

## From research to diplomacy and trade

Research collaboration plants the seeds for other kinds of collaboration. Using Canada's research strengths to promote growth and development drives Canadian diplomacy and international trade to the benefit of all Canadians.

“It is perhaps the defining question of our time: How to tackle the complex, interrelated challenges of the 21<sup>st</sup> century in a coherent and effective way? The answer, I am convinced, lies in what I call the diplomacy of knowledge, defined as our ability and willingness to work together and share our learning across disciplines and borders. When people achieve the right mixture of creativity, communication and co-operation, remarkable things can happen.”

His Excellency the Right Honourable David Johnston,  
Governor General of Canada

# ENGAGED GLOBAL COLLABORATIVE STRATEGIC CONNECTED UNIVERSITY RESEARCH

How Canada's universities are making a difference through international research partnerships

The Association of Universities and Colleges of Canada is the voice of Canada's universities.

AUCC represents 95 Canadian public and private not-for-profit universities and university-degree level colleges.

[www.aucc.ca](http://www.aucc.ca)

Photo: The University of Winnipeg

 **AUCC**  
Association of Universities and Colleges of Canada  
Association des universités et collèges du Canada

## Innovation is a global enterprise

The most pressing challenges facing us today transcend national borders. That's why Canada's university researchers embrace partnerships beyond their own institutions and country to accelerate research and address complex questions of international scope.

Canada's universities and funding partners recognize that international research collaboration boosts the quality, reputation and impact of Canadian research. Partnerships allow our researchers to work with global leaders in state-of-the-art labs.

There are more than seven million researchers around the world involved in R&D projects valued at nearly C\$1 trillion.

About one-fifth of the world's one million scientific papers are co-authored by researchers collaborating with international partners.

### IMPROVING QUALITY OF LIFE

How can we make cities better? For starters, we need data for sound comparisons between cities. How does domestic water consumption in São Paulo compare to Bogotá? How is Richmond Hill dealing with hospital care compared to Surrey?

Patricia McCarney, professor of political science at the University of Toronto, addressed this need by helping the World Bank develop a globally standardized methodology

for indicators that would allow cities to be accurately compared. This collaboration led to the establishment of the Global City Indicators Facility based at the University of Toronto.

Now 130 cities from every continent submit data to the GCIF website on an annual basis, enabling cities to measure, monitor and improve their performance and quality of life.

Photo: Acadia University



## The world's brightest minds are tackling our most pressing problems

International research collaboration brings together the brightest minds around the world to work on the most important issues. Canadian researchers are working with their peers to find solutions to a variety of challenges, including determining the socio-economic effects of aging, preventing the spread of disease, ensuring the supply of safe water and food, increasing energy security, and maximizing the potential of digital and information technologies.

### FACILITATING GLOBAL COMMUNICATIONS

From 2004 to 2007, a consortium of 38 universities and companies from 15 countries teamed up to develop international standards for wireless broadband connectivity. This project provided the basis for the fourth generation of wireless mobile devices (4G), which facilitates seamless global wireless communications. Canada's participation in the

project, funded by the Natural Sciences and Engineering Research Council, involved a team of three researchers from Carleton University. With support from foreign companies, including Huawei, China's largest telecom company, one of the Carleton researchers is now working on the next generation of mobile technology.

Photo: University of Regina



Photo: University of Lethbridge

### MAKING MEDICAL ADVANCEMENTS

Marco Prado, a Brazilian-born researcher recruited by the Robarts Research Institute at Western University in 2008, knows the value of international research collaboration. While researching diseases such as Alzheimer's, his team of Canadian and Brazilian scientists discovered a new

potential treatment for heart failure. Since his arrival at Western, Dr. Prado has helped recruit top talent from Brazil. He recently joined a Canadian academic delegation to Brazil to promote collaboration on neurodegenerative diseases such as Parkinson's, Alzheimer's and Huntington's.

Cooperation between researchers from around the globe also creates a critical mass of expertise and resources. Through international collaboration, researchers can leverage their combined data and knowledge, working together to identify data-driven solutions to specific challenges.

#### TREATING RARE DISEASE

In 2011, the European Commission, the National Institutes of Health in the United States and the Canadian Institutes of Health Research teamed up to form the International Rare Diseases Research Consortium. Rare diseases, such as uncommon disorders

of autoimmunity, are estimated to affect more than 250 million people worldwide, but fewer than two percent of any country. Through the consortium, researchers seek to identify and create 200 new therapies and diagnostic tools for rare diseases by 2020.

