2015 Innovation Fund

STRIVING FOR GLOBAL LEADERSHIP AND REAPING THE BENEFITS

Call for Proposals

January 2014

INNOVATION.CA
CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

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COMPETITION DESCRIPTION

Context

Canada is building a global reputation for research excellence and productivity. In its 2012 assessment of the state of science and technology, the Council of Canadian Academies[1] reports that although Canada has less than 0.5 percent of the world's population, Canadian researchers generate 4.1 percent of the world's academic articles and almost five percent of the most highly cited papers. This record of achievement places Canada sixth overall in knowledge generation. Canadian researchers are also highly collaborative on the international stage, with 43 percent of all publications co-authored with researchers from other countries, well above the international average of 35 percent. Canada is increasingly recognized for the excellence of its research, the commitment and high calibre of its researchers and the quality of its research institutions and infrastructure. As a result, Canadians are often partners of choice for conducting cutting-edge research and technology development. In fact, over the past 10 years, Canada has attracted some of the world's very best research talent.

Canada's scientific reputation is, in part, the result of sustained investments in world-class research infrastructure, one of the key pillars on which research excellence is built. Coupled with institutional strategic research plans, these investments have substantially improved the ability of Canadian researchers to compete globally and to make important contributions to addressing complex global challenges. Many institutions and their researchers are now in a position to capitalize on this success and continue to improve their standing in the global research enterprise.

Research is also a central component of innovation and future economic growth and prosperity. Over the past few years, several reports and analyses[1,2] have called for improvements in the way research knowledge is translated into benefits, whether they be social or economic — for example, through increased knowledge transfer among academic, public, private and not-for-profit sectors as well as the development of a skilled Canadian workforce.

Forging productive partnerships within and across sectors is essential to realizing the full potential of investments in research and research infrastructure. Working in partnership at the institutional, regional, national and international levels helps to generate new ideas and insights and to improve our understanding of the research challenges and skills needed for particular areas. As well, engaging with the users of research results has a wider value in bringing together different perspectives and developing new pathways for scientific, social and economic impact.

The success of the Canadian research community relies on its ability to renew and sustain the existing bedrock of infrastructure. Doing so will help keep Canada at the forefront of tomorrow's technological revolutions. Continued investments in research and research infrastructure across the full spectrum, from the very fundamental to the very applied, will allow Canada to maintain its enviable position and to reap the full benefits. This is why the CFI was recently entrusted with $325 million to launch its eighth nationwide competition for advanced large-scale research infrastructure.

These elements — research excellence, sustaining and enhancing research capacity, partnerships, and global influence — are key strategic directions of the *CFI Strategic Roadmap 2012-17*.

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[1]CCA (Council of Canadian Academies). (2012). The State of Science and Technology in Canada 2012. Ottawa (ON): Expert Panel on the State of Science and Technology in Canada.

[2] STIC (Science, Technology and Innovation Council). (2012). State of the Nation 2012 — Canada's Science, Technology and Innovation System: Aspiring to Global Leadership. Ottawa (ON): Science, Technology and Innovation Council.

Challenge

For this competition, the CFI challenges institutions to propose transformative infrastructure projects that will underpin cutting-edge research and will have a structuring effect on Canada's research landscape. The CFI is also challenging institutions to continue to make strategic choices and set priorities that build on their distinct advantages. Through the 2015 Innovation Fund, the CFI seeks to support promising and innovative directions in research or technology development in areas where Canada currently is, or has the potential to be, competitive on the global stage. The CFI will support initiatives that allow institutions and their researchers to build on and enhance an emerging strategic priority area, accelerate current research and technology development work or take established capabilities to a globally competitive level. In short, the initiatives should be of sufficient maturity to enable institutions to launch them rapidly.

The objectives of the 2015 Innovation Fund are to enable institutions and their best researchers to:

- Strive for global leadership by conducting world-class transformative research and technology development in areas of institutional strategic priority;
- Forge and foster productive, value-added partnerships within and among institutions, sectors and disciplines that will nurture creativity and innovation which will result in the effective and sustainable use of the research infrastructure and facilities;
- Identify and develop plans and potential pathways to social, health, environmental and economic benefits for Canada, including better training and improved skills for highly qualified personnel.

The CFI encourages institutions to submit proposals for which there is a proven record of, or a strong potential for, excellence and commitment. Institutions will, therefore, need to demonstrate how the proposed activities: meet the standard of excellence for each of the three competition objectives; are in line with both their priorities and their past, current and future commitments; and are in line with their track record in areas in which they are proposing to reinvest.

