



National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230

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NSF 10-025

Dear Colleague:

The Office of Cyberinfrastructure (OCI) and the Office of International Science and Engineering (OISE) announce a new G8 Research Councils Initiative on Multilateral Research, ***Interdisciplinary Program on Application Software towards Exascale Computing for Global Scale Issues***. Through a pilot collaboration, the U.S. National Science Foundation, the Canadian National Sciences and Engineering Research Council (NSERC), the French Agence Nationale de la Recherche (ANR), the German Deutsche Forschungsgemeinschaft (DFG), the Japan Society for the Promotion of Science (JSPS), the Russian Foundation for Basic Research (RFBR), and the United Kingdom Research Councils (RC-UK)¹, will support on a competitive basis, collaborative research projects that are comprised of researchers from at least three of the partner countries. Proposals will be jointly reviewed by the participating funding organizations and successful projects are expected to demonstrate added value through multilateral collaboration. Support for U.S.-based researchers will be provided through awards made by the National Science Foundation.

The Deutsche Forschungsgemeinschaft (DFG) will serve as the Call Secretariat and will maintain the official website at www.dfg.de/g8-initiative. Information specific to U.S. researchers will be posted at www.nsf.gov/od/oise/g8initiative/

Program Synopsis

Interdisciplinary Program on Application Software towards Exascale Computing for Global Scale Issues²

Simulation supported by high performance computing infrastructures has become the third pillar of science complementary to experimentation and modelling. Major challenges of the 21st century such as climate change, energy, water, environment, or natural disasters can be addressed by high performance numerical and symbolic simulations that are both data and computer intensive. Computing resources required for these simulations, including improved model resolution, model physics, data analysis and visualization, will reach the exascale (10^{18} operations per second) level by 2020. However, taking full advantage of these resources for global scale scientific challenges will rely on application software featuring fundamentally new algorithms and data structures capable of exploiting the massive parallelism underlying future exascale level computing.

This international program aims at supporting collaborations between experts in research areas related to these global challenges and developers of future exascale platforms, so that they address together the relevant needs of the research community during the early design stages of

¹ Italy will not be participating in this call for proposals.

² The programme acknowledges a preliminary study of application needs and of the matching computing technologies, which was conducted through a series of international workshops (www.exascale.org) held in 2009, gathering an international community of software specialists, application specialists and funding agencies to lay the groundwork for an international activity on exascale development.

emerging new computing systems.

Not only will such collaborations bring together global networks of experts on global topics, they will ensure the rapid and efficient application of new tools as they become available. Proposals for multilateral collaborations should therefore define milestones which can be seen as initial steps ultimately leading to the exascale capabilities. They are expected to focus on fundamental research and application issues that will address short-, intermediate-, and long-term goals, corresponding to (approximately) 10 petaflops in 2013, 100 petaflops in 2016 and 1 exaflop in 2019.

The program will support interdisciplinary projects targeting the exploration and development of open source algorithms and data operations that are resilient, sustainable and scalable to exascale for application solutions to socially relevant global scale issues. It is only through the close cooperation of scientific researchers working on global scale issues and by including computing, social and human factor scientists where appropriate, that future high performance computing systems can successfully be applied to tackle essential challenges for mankind in the 21st century.

Schedule

Preliminary Proposal Due Date to the Call Secretariat	7 May 2010
Notification for Submission of Full Proposals	28 June 2010
Full Proposals Due Date to Call Secretariat and NSF	25 August 2010
Official Funding Decisions/Award	February 2011

Funding Principles

Within each selected consortium, funding of the participating researchers is provided by their respective national funding organization in accordance with their standard award terms and conditions. Funding is meant for collaborative research, which may include clearly justified travel and workshops. The total budget for this call is approximately 10 million € over three years. Funding can be provided for projects lasting for two or three years and it is anticipated that 8-10 research consortia will be funded in this call. NSF anticipates making awards at a level of approximately \$150,000 per award per year, pending the availability of funds. It is anticipated that awards will be made by February 2011.

Eligibility

Each consortium must include at least three partner countries with at least one academic Principal Investigator (PI) from each country in the consortium. Each PI/Co-PI must be from one of the seven partner countries. A proposal may not include researchers from non-partner countries. Consortium partners should identify a Leading Principal Investigator (LPI) for each proposal for application, management and communication purposes. The Leading PI is officially responsible for all communications with the Call Secretariat, including the submission of the Preliminary Proposal and, if encouraged to do so, submission of the Full Proposal.

For this call, NSF eligibility is limited to academic institutions³.

³ **Universities and Colleges** - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions. NSF Grant Proposal Guide (GPG) NSF 10-1 January 2010

Evaluation Criteria

A successful proposal combines significant contributions of scientists from the partner countries and must show an interdisciplinary approach in addressing problems and goals within the scope of the described call theme. The proposal should conform to program aims and designated research fields. Proposals will be evaluated in accordance with the NSF review criteria of Intellectual Merit and Broader Impacts, with special emphasis on:

- Scientific quality and innovativeness of the joint research plan
- Sound project management, methodological approach, feasibility and appropriateness of the joint research plan
- Added value to be expected from the research collaboration
- Balanced cooperation
- Competence and expertise of teams and complementarities of consortium (interdisciplinary / inclusion of all necessary expertises)
- Appropriateness of resources and funding requested
- Expected impacts: e.g. scientific, technological, economic, societal
- Opportunities for early career researchers

Full proposals will be reviewed by *ad hoc* peer review and panel.

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