Transnational research partnerships help build research capacity in developing countries. Through knowledge-sharing and other collaborative efforts, Canadian researchers are working with colleagues in developing countries in a number of high-priority areas including environment, health, governance, private-sector development, education, agriculture/ rural development, social sciences and engineering.

Photo: Queen's University



Photo: Université Laval



#### STRENGTHENING FOOD SECURITY

Congolese farmers have tripled their corn production since 2005, thanks to a partnership between Laurentian University and the University of Kinshasa (UNIKIN) in the Democratic Republic of the Congo. Farmers in 20 communities are now applying cutting-edge agricultural techniques to

allow the cultivation of high-yielding corn seed with better nutritional value. Together, the universities have also developed master's and PhD-level programs in food security at UNIKIN.

## Canadian investments in research

Canada's research granting agencies recognize the critical importance of the international dimension of research and provide support to stimulate and sustain Canadian participation in international projects.

Through strategic investments in CANARIE, Canada's advanced research and information network, the federal government has enabled Canadian researchers to be linked not only from coast to coast but also to the best research teams around the world. Canada's digital research infrastructure allows researchers to access, exchange and analyze massive data sets from all corners of the world.

Our research facilities attract thousands of foreign researchers each year and are helping to make Canada a hub for international research collaboration. In 2010, 6,500 researchers from around the world made use of state-of-the-art infrastructure, funded by the Canada Foundation for Innovation, at Canadian universities and research hospitals. More than 900 projects at these centres have international linkages with a total of 73 countries.

#### MONITORING ARCTIC ECOSYSTEMS

In 2002, the Canada Foundation for Innovation and Fisheries and Oceans Canada invested in the retrofit of a Canadian icebreaker to create a state-of-the-art research vessel, the Amundsen, that has attracted international acclaim. As part of the 2007-08 International Polar Year, the Amundsen was central to the success of one

of the largest expeditions ever launched to study the changing Arctic marine ecosystem. Spearheaded by the University of Manitoba and Université Laval, the project involved researchers from 27 countries. Canada's universities are world leaders in Arctic research.

Photo: Université de Sherbrooke



## Canada's growing international reputation for research excellence

Canadian universities have a deep commitment to international research collaboration and are constantly seeking new international research opportunities for faculty and students.

Close to 50 percent of publications from Canada have co-authors from other countries – double the world average. And collaboration is on the rise – Canada's rate is now twice what it was 15 years ago.

Almost half of all Canadian scientific papers with international collaboration are co-authored with U.S. researchers. But the fastest growth in bilateral scientific collaboration is occurring with powerhouse economies such as China, Brazil, the Republic of Korea and Nordic countries such as Finland and Norway.

Over the last 20 years, Canadian university research funding from foreign sources grew 10-fold, from C\$12 million in 1990 to C\$123 million in 2011.

### DISCOVERING THE ORIGIN OF MASS

More than 100 Canadian scientists are among 3,000 researchers from 38 countries taking part in CERN's ATLAS experiment, an international effort to search for an understanding of the origin of mass. They developed a unique expertise that helped TRIUMF, Canada's leading

nuclear and particle physics research lab, become host to one of 10 computing centres around the world that process data collected from ATLAS. TRIUMF is owned and operated by a consortium of Canadian universities, and is located on the campus of the University of British Columbia.



Photo: University of Toronto

## Positioning Canada for the future

Strong international research partnerships ensure that Canada's university graduates are engaged worldwide. Faculty enrich their courses by bringing global cultural and research information to students through their research networks. Graduate students – and increasingly undergraduates as well – benefit from hands-on research experiences involving international collaboration.

More than 40 percent of faculty at Canadian universities earned at least one degree abroad. They bring to our campuses international experience and connections, and new approaches to research and learning. They are innovative, interdisciplinary, collaborative and open to the world.

### ROOM TO GROW

Only 12 percent of Canadian undergraduate students have a study abroad experience by the time they graduate compared to about 20 percent in similar U.S. universities and more than 30 percent in Germany.

Canadian employers recognize and reward students who have taken part in an international experience:

more than half of employers polled would hire a student with study abroad experiences over a candidate without those experiences. Ninety-one percent of employers identify understanding of other cultures and knowledge of cultural differences in business and relationship-building as an asset in employees.

“The connections between Canadian universities and those in Brazil are sparking discovery and innovation that will yield tremendous benefits for both countries.”

Stephen Toope, president of the University of British Columbia, and chair of the AUCC board of directors