



Universities  
Canada.

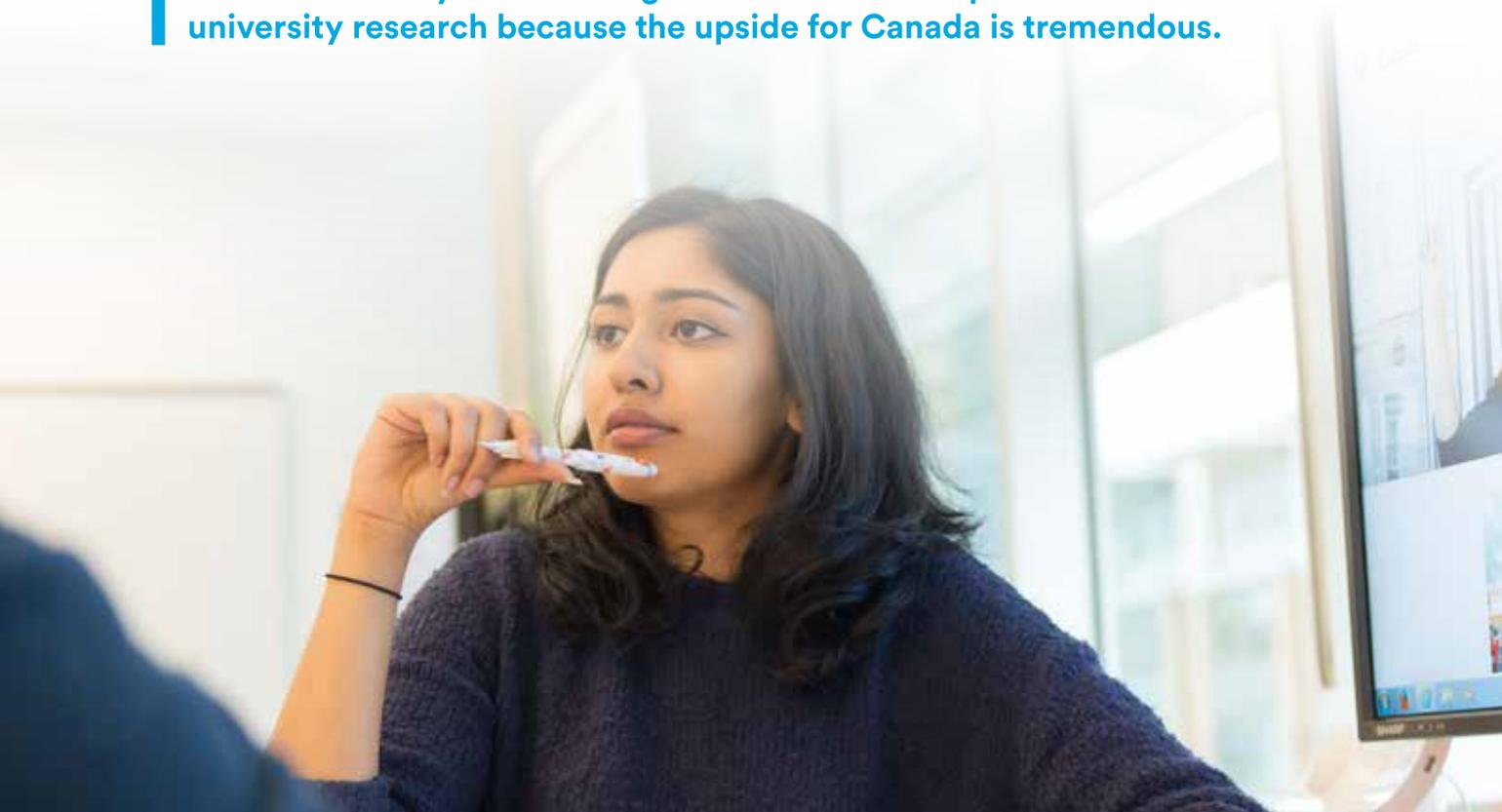
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**IMPROVING LIVES  
AND BUILDING A  
STRONGER CANADA  
THROUGH RESEARCH**

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# 86%

of Canadians say the federal government should spend more on university research because the upside for Canada is tremendous.