Institutions are encouraged to consider how their proposals can be made more competitive through collaboration with appropriate partners and to plan co-operatively to acquire, develop, operate and maintain infrastructure. In this competition, the CFI is encouraging institutions to come together to propose multi-institutional initiatives that forge and foster productive partnerships, enabling institutions and their best researchers to exploit fully the capabilities and capacity of the research infrastructure and facilities.

Finally, in developing proposals, institutions are encouraged to engage with end-users of research or technology development to clearly define the potential benefits for Canadians. In their proposals, institutions should identify the kinds of activities they expect to undertake to increase the potential for economic and social impact from their research or technology development activities.

Timeline

Dates	Activity
March 28, 2014	Deadline for the submission of notices of intent (NOI)
June 27, 2014	Deadline for the submission of proposals
Mid-August to October 2014	Expert committee meetings
January 2015	Multidisciplinary assessment committee meetings
February 2015	Special multidisciplinary assessment committee meeting
March 2015	CFI Board decisions

FUNDS AVAILABLE

Competition budget

The CFI will invest up to $250 million in infrastructure costs for funded projects in this competition. The CFI will fund up to 40 percent of a project's eligible infrastructure costs.

Institutional envelopes

As in previous competitions, the CFI will place an upper limit on the total value of the funding that eligible institutions may request from the CFI. Institutions will thus need to comply with their institutional envelopes.

The envelopes are calculated in the following manner:

- The overall envelope allocation is slightly greater than three times the available budget of $250 million.
- Each institution's envelope is calculated based on its average share of research funding received from the three federal research funding agencies over the period 2009-10 through 2011-12.

CFI-eligible institutions will have a minimum envelope of $1 million. Please note that institutional envelopes include affiliated research hospitals (see Appendix 1 for the list of funding envelopes by institution).

Adhering to institutional envelopes

By the notice of intent (NOI) deadline, institutions are allowed to exceed their total envelope by as much as 20 percent. At the time of submission of the proposals, the CFI will ensure that the total value of CFI funding requested by each institution is within its envelope.

Multi-institutional projects

A multi-institutional project involves two or more collaborating institutions eligible to receive CFI funding. A collaborating institution is one that receives part of the infrastructure or shares part of its institutional envelope.

By the NOI deadline and again by the proposal submission deadline, the lead institution must communicate to the CFI the dollar value of its share of the proposal as well as the names of the other participating institutions and the value of each institution's share. Two template cover letters, one for the NOI and one for the proposal, are available on CFI's website.

Exception to the institutional envelope

Should an institution choose to submit a single proposal to the competition, it will not be required to respect its institutional envelope.

Operating and maintenance costs

The CFI will contribute to the operating and maintenance (O&M) costs of funded projects through its Infrastructure Operating Fund (IOF). The IOF allocated will be equivalent to 30 percent of the CFI contribution to the capital cost of projects funded under the Innovation Fund.

For multi-institutional projects bringing together three or more CFI-eligible collaborating institutions, the applicant may request up to an additional five percent of the CFI award to cover, among others, administrative costs associated with the management and governance of those projects. A justification for these additional funds must be included in the proposal and will be subject to the merit-review process.

For all proposals, institutions will need to demonstrate that appropriate O&M resources are, and will continue to be, available in order to capitalize on the full potential of the requested infrastructure, including research computing infrastructure that will be housed, managed and operated by the institution. Being a review criterion, this form of sustainability is an integral part of the review process and may influence the recommendations of the multidisciplinary assessment committees.

ELIGIBILITY

Institution eligibility

Canadian universities, colleges, research hospitals and non-profit research institutions that have been recognized as eligible by the CFI can apply. These institutions must have submitted the following to the CFI:

- A signed *Institutional agreement* (required before submitting a notice of intent);
- A Strategic research plan summary of a maximum of five pages (required before submitting a proposal). The authorized signatory or the CFI liaison from an institution can submit a new Strategic research plan summary (PDF format) by email.

Eligible infrastructure

An eligible infrastructure project involves the acquisition or development of research infrastructure to increase research capacity, allowing the pursuit of world-class research. Construction costs to build new space or to renovate existing space (including fitting out existing space) which is essential to house and use the infrastructure effectively, are eligible. To be eligible for funding, in-kind contributions from external partners and cash expenditures by the institution must have taken place on or after November 1, 2012. Expenditures are considered incurred when goods are received, services have been rendered or work has been performed.

