY  
MUSEUMS CORPORATION  
SOCIÉTÉ DES MUSÉES DE SCIENCES  
ET TECHNOLOGIES DU CANADA

## ABOUT THE CANADA SCIENCE & TECHNOLOGY MUSEUMS CORPORATION

As Canada's Science and Technology Communications Platform, the three Ottawa Museums together are responsible for preserving Canada's scientific and technological heritage, while also promoting, celebrating and sharing knowledge of that heritage.

The Canada Science and Technology Museums Corporation includes:

- The Canada Agriculture and Food Museum
- The Canada Aviation and Space Museum
- The Canada Science and Technology Museum

The **Canada Agriculture and Food Museum** is Canada's national museum of agricultural science and technology. Located at the Central Experimental Farm, the Museum is a working demonstration farm with more than 100 animals. The CAFM also presents exhibitions on Canada's agricultural heritage, as well as a wide range of educational programming, from renewable energy on farms to beekeeping. The Museum hosts festivals such as Baconpalooza and Ice Cream Festival, and reaches across Canada with travelling suitcase exhibitions and full scale travellers such as Food for Health.

The **Canada Aviation and Space Museum** is Canada's national museum of aerospace technology. Situated beside a working heritage airfield, the CASM houses the largest collection of historical aircraft in Canada, and one of the finest in the world. The Museum was named by CNN as one of the world's top ten aviation museums. The CASM also presents programming, special events, and exhibitions related to aerospace technology and engineering, Canada's role in human Space exploration, and Canada's proud achievements in aviation history. The Museum hosted the blockbuster STAR WARS™: Identities exhibition in 2013 and will feature the equally spectacular Star Trek: Starfleet Academy Experience exhibition in 2016.

The **Canada Science and Technology Museum** opened in 1967 as the first interactive science and technology museum in the country, and it is one of the oldest of its kind in the world. For the past 48 years, the CSTM has celebrated Canadian scientific and technological achievement, and remains Canada's largest science and technology museum to this day. The Museum acts as both a science center and a museum. Closed in September 2014, the renewed Museum will reopen in 2017 featuring the theme of "Making Canada".

The three museums welcome more than 700,000 visitors annually, including more than 55,000 children to school programs, with 1,315,000 virtual visitors.



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## Digital Applications

- **Ace Academy:** Learn how to fly these fragile wood and fabric biplanes from the collection of the Canada Aviation and Space Museum. Available at the App Store or on Google Play.
- **Ace Academy Black Flight (second edition in the Ace Academy mobile apps series):** Experience unmatched gameplay, graphics and narrative as you climb into the cockpit of the most aggressive WWI dogfighting game on mobile. You will fly with real squadrons, over actual historical locations, as you ascend the ranks to become a World War One Ace.

## Open Data and Open Heritage

The Corporation is releasing open data to enable use in innovative and value-added ways. The machine readable data is open to use by programmers, researchers, students, hackers, builders, or anyone interested in the Museums' collections and operations. The Corporation is also working on enabling its content (internal working and planning documents) to become entirely accessible to the public in real time. The Corporation's open data is released under the Government of Canada Open Government License.

## National Outreach

The Canada Science and Technology Museums Corporation develops, creates and produces products that reach, connect and engage with new and existing audiences outside the museums.

On a global scale, the Corporation is looking to enhance its digital presence and connections.

On a nation scale, the Corporation is looking to grow and expand national networks, partnerships and activities.

On a regional scale, the Corporation is looking to increase its presence outside the Museums, within the National Capital Region.

## Canada Science and Technology Museum Renewal

The renewed, modern museum, set to open in fall 2017, will continue to promote and celebrate Canada's long history of scientific and technological achievements, and to inspire future innovation.

The modernized exterior façade will feature a large LED screen.

The Museum's exhibition space will be upgraded to enhance visitor experience and inspire the next generation of scientists, engineers, and innovators.

The Museum will have five main galleries, including the Children's Gallery, and the others following various themes:

- Creating and Using Knowledge;
- Moving and Connecting, which will include the beloved locomotives;
- Technology in our Lives;
- Transforming Resources.





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Additionally, to better showcase the Museum's magnificent collection, there will be Artifact Alley, which will introduce Augmented Reality to Museum visitors. Visitor favourite the Crazy Kitchen will also be part of the renewed Museum, as well as a demonstration stage, classrooms, maker space, and temporary exhibition space.

## Travelling Exhibitions

The Canada Science and Technology Museums Corporation offers several travelling exhibitions, varying in sizes and topics: A Taste of Science; Food for Health; Energy House; On the Trail of the Monarch Butterfly; Echoes in the Ice.

New Travelling Exhibitions in the works: Game Changers (2016); The Science of Hockey (2017).

