GenomeCanada

November 5, 2015

Request for Applications

2015 Bioinformatics and Computational Biology Competition

1. Overview

Genome Canada, in partnership with the Canadian Institutes of Health Research (CIHR), is seeking proposals for research projects to address any aspect of **bioinformatics**[1] and **computational biology**[2] (B/CB) as it relates to **genomics**[3]**.** Proposals with applications across all of Genome Canada's sectors are welcome, i.e., agriculture, energy, environment, aquaculture/fisheries, forestry, human health and mining.

The massive and ongoing influx of data from 'omics research underscores the need for new computational and theoretical tools in modern biology. These tools are essential for analyzing and integrating complex data sets and to better understand the associated biology. The lack of efficient B/CB tools and methodologies available to analyse these data sets and maximize the impact of the research is a major bottleneck faced by the genomics research community. Genome Canada has identified B/CB as a priority area with the goal to create an environment that supports the creation and evolution of enhanced B/CB tools and methodologies. In August 2015, a B/CB Advisory Committee struck by Genome Canada and CIHR released a consultative version of a Strategic Framework for the future of B/CB in Canada (see www.bioinformatics/ca/bcb).

CIHR is partnering on this Request for Applications (RFA) in support of proposals in the area of human health because it recognizes that application of current technologies in genomics would create health-related data sets of unprecedented size and complexity, such that advanced computational tools are required for their analysis. While these data are of potential enormous importance for health and wellness, extracting value from this vast amount of information is a critical challenge. Thus, advancing the field of B/CB through innovative or transformative ideas with the potential to disrupt current practices in the area of B/CB will be a key to enabling novel translational research applications in health-related areas.

Through this Genome Canada and CIHR Strategic Partnership, Genome Canada will continue implementing a vital element of its Strategic Plan and CIHR will deliver on key objectives underpinning the CIHR Personalized Medicine Signature Initiative.

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[1] The term bioinformatics is defined here as the development and application of computational tools and approaches for maximizing the use of genomics data.

[2] The term computational biology is defined here as the development and application of theoretical data-analytical methods, mathematical modeling and computational simulation techniques in the context of the study of biological systems.

[3] The term genomics is defined here as the comprehensive study, using high throughput technologies, of the genetic information of a cell or organism, including the function of specific genes, their interactions with each other and the activation and suppression of genes. For purposes of describing Genome Canada's mandate it also includes related disciplines such as bioinformatics, epigenomics, metabolomics, metagenomics, proteomics and transcriptomics.

2. Objectives

The major objectives of this RFA are to:

1) support the development of next generation Bioinformatics and Computational Biology tools and methodologies that will be required by the research community to deal with the influx of large amounts of data produced by modern genomics technologies; and,
2) provide broad and timely access of these new Bioinformatics and Computational Biology tools to the research community.

To ensure that the objectives of the RFA are met, all applications must address the evaluation criteria established for the competition, i.e., research, benefits, management and financial (see Appendix 1). Only those proposals demonstrating the highest degree of overall excellence will be funded.

3. Funding Available and Term

- There is $4 million available for this competition with the Government of Canada providing $2 million through Genome Canada and $2 million through CIHR's Roadmap Accelerator Fund (RAF)[4].
- Co-funding is **NOT** required.
- There will be a maximum investment of $250,000 in an individual project; this will be provided by Genome Canada, CIHR, or a combination of the two.
- Projects requiring less than $125,000 will not be considered unless well justified.
- Successful projects will be awarded funding for a term of up to two years.

4. Eligibility and Types of Proposals Being Sought

To be eligible for this competition, proposals must meet the following requirements:

- The proposal must respond to the objectives of the competition.
- The essential components and outcomes of the proposed project must be sufficiently targeted to the requirements of the genomics research community.

This competition provides an opportunity for individuals or small groups to propose innovative ideas with the potential for significant impact that will disrupt current practices in the B/CB community and to stimulate the B/CB community to address real world challenges and currently recognized needs in the field. Applications should also encourage the involvement of researchers from a variety of other disciplines including, but not limited to, biology, statistics and mathematics.

