



National Science Foundation
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NSF 11-068

Dear Colleague Letter: G8 Multilateral Funding Initiative "Interdisciplinary Program on Material Efficiency - A first step towards sustainable manufacturing"

June 30, 2011

The Directorate for Engineering and the Office of International Science and Engineering announce a new G8 Research Councils Initiative on Multilateral Research, "*Interdisciplinary Program on Material Efficiency - A first step towards sustainable manufacturing.*" 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 Japan Society for the Promotion of Science will serve as the Call Secretariat and will maintain the official website at <http://www.jsps.go.jp/j-bottom/g8-initiative.html>. Information specific to U.S. researchers will be posted at <http://www.nsf.gov/od/oise/g8initiative/>

Program Synopsis: Interdisciplinary Program on Material Efficiency - A first step towards sustainable manufacturing

For most materials used to manufacture equipment and products, global stocks are still sufficient to meet anticipated demand, but the environmental impacts of materials production and processing, particularly those related to energy, are rapidly becoming critical. These impacts can be ameliorated to some extent by the ongoing pursuit of efficiencies within existing processes, but demand is anticipated to double in the next 40 years, and this will lead to an unacceptable increase in overall impacts unless the total requirement for material production and processing is reduced.

Material efficiency forms part of the suite of philosophies towards sustainability and any proposal should give consideration to how the research undertaken will have wider impact in the long term on this agenda.

This Call aims to support collaborations between experts in research areas related to the global challenge of materials efficiency to address one or more of seven potential strategies for reducing material demand through material efficiency:

- longer-lasting products;
- modularisation and remanufacturing;
- component re-use and re-cycle;
- designing products with less material;
- rethinking products and their use;
- redesigning the manufacturing processes;
- replacement of scarce and expensive elements, notably those critical for energy applications.

The Call will support interdisciplinary projects with the potential of creating a step change in the approach taken towards the sustainable use of material resources and the contribution and impact that this will have upon the wider cradle-to-cradle design and manufacturing principles.

The Call includes within its scope the entirety of the industrial system - from material extraction, through supply chains, logistics, manufacturing, and distribution - and recognizes the global nature of that system. Proposals are expected to show how they address this global approach in a synergistic way and to justify the need for the international collaboration proposed. The Call emphasizes *the potential future role of manufacturing in supporting a sustainable global economy*, and encompasses all parts of the materials hierarchy.

The collaborative and interdisciplinary nature of the Call is expected to encourage proposals that bring different sets of knowledge together in a concerted effort toward solving a problem. Proposals that focus on basic materials science or current manufacturing processes in isolation are unlikely to meet the requirements.

The Call emphasizes the systemic nature of material efficiency and seeks proposals that show awareness of system interactions, and propose novel approaches to influencing the system. In particular,

- Each proposal must firstly position itself within the larger global material system and demonstrate that the scope of the research (what is included in the proposal and what is left outside) is
 - Clear
 - Logical and coherent (in that it does not create an unrealistic simplification - e.g. tackling a material recycling problem that assumes that the waste stream will return from end users in a clean and homogeneous state, an assumption that is not supported by our knowledge of current or future predicted practice)
 - Of significant global scale of impact (show that solving the problem is worthwhile)
- Each proposal must secondly demonstrate its contribution to improved materials efficiency
 - In the synergism made possible by the multi-disciplinary skills held by the team
 - By explaining the relationship between the proposed research and its impact on sustainability of the materials system

SCHEDULE

Preliminary Proposal Due Date to the Call Secretariat September 30, 2011

Notification for Submission of Full Proposals November 21, 2011

Full Proposal Due Date to Call Secretariat and NSF January 27, 2012

Official Funding Decisions/Award May 2012

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 (euro) 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 May 2012.

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. Proposals may include researchers from non-partner countries but they are responsible for providing their own funding. Consortium partners should identify a Leading Principal Investigator (LPI) for each proposal for application, management and communication purposes. The LPI is officially responsible for all communications with the Call Secretariat, including the submission of the Preliminary Proposal and, if invited to do so, submission of the Full Proposal.

For this call, NSF eligibility is limited to academic institutions².

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:

1. Quality/Intellectual Merit

- *Scientific quality and innovativeness of the joint research plan*
- *Added value to be expected from the research collaboration*

How well does the activity advance knowledge and understanding within its own field or across different fields?

Does the proposal contribute to scientific excellence and significant progress toward the state of the art?

To what extent does the proposed activity suggest and explore creative, original concepts?

If these partnerships were in place already what does this new funding allow them to do that they could not do otherwise?

What is the added value of the international cooperation?

2. Societal/Broader Impacts

- *Expected impacts: e.g. scientific, technological, economic, societal*
- *Opportunities for early career researchers*

What may be the benefits of the proposed activity to society?

To what extent will it enhance infrastructure/capabilities for research and education, such as training, learning, networking and partnerships?

Does the project involve early career researchers?

Does the research collaboration focus on global challenges for which solutions can only be achieved by global scientific approaches?

3. Personnel/Quality of the Consortium

- *Competence and expertise of team and complementarities of consortium (inter-disciplinary / inclusion of all necessary expertise)*

How well qualified are the proposers (Leading Principal Investigator and team) in terms of knowledge, expertise and experience to conduct the project?

What is the quality of previous work in terms of past or potential contributions to, and impact on the proposed and other areas of research?

Is the Leading Principal Investigator team (including any identified Co-Principal Investigators) able to lead the project, e.g. having strong management and leadership skills, or having complementarity of expertise and synergy of the members of the team?

4. Resources and Management

- *Appropriateness of resources and funding requested*
- *Balanced cooperation*

How well conceived and organized is the proposed activity?

Is there an operational plan with well defined milestones in place?

Is the coordination plan adequate?

Is there sufficient access to resources?

Are the requested investments well justified and relevant?

Are the scientific and financial contributions of the partners from each country well balanced?

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

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

²**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 11-1](#) January 2011