“Progress is not a law of nature, like gravity. It takes work. Progress comes from innovation, which comes from research, which comes from investment, which comes in great part from government funding.”

BILL GATES  
Co-founder, Microsoft, October 16, 2016

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## Investing in Canadian ideas

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Today, Canada is front and centre on the world stage. At a time of closing borders and closing minds, and economic change driven by technological disruption, the world is looking to Canada for leadership on the most pressing issues of our time.

Canadians are feeling increasingly confident about Canada’s ability, and the potential of our next generation, to take up these challenges. And they value the role of universities and university research in leading the way to a new economy based on Canadian brain power.

Canadians know that university research is essential to Canada’s future. In fact, almost 90 per cent agree that the best way to ensure Canada is a leader in innovation for the long-term is to invest in fundamental research.

A well-funded and balanced research ecosystem has a ripple effect throughout Canadian society. Research outcomes and partnerships support small business growth and draw knowledge-intensive multinational companies to Canada, creating jobs and invigorating the economy. Health and social science research finds solutions that save lives and help our most vulnerable. And state-of-the-art research facilities keep Canada’s

brightest young people here, providing them with opportunities to discover, innovate and ultimately give back to their communities.

Yet Canada is not keeping pace. In terms of research intensity, we have slipped relative to our international peers, to the point where we no longer rank in the top 30 nations worldwide.

The Fundamental Science Review Advisory Panel – composed of nine eminent Canadians – has laid out a road map of the urgent need for reinvestment in Canada’s research ecosystem. The Naylor report, as it is known, needs action. That’s why Canada’s universities are calling for the government to commit its full support to the report’s recommendations, over a multi-year period, starting in Budget 2018 with:

- 1. Significant increases in support for discovery research.**
- 2. A dedicated support fund for international research collaboration.**
- 3. Stable and predictable funding for the Canada Foundation for Innovation.**

Now is the time to invest in improving the lives of Canadians – for today and for the future.

**It is time to invest in research.**



“Discovery research... is very important because it turns out that if you attempt to only do direct commercializable research, then you find that you run out of ideas fairly quickly.”

DR. ARTHUR B. MCDONALD

Nobel laureate in physics; professor emeritus, Queen's University; Fundamental Science Review Panel member, interview with Universities Canada, January 21, 2016

A view looking inside the SNO+ detector at the Sudbury Neutrino Observatory (SNOLAB), where physicist Dr. Arthur McDonald led his Nobel-winning research on neutrino particles.

Photo: SNOLAB

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# Bold ideas, big breakthroughs

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Canada is a country of great achievements and even greater potential. Our greatest resource is our people. Supporting Canada's brightest minds to think boldly and be curious sets us on a path to prosperity.

Unfortunately, over the past decade, federal support for fundamental research has fallen by about 35 per cent, leaving Canada trailing behind other OECD countries. Research generates the knowledge that feeds the innovation pipeline, contributing to breakthrough discoveries, as well as new products, services and policy solutions. These advances generate high-skill, high-knowledge jobs, improve Canadians' health and help build more prosperous communities.

The benefits for young people are significant. Students educated in a research-enriched environment, learning and discovering alongside talented and diverse researchers across disciplines, graduate with 21<sup>st</sup> century skills.

**92%**

Canadians recognize that Canada can't afford to stand still while our peers around the world are making research a national priority. In a new Abacus Data survey, 92% of respondents said they support increasing university research funding to comparable levels of competitor countries.<sup>1</sup>

## Supporting our next generation of top researchers

Canada's Nobel laureates did not start at the top. They had the support and guidance of research leaders who helped them follow their curiosity and realize their potential. Today's students need the same.

In fact, students are among the main beneficiaries of a healthy research ecosystem. For example, 50 per cent of funds from National Science and Engineering Research Council grants go to supporting students, helping develop the next generation of Canadian brain power. In Canada, nearly a quarter of people holding graduate degrees become entrepreneurs.

Better funding support for researchers early in their career will improve equity outcomes, broadening the talent pipeline and bringing in more diverse ideas, perspectives and ways of knowing into our research solutions.