[4] CIHR's RAF is intended to support transformative and impactful research that aligns with CIHR's Research Priorities (http://www.cihr-irsc.gc.ca/e/48964.html#a5) and is multi-disciplinary in nature. Scientific leadership and support for this RAF-funded initiative is shared across CIHR's Institute of Cancer Research (ICR), Institute of Genetics (IG), and Institute of Infection and Immunity (III).

All applications are expected to propose new approaches to data analysis and data interpretation in the area of genomics, including development of software tools and algorithms. Of particular interest will be proposals addressing problems associated with current data handling and analysis and proposals addressing challenges arising from handling and analysis of data emerging from new technologies. Such tools and methods, in the long term, are expected to underpin Canada's national B/CB strategy and will help the Canadian research community in maximizing the impact of data generated by new and future 'omics technologies.

In order to maximize the effectiveness of this RFA in advancing B/CB and its application to genomics in Canada, sharing of resources and expertise through inter-regional or international collaboration is encouraged at all levels.

5. Benefits

The ongoing need for efficient B/CB tools and methodologies available to analyse large genomics data sets is a major bottleneck faced by the genomics research community. Genome Canada recognizes that the real value of genomics research can only be realized through the development of novel B/CB tools and methodologies. The purpose of this RFA is to enable the B/CB community to develop these B/CB tools and methodologies to facilitate genomics research which will lead to benefits for the genomics research community and eventually Canada.

All applications must describe, with supporting evidence, the deliverable(s) that will be realized **by the end of the project.** Deliverables should have practical applicability in as short a time as possible after the end of the project and lead to benefits for the genomics research community in Canada and worldwide.

Applications must include a plan and time-frame that outlines how the deliverables from the research will be transferred, disseminated, used, and/or applied to realize the benefits to the genomics community. Although open source/open access currently typifies the B/CB community, applicants are invited to articulate alternative options for community availability and downstream development as long as the dissemination plan ensures maximum community uptake. Preference will be given to applications with a high potential for community impact and/or uptake regardless of the type of dissemination plan proposed.

6. Guidelines for Funding

Genome Canada's *Guidelines for Funding Research Projects* must be adhered to throughout the competition and post-award management processes.

6.1. Exceptions to the Guidelines

Exceptions to the Guidelines specific to this RFA include:

- **Integrated GE^{3}LS:** An integrated GE^{3}LS component is not required.
- **Project Managers:** A dedicated Project Manager is not required.
- **Research Oversight Committee:** A Research Oversight Committee (ROC) is not required.

6.2. Additional Guidelines

Additional Guidelines specific to this RFA include:

Ineligible costs:

- Salaries, benefits and associated costs for the performance of wet lab work
- Costs for high performance computing infrastructure
- Costs for a project manager

6.3. CIHR Guidelines

In addition, in order to receive funds from CIHR, their guidelines must also be followed. See the CIHR Guidelines and Policies for a complete listing of all CIHR guidelines and policies.

7. Application Process

Applicants are required to apply for funding through their regional Genome Centre.

7.1. Registration

A brief Registration form will be used to provide early guidance on elements such as who is applying, what they are planning to do, expected deliverables, approximate budgets and suggested reviewers. This will allow for screening for eligibility by the Genome Centres (followed by final decisions on eligibility by Genome Canada) and facilitate the early selection of reviewers for the peer review process. Information from eligible Registrations (i.e., name of project leader(s), lead institution, title of project, research areas and keywords) will be posted on the Genome Canada website to facilitate the identification of areas of potential synergy between applications from across the country so that applicants could consider engaging with other researchers on a common project.

7.2. Full Application

Full applications must address the evaluation criteria established for the competition, i.e., research, benefits, and management and financial. A final check for eligibility will be carried out. Only those proposals demonstrating the highest degree of overall excellence in terms of the review criteria will be funded.