For this competition, the CFI will only consider proposals whose total project costs are greater than $500,000.

For more information on CFI eligibility guidelines, please refer to the *Policy and program guide*.

Research computing infrastructure

The 2015 IF competition offers institutions and their researchers an opportunity to request research computing infrastructure and related resources to carry out a research or technology development project. By comparison, the forthcoming cyber-infrastructure initiative will focus on collective resources – for data acquisition, storage, management and integration, data mining and visualization, computational and information processing services, etc. – to enable Canadian researchers to remain globally competitive. Consequently, given that the CFI has set aside funding for a cyber-infrastructure initiative, proposals that focus predominantly on collective research computing resources will not be accepted in this competition.

Definition

For the purposes of this competition, please note that the term “research computing infrastructure” encompasses any computing system costing more than $100,000. Such research computing infrastructure normally includes systems or resources such as:

- Capacity or throughput computing
- Capability computing supporting tightly coupled, fine-grained applications
- Shared memory systems
- Systems supporting very large memory requirements

- High-performance storage
- Long-term storage
- Cloud computing
- Computing using specialized accelerators, including GP-CPU and others
- High-performance visualization systems
- Systems suitable for computational steering and interactive use

In each case, the term “research computing infrastructure” encompasses the software and environment needed for a given discipline to effectively utilize these types of infrastructure and encompasses needs such as high levels of data security and integrity as may be required by specific disciplines or researchers.

Consultative process with Compute Canada

As a matter of policy, the CFI is convinced that investments in research computing infrastructure are maximized through the sharing of resources. The CFI, therefore, expects that new or additional research computing resources funded through this competition, and costing more than $100,000, will normally be housed, managed and operated by Compute Canada[3]. In such cases, Compute Canada will provide world-class expertise in advanced computing services and assume the associated O&M costs of the research computing infrastructure. Both are of direct benefit to researchers and their institutions. Although this is the CFI’s preferred approach, it is not intended to be an iron-clad rule. The CFI recognizes that there are instances where, for compelling reasons, research computing infrastructure is best housed, managed and operated by institutions.

The CFI expects all institutions to consult with Compute Canada when planning to request research computing infrastructure as defined above. For such cases, Compute Canada has established a process (available on its website following this link) to facilitate the collaboration with institutions. If, however, an institution chooses to not consult with Compute Canada, the CFI will conclude that the institution is planning to assume full responsibility for the O&M costs of the proposed infrastructure, including the research computing component.

The purpose of the consultation with Compute Canada is to:

- Understand the scientific objectives of the project, the research computing infrastructure needed and the type of resources being contemplated;
- Establish whether Compute Canada can meet the research computing needs of the project with existing resources, or if additional resources are required; and
- Determine whether the project has unique characteristics such that the resources would best be housed, managed and operated by the institution.

For all cases where the institution will itself house, operate and manage the research computing resources, following a consultation or not, the institution will need to demonstrate, as part of the proposal’s O&M plan, that appropriate resources will be available for the requested infrastructure,

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[3] Compute Canada provides a broad range of technological resources and human support services for advanced research computing: high performance computing for large-scale computation, simulation and modeling; cloud computing for research; advanced data management, sharing and storage; data visualization; network-mediated collaboration tools; and computer mediated instrumentation and sensor networks.

including the research computing component. In cases where the research computing infrastructure is housed by Compute Canada, the lead institution will need to indicate in its plan that the O&M costs will be assumed by Compute Canada. This O&M plan must be included in the "Sustainability of the research infrastructure" section of the proposal and will be subject to the merit-review process.

Following final decisions on funding, the CFI will engage with those funded institutions that chose to employ Compute Canada's services and Compute Canada to determine the most effective and efficient acquisition, deployment and operation of the infrastructure. For example, the CFI will discuss with the institutions and Compute Canada whether there are opportunities for leveraging Compute Canada expertise and/or combining infrastructure purchases with other projects to get a better deal from vendors.

At its discretion, the CFI may choose to adjust the conditions of individual awards to ensure maximum efficiency and effectiveness of the research computing infrastructure that it supports.

The CFI firmly believes that an integrated shared resource, such as offered by Compute Canada, provides the highest quality, most cost-effective and flexible way of delivering most research computing resources and services. This approach also helps to ensure the sustainability of research computing infrastructure over its life cycle. The housing of significant research computing resources within Compute Canada is, therefore, the CFI's preferred approach.