Canadians support these measures – in fact, 93 per cent of Canadians recently polled agree that it should be easier for early-career researchers to get funding. Without increased funding for our brightest minds, Canada risks losing its next generation of talented researchers and innovators through inadequate support.

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<sup>1</sup> Abacus Data, 2017



“Innovation is exciting and rewarding. It is our responsibility to inspire and encourage ongoing research and innovation to keep the momentum going, keep ahead of the times and find effective solutions.”

PATRICIA LINGLEY-POTTIE

2017 Governor General’s Innovation Award recipient; president and CEO, Strongest Families Institute; professor of psychiatry, Dalhousie University, 2017

## Studying the brain leads to advances in artificial intelligence

When Canadian Geoffrey Hinton was an undergraduate student, he wanted to understand how the human brain works. But he was frustrated because no field of study offered the answers he sought. So he started to build his own computer models to mimic the brain.

Hinton is now one of the world’s leading computer scientists, an emeritus distinguished professor in computer science at the University of Toronto, vice-president engineering fellow at Google and the architect of an approach to artificial intelligence (AI) with the potential to radically alter the role computers play in our lives. He was recently named to the 2016 WIRED 100 list of global influencers. After 30 years of dedicated research driven by boundless curiosity, his learning machines have proven immensely valuable. They make self-driving cars safer,



