

Dedicated Programming Support

Application Guidelines

Round XXVII

SHARCNET **Dedicated Programming Support**

1. Objectives

- To enable key research projects with the potential for exceptional and lasting impact that require significant programming support to proceed, *and*
- To facilitate optimal exploitation of **SHARC**NET's or the Digital Research Alliance of Canada's (the Alliance) high performance and advanced computing infrastructure for internationally leading research.

2. Summary of Programme

The programme provides support for computational projects of exceptional potential that will have lasting impact and value, that require high performance and advanced computing resources and significant programming support from **SHARC**NET to proceed. Applications are encouraged that satisfy the programme objectives and priority will be given to proposals that meet one or more of the following conditions:

- Propose an innovative project that will leverage the expanded capabilities of the national systems, such as "Nibi" and the cloud.
- Propose a programme of work that deals with the efficient processing of large, heterogeneous datasets ("big data") using a variety of data mining, machine learning or other analytics software.
- Build new AI tools or leverage existing trained models to address specific computational research issues.

Applications from teams of faculty, especially if these are inter-disciplinary and/or inter-institutional, are especially encouraged. The key elements of the programme are described in the following points:

- The primary resource provided is programming and development support by one or more **SHARC**NET personnel. The intent is to enable specific, focused projects, not to provide an envelope of incidental support time or basic software development. Requests that do not clearly indicate a well-defined, specific outcome that represents a substantive advance in the field, will be uncompetitive.
- The programming effort is expected to occur within the setting of a collaborative team of faculty, students, postdocs etc. and the **SHARC**NET programmer is expected to become an integral member of the team for at least the duration of the project. It is anticipated that the involvement will be such that the programmer would receive co-authorship on methods and related research papers and that s/he would develop new skills as a part of this interaction. Note that the programmer may be remote from the applicant's institution but it is expected that the programmer will meet regularly via videoconference and semi-regularly, such as once a month, in person with the team.
- The project time is anticipated to be from two - four months in duration, during which the programmer will spend at most 50% of their working time on the project.
- Projects requiring more than 4 months of support will be considered, however, they will be held to much greater scrutiny. Continuation beyond the initial 4 month award will be contingent on a

successful review of the project's progress by **SHARC**NET administration. It is expected that each four- month period proposed will have clear objectives and deliverables.

- Renewal requests will be reviewed by the selection committee and judged alongside new proposals.
- **SHARC**NET programming personnel are experts in the development and programming of large-scale HPC applications, however **SHARC**NET makes no guarantees as to the fitness or suitability of any software or application, or of the correctness or validity of research output, resulting from involvement in this programme.
- All work resulting from support through this programme must properly acknowledge **SHARC**NET.

Prospective applicants should refer to the following sections for detailed information about the application process.

3. How to Apply

Eligibility

The programme is open to all faculty holding a valid Alliance (formerly Compute Canada) account. In the event that proposals are closely ranked, preference will be given to faculty from **SHARC**NET partner institutions[1].

Applications

Competition applications should be submitted electronically by the posted deadline, via the web form posted at www.sharcnet.ca/my/research/programming. All application materials will be treated confidentially. You will be able to print a formatted hardcopy of your application from your web browser.

All applicants must consult with one of the **SHARC**NET HPC Consultants before submitting to ensure that it meets the requirements for eligibility in the support programme and contains sufficient detail to justify their demand for support. In particular, the application must include a complete description of the expected outcomes and methodology to be employed in the project, a very detailed work plan including time-lines and deliverables, and a clear indication of the personnel resources to be committed by the applicant(s) and team(s). Applicants should email help@sharcnet.ca to request a consultation.

Questions regarding the application process or form may be directed to the **SHARC**NET office at (519) 661-4000 or by e-mail to research-support@sharcnet.ca.

Project Description

Note the word restrictions on the application form; excess material will be rejected.

[1] The **SHARC**NET partners are: Brock University, Lakehead University, Laurentian University, McMaster University, Nipissing University, Ontario College of Art & Design, The University of Western Ontario, Trent University, University of Guelph, University of Ontario

Institute of Technology, University of Waterloo, University of Windsor, Wilfrid Laurier University, York University, Fanshawe College, Sheridan College, Conestoga College, Durham College and Perimeter Institute.