REVIEW AND DECISION MAKING

Assessment criteria

The CFI merit review process will be used to evaluate proposals on the basis of the following six assessment criteria that reflect the competition objectives, described under the Challenge section.

Proposals should clearly present the merits and excellence of the proposed project and provide sufficient information to enable reviewers to evaluate the proposal in accordance with the following six criteria:

- **Institutional track record and commitment:** The proposal builds on existing capacity and key investments in people and infrastructure. Through tangible commitments, the institution supports the area of the proposal in order to maintain or gain a competitive advantage internationally.
- **Research or technology development:** The proposed research or technology development activities enabled by the research infrastructure are timely, innovative and at the leading edge internationally. The activities have the potential to lead to breakthroughs and will enhance the international competitiveness of the institution and its researchers.
- **Team:** The principal users of the infrastructure are established or emerging leaders in the relevant research or technology development domains. The team has the necessary expertise, ability and relevant collaborations and partnerships in place to successfully conduct the research or technology development activities.
- **Infrastructure:** The infrastructure is necessary and appropriate to conduct the research or technology development activities. The use of the infrastructure will be maximized within and among institutions and sectors (private, public and non-profit).
- **Sustainability of the research infrastructure:** The proposal presents a compelling plan for the management, operation and maintenance of the proposed infrastructure with tangible and appropriate commitments over its useful life.
- **Benefits to Canadians:** The research or technology development activities are likely to lead to significant tangible benefits for society, health, the economy and/or the environment. Where appropriate, effective pathways have been identified and will be developed to transfer the results and outputs of the research or technology development to potential end-users in a timely manner.

Review process

The CFI will first ensure that proposals are eligible and complete. The assessment of each proposal will include three stages, as outlined below. Its extent will be tailored to the nature and complexity of the proposal.

Expert committees

The first stage of review, the expert review process, is designed to assess the strengths and weaknesses of the proposals in relation to the six assessment criteria. Wherever possible, expert committees will review small groups of similar or related proposals.

Large and complex proposals, typically requesting $6 million or more from the CFI, may involve face-to-face meetings of expert committees and senior representatives of the lead institution. Shortly after the submission of the NOIs, the CFI will provide guidance to institutions about projects that are likely to require such a meeting. Following the submission of proposals, the CFI will provide a confirmation to institutions in July 2014 if a face-to-face meeting is deemed necessary. For those proposals, the CFI expects a more detailed governance and management plan commensurate with the level of complexity of the proposed facility. The CFI may also decide to include large-facility management expertise on its expert committees.

Multidisciplinary assessment committees

The second stage of review involves the assessment of proposals by multidisciplinary assessment committees (MACs). The MACs will review proposals grouped with others of similar size and/or complexity. Following a careful analysis of the results of the expert review, the MACs will be responsible for:

- identifying proposals that best meet the standards of excellence for the competition;
- among these, identifying the ones that best meet the three competition objectives — striving for global leadership, forging and fostering productive partnerships, and reaping the benefits — relative to other competing requests.
- establishing the amount that should be awarded to the proposals.

MAC members are chosen for their capacity to assess proposals based on the competition objectives and for their breadth of understanding of the research environment, the niches of innovative excellence in eligible institutions and the breadth of impacts and outcomes from research investments across the entire landscape of research activity. The MACs that review large-scale proposals will also include expertise in the management of large research facilities.

To assist in the next stage of review, the MACs will also be asked to identify a subset of those proposals that are of exceptional merit. Since the MACs are instructed to be extremely selective in the proposals they deem exceptional, each MAC is limited to choosing only a few proposals in this category.

Special multidisciplinary assessment committee

The third stage of review involves a review and integration of the MAC assessments by a Special multidisciplinary assessment committee (S-MAC). The S-MAC is charged with ensuring consistency among the MACs, and in instances where MAC recommendations exceed the available resources, the S-MAC recommends to the CFI Board of Directors the proposals that most effectively support the CFI's mandate, meet the objectives of the competition — striving for global leadership, forging and fostering productive partnerships, and reaping the benefits — and represent the most effective portfolio of investments for Canada.

Collaboration with provinces

To coordinate the review processes and avoid duplication of review efforts, the CFI will share a list of the NOIs submitted, provide expert committee reports, along with the names and affiliations of committee members, to relevant provincial and territorial funding authorities. Disclosure of the list and committee reports will be made only in accordance with agreements between the CFI and provincial or territorial authorities, as permissible pursuant to the *Privacy Act*.