Photo: Johnny Guatto, University of Toronto

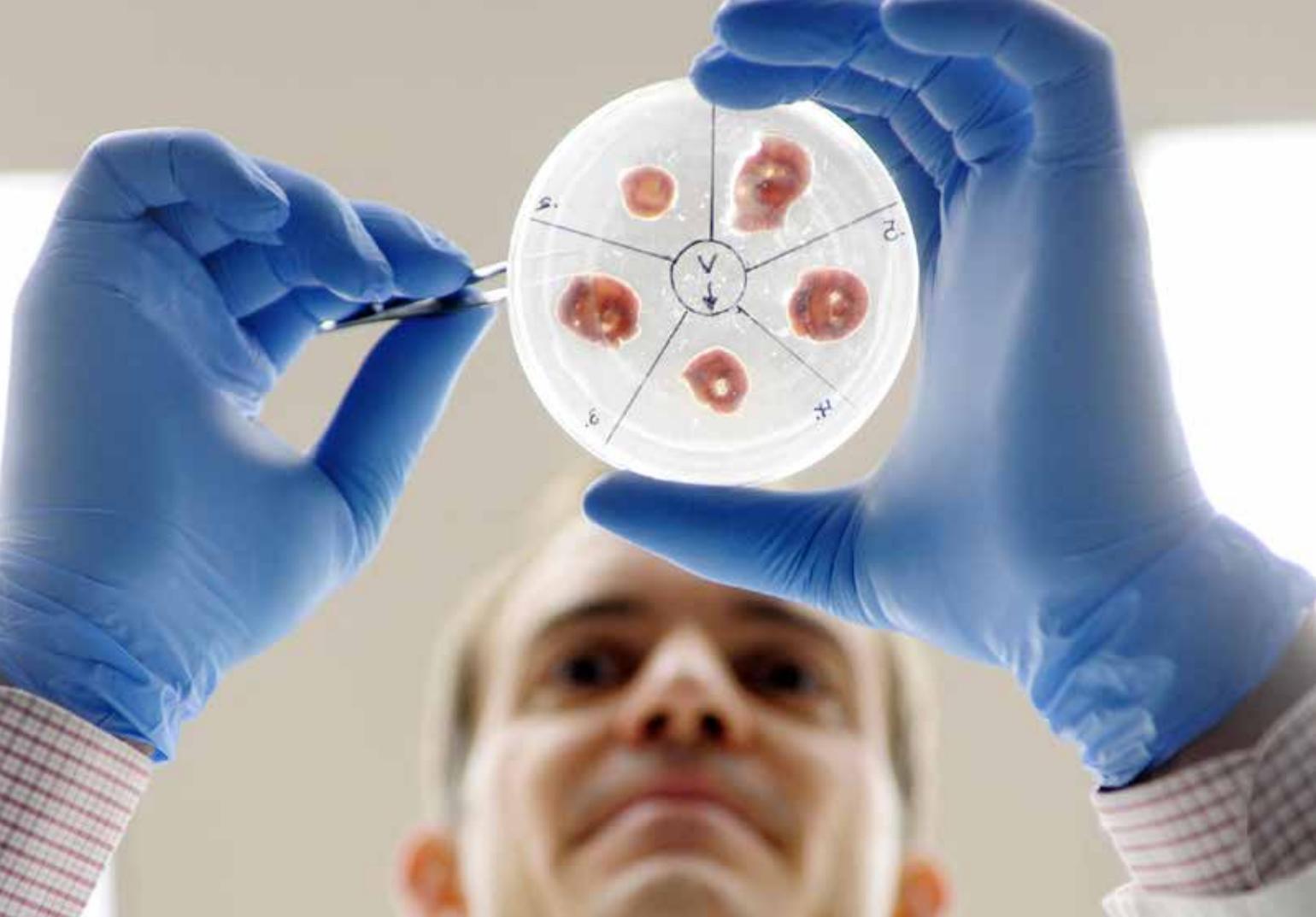
Dr. Geoffrey Hinton

can effortlessly translate between languages and will increasingly take on manual and cognitive tasks for us at work and home.

Dr. Hinton’s work, and that of other top AI researchers at universities across the country, has positioned Canada as a world leader in the field, attracting students, creating new jobs and drawing Google, Facebook and Microsoft to all invest in Canada.

## OUR RECOMMENDATION FOR BUDGET 2018:

Universities Canada recommends that the federal government endorse full implementation of the Naylor report over a multi-year period, beginning in Budget 2018 with a significant increase in support for discovery research through the federal granting agencies, including support for the associated institutional costs of research.



“Innovative ideas need leaders who can create new solutions, bring the right people and teams together and propel the ideas forward to important influencers...This doesn't happen overnight.”

BONNIE MALLARD

2017 Governor General's Innovation Award recipient; professor of immunogenetics, Ontario Veterinary College, University of Guelph

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# Global challenges, global solutions

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The world's most pressing challenges – climate change, food security, refugee resettlement, cybersecurity, automation of labour – are not confined to one nation's borders. These problems are global, and solving them requires global cooperation.

The world is turning to Canada for leadership, and Canada's universities are ready to respond. With adequate support and funding, our universities can become leaders in international research collaboration, marquee destinations for global research talent and growing centres of learning and knowledge creation.

Through the Government of Canada's new Canada 150 research chairs program and the Global Skills Strategy, we are making progress. But more must be done to build and support the international research connections that put the world's best minds to humanity's biggest challenges.

**95%**

Canadians understand the value of forming cross-border research partnerships. In a new Abacus Data survey, 95% of respondents said they support international collaboration in university research.<sup>2</sup>

## Internationally engaged faculty

Many of Canada's top researchers have studied abroad and built networks far beyond their own campuses and communities. They bring a variety of perspectives, expertise and ideas to bear on challenges at home and abroad, and to classrooms and labs, enriching the student experience. Supporting our researchers in collaborating with their international peers helps Canada lead and strengthens our relationships with global partners.

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<sup>2</sup> Abacus Data, 2017



“Science is the bedrock of modern civilization... Canada must strategically build critical density in our researcher communities to elevate its global competitiveness. This is the path to new technologies, new businesses, new jobs and new value creation for Canada.”

MIKE LAZARIDIS

Founder and managing partner, Quantum Valley Investments; co-founder, BlackBerry; Fundamental Science Review Panel member, April 10, 2017, Ottawa

Significant changes to the Arctic Ocean have been documented thanks to the Joint Ocean Ice Study, a research program carried out onboard Canada's largest ice-breaker ship, the Louis S. St-Laurent. In collaboration with Fisheries and Oceans Canada, researchers from universities across Canada, the United States and Japan are studying the impacts of global climate change on Arctic Ocean health, leading to discoveries that confirm the thinning of ice packs.