The overarching criterion for consideration of applications is their potential to enable substantively new uses of HPC and of **SHARC**NET's computational resources that will lead to high-impact, internationally-leading research results. The intention is to enable a "step change" in the supported discipline(s). Consider the following when preparing your project description:

- *Novelty*. Applicants should clearly explain how the project is novel, how it requires high performance and advanced computing resources and that it is not simply a reimplementation of work done or available elsewhere.
- *Cross Discipline*. The ability to leverage expertise from one discipline in enabling leading research in another is especially valuable.
- *Team*. Proposals should clearly explain how an integrated team will be constructed – including the **SHARC**NET staff member(s) – that will lead to a successful conclusion. This explanation should also describe any expertise in project management that the team brings to the project.
- *Resources*. Applicants should make realistic estimates of the resources, including programmer time, necessary to complete the project.
- *Work Plan.* It is very important to discuss the proposed work plan with an HPC Consultant before submission to ensure it is reasonable and contains sufficient detail to justify the amount of support being requested. The plan should clearly lay out the major steps and milestones in the project; proposals that fail to do so will be asked to resubmit in a subsequent round.
- *Expected Research Outcomes*. Applicants should specify the anticipated outcomes in concrete terms. For example, compare what is proposed with the state-of-the-art; give the names of journals in which you anticipate publishing results; explain how the product can help other researchers.
- *Expected Technical Outcomes*. Applicants should describe the technical outcomes in sufficiently concrete terms that a technical evaluation can be made of the feasibility and value of what is proposed. The proposal should also describe the expected lifetime of the application or code that will be developed and, if it is to have longevity, how it will be maintained. Putting a resulting code or package in the public domain is encouraged unless specific reasons for doing otherwise are justified.
- *Intellectual Property*. If appropriate, describe the potential for development of intellectual property, or new relationships with private sector firms.
- *Renewal*. Applications requesting renewal of an existing award must make a compelling case that additional resources will lead to important new advances and results. It should be noted that such requests will be held to a very high standard. (**N.B**. any renewal request should append the word "RENEWAL" to the title in the online form.)

It is understood that applicants from non-traditional HPC disciplines may be less well versed in completely describing the technical requirements and scope of their proposal. The selection committee will take this into account in judging applications, however, it is imperative that these applicants have in-depth discussions with one or more SHARCNET staff prior to submission to try to alleviate any uncertainty in the details of the application.

Applicants should bear in mind that their principal audience is a group of scientists and technical experts

knowledgeable in the uses of high-performance computing but not necessarily expert in the research area of the applicant. ***Therefore, project descriptions should not use highly specialized language, and should clearly state the motivation, methods, and objectives of the proposal.***

Supporting Information

Applicants should provide additional information that supports their expertise and track record in completing projects of this kind. This may include:

- Brief descriptions of previous large-scale and/or long-term projects or developments and their outcomes.
- Up to three key papers that demonstrate research impacts in the field of the application (or in a closely related field). A brief description of the papers' impact may be provided; complete bibliographic details must be provided.
- Outcomes from previous SHARCNET awards (i.e. Fellowship, Dedicated Resources, Programming, etc.). Be specific about the outcomes of such awards: people, papers, significance, recognition etc.
- Applicants must describe the relationship to this proposal of any other funding held or applied for by any of the team members. Need for the programmer time and the promise that this time will lead to a significant new capability in the applicant(s)' research will be necessary criteria for success.

Suggested Reviewers

Applications will be reviewed from both a scientific and technical perspective. Applications will be reviewed internally to **SHARC**NET and may also be sent out for external review. Applicants should list on the form three suggested reviewers who can give an informed opinion of the proposal if requested. The suggested reviewers should be "arms-length" in that the reviewer should not:

- be from the same university (or associated institution) as the applicant
- have a personal relationship with the applicant (close friend, relative)
- have been a research supervisor or graduate student of the applicant within the last 6 years
- have been the applicant's Ph.D. (or equivalent) supervisor
- have collaborated with the applicant in the last six years or have plans to collaborate in the near future
- be in a position to gain financially from the application

The selection committee will endeavour to use at least one of the suggested reviewers if an external review is sought, but may select additional or alternate reviewers as it feels appropriate.

Curriculum Vitae

- No specific format is required for your submitted CV but an NSERC Form 100, Parts I and II or Canadian Common CV (CCV) or any reasonably analogous document with equivalent information is acceptable.

- Applicants must ensure that a CV no more than one year old is present in their Alliance online portal profile.
- The PI account must be in good standing with the Alliance.

Multiple Applications

An individual faculty member may be the lead on only one application. The faculty member may be a co-investigator on other applications to this programme. Applicants should take note that one measure used to judge the suitability of an application for an award will be the extent to which the principal investigator will be closely engaged in, and able to lead, the project.

4. How Decisions Are Made

Applications will be reviewed by a committee comprised of researchers from **SHARC**NET institutions and **SHARC**NET technical programming staff, chaired by the Scientific Director. The committee will be constituted to ensure that its members have a broad appreciation of the impact and potential of HPC in a variety of disciplines.

The committee will take into account how well the application satisfies the selection criteria detailed earlier as well as comments from any external reviewers.

Ranking Criteria

Proposals will be judged on the degree to which they meet the programme objectives described in sections 1 and 2, and in the subsections “Project Description” and “Supporting Information” of section 3.

Announcement

Applicants will be notified by email within 3-4 weeks of the submission deadline whether or not they have been successful.

Feedback on Applications

Upon request, applicants will receive brief comments on their application that will summarize the reasons for the committee’s decision.