Genome Canada may adjust its evaluation processes where warranted by the number or complexity of proposals received or other relevant factors. Any changes will be rapidly communicated through Genome Canada's website and through the Genome Centres.

7.3. Co-Funding

Co-funding is **NOT** required.

7.4. CIHR Relevance Review for Health-Related Proposals

Canadian Institutes of Health Research – Institute of Genetics (CIHR-IG), Canadian Institutes of Health Research – Institute of Cancer Research (CIHR-ICR), Canadian Institutes of Health Research - Institute of Infection and Immunity (CIHR-III) will have access to the complete registrations and full applications in order to conduct a relevance review to identify projects that have potential application to health. If additional CIHR Institutes decide to participate in the competition, access to this material will also be provided to them to identify projects relevant to their mandate and/or priority areas.

8. Competition Timeline

Requests for support of projects must be submitted to Genome Canada through a Genome Centre. The competition timeline outlined below includes both Genome Canada and Genome Centre deadlines. Please contact your regional Genome Centre for further information on their process and internal deadline dates.

Date	**Activity**
October 29, 2015	Launch of Request for Applications (RFA)
December 4, 2015	Registrations due at Génome Québec
December 11, 2015	Due date for registrations at Genome Canada
December 18, 2015	Review of eligibility of registrations by Genome Canada completed
February 5, 2016	Full Applications due at Génome Québec
March 4, 2016	Deadline for Full Applications at Genome Canada
Early May, 2016	Review process completed
Late June, 2016	Decisions by Genome Canada and Partners
Late June, 2016	**Notification of Decision**

9. Contacts

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For questions on CIHR funding guidelines, how to apply, and the peer review process contact:

For all inquiries please contact:

Telephone: 613-954-1968
Toll Free: 1-888-603-4178
Email: support@cihr-irsc.gc.ca

For questions about this initiative and research objectives contact:

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Appendix 1 – Evaluation of Applications

Proposals submitted to Genome Canada are evaluated through a rigorous independent peer review process to assess their eligibility, research merit and potential for benefits to the genomics research community as well as to ensure that sound management and financial practices are implemented. Excellence in terms of the review criteria at the highest of international standards must be demonstrated for funding to be awarded.

1. Eligibility Criteria

Each proposal will be reviewed for eligibility at every stage of the application process. The following criteria will be used.

- Does the project proposal respond to the objectives of the competition?
- Are the essential components and outcomes of the proposed project sufficiently targeted to the requirements of the genomics research community?

If considered eligible, the proposal will be reviewed using the criteria described below.

2. Review Criteria

The review criteria fall into three categories:

1) Research Proposal;
2) Benefits; and,
3) Management and Finance

Note that the descriptive phrases which follow the criteria below are not all-inclusive.

2.1. Research Proposal

- To what extent will the proposal support transformative ideas with the potential to disrupt current practices within the B/CB community?
- To what extent does the proposed research reflect creative, original thinking?
- To what extent will the proposed tools or methodologies increase the productivity of genomics research?
- How appropriate are the methods and approaches (including handling of data and resources) in terms of the research objectives?
- How appropriate is the expertise of the applicant(s) in terms of realizing the research goals?

2.2. Benefits

- To what extent have the applicants identified appropriate deliverables in terms of their potential to have practical applicability to the genomics research community?

- What is the probability that the deliverables will be realized by the end of the funding period?
- How significant are the anticipated benefits described in the proposal to the genomics community?
- What is the probability that the benefits will be realized within a short time-frame after the end of the project?
- How appropriate is the plan for access to, and dissemination of, the tools and methodologies developed?
- How high is the potential for community impact and/or uptake, regardless of the type of dissemination plan proposed?

2.3. Management and Finance

- How good is the management plan, including accountabilities of personnel and processes for decision-making on research?
- How realistic is the project schedule?
- How reasonable is the proposed budget in terms of the anticipated level of effort and deliverables?
- To what extent does the proposal provide assurance that expenditures from a funded project would be closely and critically monitored?