Photo: Arthi Ramachandran, Concordia University

## Improving quality of life for HIV-positive women, at home and abroad

In South Africa, nearly 2000 young women are infected with HIV every week. For global health epidemiologist and social science researcher Dr. Angela Kaida, Canada Research Chair in Global Perspectives on HIV and Sexual and Reproductive Health at Simon Fraser University, this fact was a call to action.

Together with local, national and global leaders in public health and biomedical and social sciences, Dr. Kaida is conducting cutting-edge research into the sexual and reproductive well-being of those living with HIV. Dr. Kaida is also exploring the effects of a safer, patient-centred conception intervention that eliminates the risk of transmitting HIV to the uninfected partner or future infant.



Dr. Angela Kaida

Dr. Kaida also examines the impacts of HIV care on the lives of HIV-affected women in Canada, and works to translate her findings into better health and social care policies for women.

## OUR RECOMMENDATION FOR BUDGET 2018:

Linked to our call for a significant increase in support for discovery research, Universities Canada recommends a dedicated support fund for international research collaboration to capitalize on Canada's global moment and increasingly strong position as a research partner of choice, as highlighted in the Naylor report.



“Tomorrow’s prosperity will depend on today’s young people and their ability to take on a future that’s equally inspiring and unnerving. We’re sitting at an intersection of history, as a massive generational shift and unprecedented technological revolution come together. And we need to ensure young Canadians are prepared to help take us forward.”

DAVID MCKAY  
President and CEO, Royal Bank of Canada, March 2017

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# Equipping Canada’s brightest minds

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Canada cannot achieve its potential in research and innovation without investing in modern research centres, labs and equipment. Modern research infrastructure across disciplines will support breakthrough discoveries, help develop top young researchers and secure Canada’s position as a global research powerhouse. In today’s rapidly changing world, Canada’s youth need to be trained on the most up-to-date tools and technologies in order to adapt and succeed in a quickly evolving job market.

Modern research facilities and equipment are also needed to attract top global talent. Stable and predictable support for world-class research infrastructure through the Canada Foundation for Innovation (CFI) will enable Canadian researchers to do their best work and ensure that Canada is a destination of choice for the best minds around the world.

## Building partnerships, attracting investment

Science infrastructure helps foster partnerships among academic, private, public and non-profit sectors on a range of projects and across disciplines. Modern equipment and hubs of research excellence also make Canada a magnet for knowledge-intensive multinational companies. A highly skilled workforce with graduates trained in the latest technologies is essential to attracting foreign investment from the likes of Google, Uber, General Motors, Microsoft, Facebook and Thomson-Reuters. These companies have all made recent investments in research and development in Canada, creating thousands of new jobs.

“Montreal already has an existing fantastic academic AI community, an exciting ecosystem of startups, and promising government policies to encourage AI research. We are excited to become part of this larger community, and we look forward to engaging with the entire ecosystem and helping it continue to thrive.”

YANN LECUN, Chief AI scientist, Facebook, regarding Facebook’s Sept. 2017 announcement of a new AI research centre in Montreal led by Professors Joelle Pineau and Pascal Vincent, of McGill University and the University of Montreal



“Innovation is going to be a very important shift – how we scale it, how we go from inventiveness to commercialization – and there is no reason why we [Canada] can’t lead on that side. And we, by the way, are going to attract way more talent than we ever have been able to, given what’s going on in the world. This is an attractive place for top talent, students and research.”

DOMINIC BARTON

Managing director, McKinsey & Company; head of the federal government’s economic advisory council, Converge 2017, Ottawa

Photo: Department of Plant Agriculture, University of Guelph

## Increasing crop yields through precision irrigation

Experiments conducted at Université Laval’s CFI-funded greenhouse complex have led to increased crop yields for farmers.

Through field and lab experiments conducted at the technologically advanced greenhouse, agronomist Jean Caron and his team at Laval have developed a precision irrigation tool that allows real-time monitoring of a variety of conditions such as soil moisture. The software alerts farmers when to water their crops and when to leave them be – resulting in increased yields and increased profit for farmers.