In addition, representatives of the relevant provincial or territorial authorities will be invited to participate as observers at the expert review stage and will have the opportunity to submit their respective views on proposals for consideration by the S-MAC.

The CFI encourages institutions to work with relevant provincial and territorial funding authorities as key partners at an early stage in the planning and development of proposals.

Funding decisions

All funding decisions will be made by the CFI Board of Directors at its March 2015 meeting. Following this meeting, the applicant institutions will receive the review materials for their proposals.

HOW TO APPLY

Researchers and institutions must use the CFI Awards Management System to prepare and submit the notice of intent as well as the proposals.

Notice of intent

This competition requires the submission of a notice of intent in advance of the submission of a proposal. In addition, the CFI requires each institution to submit a list of all NOIs in which the institution participates as lead or collaborator. The NOI submission cover letter is available on CFI's website.

The NOIs will be used to assist the CFI in planning the review process, recruit committee members, and identify potential eligibility issues for the infrastructure items requested. Therefore, the NOI should contain accurate information about the infrastructure and its users, the proposed research or technology development and the expected outcomes. A list of the NOIs received will be published on the CFI's website to encourage institutions that have similar proposals to consider potential collaborations or joint initiatives, where appropriate, to ensure the effectiveness and efficiency of the infrastructure. To further this objective, the CFI may draw attention to possible overlaps and synergies between institutions.

The submission deadline for the NOI is March 28, 2014.

Proposal

The CFI will require an updated list of all proposals in which the institution participates as lead or collaborator. The proposal submission cover letter is available on CFI's website.

The submission deadline for proposals is June 27, 2014.

PUBLIC ANNOUNCEMENT

The CFI makes national funding announcements related to infrastructure associated with its Innovation Fund. In most cases, these announcements are organized in collaboration with an institution. Public announcements provide institutions, their researchers and partners, along with government representatives, the media and the CFI, opportunities to highlight the research and technology

development in their communities. Following each national CFI funding announcement, institutions are encouraged to work with local and national media to promote the benefits and impacts of this research and technology development to Canadians.

APPENDIX 1

Envelopes by institution

Institution	Envelope
University of Toronto (and affiliated hospitals)	$113,700,000
The University of British Columbia (and affiliated hospitals)	$78,400,000
McGill University (and affiliated hospitals)	$70,750,000
Université de Montréal (and affiliated hospitals)	$46,450,000
University of Alberta (and affiliated hospitals)	$46,450,000
Université Laval (and affiliated hospitals)	$35,300,000
University of Ottawa (and affiliated hospitals)	$32,700,000
McMaster University (and affiliated hospitals)	$31,950,000
University of Calgary (and affiliated hospitals)	$31,200,000
Western University (and affiliated hospitals)	$28,750,000
University of Waterloo	$23,000,000
Queen's University (and affiliated hospitals)	$20,950,000
Dalhousie University (and affiliated hospitals)	$18,700,000
University of Manitoba (and affiliated hospitals)	$18,350,000
Simon Fraser University	$17,950,000
Université de Sherbrooke (and affiliated hospitals)	$16,400,000
University of Guelph	$13,400,000
University of Victoria	$12,650,000
University of Saskatchewan (and affiliated hospitals)	$12,650,000
York University	$10,600,000
École Polytechnique de Montréal	$9,000,000
Concordia University	$8,200,000
Carleton University	$7,800,000
Memorial University of Newfoundland (and affiliated hospital)	$7,700,000
Université du Québec à Montréal	$7,150,000
Institut national de la recherche scientifique	$6,000,000
University of New Brunswick	$5,600,000
Ryerson University	$4,750,000
University of Windsor	$4,600,000
University of Regina	$2,600,000
University of Lethbridge	$2,300,000
École de technologie supérieure	$2,300,000
Brock University	$2,250,000
Wilfrid Laurier University	$2,150,000
Lakehead University	$2,150,000
Trent University	$2,050,000
Université du Québec à Trois-Rivières	$2,050,000
Université du Québec à Rimouski	$1,950,000
Laurentian University	$1,900,000
University of Ontario Institute of Technology	$1,850,000
Université du Québec à Chicoutimi	$1,800,000
University of Northern British Columbia	$1,600,000
Saint Mary's University	$1,400,000
All other CFI-eligible institutions	$1,000,000

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