# 30,000

30,000 undergraduate, graduate and post-doctoral fellows access CFI-funded infrastructure every year.<sup>3</sup>

To develop the software, Caron partnered with one of the largest lettuce producers in Canada, which co-founded VegPro International. VegPro was the first company in Canada to specialize in the production of young lettuce leaves, known as mesclun. It provides nearly 50 per cent of the fresh lettuce in grocery store chains in Eastern Canada and generates \$40 million in sales a year.

## OUR RECOMMENDATION FOR BUDGET 2018

Universities Canada recommends that the Government of Canada invest in stable and predictable funding for the Canada Foundation for Innovation to support long-term research infrastructure planning, development and operations, as highlighted in the Naylor report.

<sup>3</sup> Data from CFI project progress reports 2012-16



“One of the most intriguing aspects of scientific research is that we can’t always predict the breakthroughs of the coming decades. We need inquisitive and even skeptical minds to develop revolutionary technologies and to push the boundaries of possibility and discovery.”

LAUREN HAYWARD SIERENS

Early-career quantum scientist and Perimeter Scholars International Fellow,  
Perimeter Institute for Theoretical Physics, University of Waterloo, *Maclean's*, July 13, 2017

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# This is Canada's moment

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Now is Canada's time to lead. Top talent, pressing challenges, public support and global interest all point to the need for transformative investment in Canada's research ecosystem.

Canadians want their leaders to create good middle class jobs, support climate change solutions, build prosperity and nurture inclusion. All of these goals are realized through investments in research.

Today's world is increasingly looking to Canada to lead in what is smart – to support and connect our talent and ideas to help address the most pressing global challenges and improve quality of life, at home and abroad.

In the report of the Fundamental Science Review Advisory Panel, Canada now has a solid blueprint for renewing our research ecosystem and achieving our country's potential in research and discovery. Canadians value research – and investments in research – for Canada's future.

**This is Canada's moment.**

**Now is the time for action.**



“Fifty years from now, I hope to see a Canada that is a champion of higher education and research institutions.”

RONALD LIU

Royal Bank of Canada Career Launch Associate, 2017; student, Ivey Business School, Western University, as part of Universities Canada’s #MyCanada2067 campaign

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## Canadians value research for Canada’s future

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In July 2017, research and polling firm Abacus Data conducted a study of Canadians’ opinions of university research. Their findings show that an overwhelming majority of Canadians believe research is vital for Canada to become a global leader in innovation, sustain local economies and tackle the most pressing challenges of our time. Canadians see the potential of Canada to become a global research powerhouse, with benefits for our country and its citizens for generations to come.

### Canadians recognize that university research provides solutions to everyday challenges:

- **84%** agree that university research is vitally important for Canada’s future.
- **Over 90%** support the value of Canadian research across a range of priorities: medical breakthroughs, food security, climate change, cyber security, economic support for lower-and middle income Canadians and liveable cities.

### Canadians value the economic benefits of university research:

- **84%** agree countries that do not invest in research will slowly but surely fall behind economically.
- **85%** agree that university research has a positive impact on the economy of local communities.
- **86%** agree the federal government should spend more on university research because the upside for Canada is tremendous.
- **87%** agree that Canada can afford to invest in higher education and that not to do so would be short sighted.

### Canadians believe research will attract global investment, improve competitiveness and shape Canada’s future:

- **Almost 90%** agree the best way to ensure Canada is a leader in innovation for the long-term is to invest in fundamental research.
- **Almost 90%** believe that committing to research-based innovation will attract future investment in Canada.

### Canadians recognize the value of globally connected research:

- **94%** support international collaborations of university research to tackle global challenges.
- **94%** support attracting the best researchers from around the world to Canadian universities to expose our students to world-leading research.

### Canadians want university research to be funded at levels of our global competitors:

- **92%** support increasing university research funding to comparable levels with our competitors.

### Canadians are confident about Canada’s future and the role of research:

- **85%** agree Canada has the chance to lead the world in higher education, research and innovation.
- **Almost 80%** agree that the future of the economy of Canada looks bright.
- **Almost 80%** have great confidence in the talents of Canada’s younger generations.



**Universities  
Canada.**

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