

Request for Proposals

Creating Visions for Computing Research

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INTRODUCTION

The Computing Community Consortium (CCC) solicits proposals that will galvanize the community to define a vision and agenda for exciting frontiers of computing research. Successful projects will articulate and mobilize community support for a research vision, with the intention of generating support from funding agencies. Proposals are encouraged across the full spectrum of work in the creation and application of information technologies to important challenges, from the theoretical to the practical. Awards can range from \$10,000 to \$200,000. Proposals may be submitted at any time; they will be reviewed on at least a quarterly basis in January, April, July, and October.

BACKGROUND

The CCC was created by the Computing Research Association (CRA) in 2006 to catalyze the computing research community to debate more audacious research challenges; to build consensus around major, long-term research directions; to articulate research agendas; to evolve the most promising visions toward clearly defined initiatives; and to work with funding organizations to move those initiatives toward funded programs. The CCC is funded under a cooperative agreement from the National Science Foundation (NSF).

A major objective of the CCC's efforts is to increase funding support for computing research, especially through the creation of initiatives that trigger the interest of policymakers concerned about national needs. An example of a broad initiative is the NSF Information Technology Research (ITR) program in the first half of this decade, but initiatives can be more narrowly focused on particular topics such as cyber security or networking innovations. Initiatives can involve multiple disciplines, an approach exemplified by the new NSF program on Cyber-enabled Discovery and Innovation (CDI), but they can also be focused on thematic areas within existing programs. Such initiatives are typically stimulated by the research community itself or by other groups that recognize the importance of computing research to the nation's interests. The efforts of the President's Information Technology Advisory Committee (PITAC) led to the ITR initiative, while a white paper written by a small group of theoretical computer scientists exploring application of computing theory as a lens on the sciences led to the CDI program. A key role of the CCC is to stimulate the community to take such initiatives.

The CCC has provided financial support for visioning efforts in several areas, including network science and engineering, robotics, big data computing, theoretical computer science, and cyber-physical systems. Visit <http://www.cra.org/ccc> for information on these activities.

This RFP solicits proposals for additional activities with the potential to excite the research community, grow funding for computing research, and encourage broader segments of society to participate in computing research and education. Proposals are welcome from any area of computing research.

VISIONING AS A PROCESS

The NSF in 2006 challenged the computing research community to think more broadly and to define compelling visions for computing research. The CRA took the lead in responding to NSF's request for proposals, and is now funded by the NSF to facilitate visioning activities *on behalf of* the computing research community. Ultimately, however, compelling visions start with a small number of individuals and become community-wide "grand challenges" only after an arduous, time-consuming process.

Visioning can be viewed as a process of (1) nucleation, (2) crystallization *and* broadening, (3) program formulation, (4) program realization and execution. The role of the CCC **is to facilitate nucleation, crystallization, and broadening.**

Nucleation is the formulation of the germ of a vision by a small number of people. This stage might happen at a workshop, via email, or in the halls at a conference. It occurs when a small group realizes, for example, that there is a problem that needs fixing and they have an idea how to go about it (e.g., the Internet), or that there is a technology trend that presents challenges we do not know how to meet (e.g., multi-core to many-core). The CCC encourages the nucleation of visions by providing exemplars of successful efforts and by providing seed funding that enables groups to get together, hold workshops, or otherwise develop a clear description of an interesting idea and a plan for how to develop it into a compelling vision. To be successful, those groups must include some of the leading thinkers in the field, even if they are not among the initiators. The output of the nucleation stage is a conceptual document that describes an exciting idea, demonstrates the existence of a core team committed to evolving the idea, and proposes the establishment of a study group and/or the convening of a focused set of workshops for the next stage.

Crystallization and broadening sharpens a vision through community participation, clarifying the ideas (e.g., "Terrific elevator speech, but beef up the actionable research thrusts.") and expanding them to enlarge their scope of applicability (e.g., "Great research topics, but fit them into a broader context that will sell them."). This step can take a lot of time, and it involves lots more than a single workshop. It requires broad consultation so that the elaboration of the vision consists of widely shared points of view. The CCC will fund study groups that are sustained over a period of time, or multiple workshops that involve far more people than the original nucleation group. During this stage, funding agencies and technical interest groups of professional societies must be involved to ensure broad community engagement and to start to pave a path to a funded program. Community ownership is an important outcome of this stage. The output of the stage is a document that describes a clear and compelling vision, a set of research initiatives that would, if successful, realize that vision, and an indication of the scope of the effort required to realize the vision.

Program formulation occurs when the CCC, with help from the research community, works with funding agencies to formulate specific programs. This stage serves as a handoff from the research community to the funding agencies. The goal is to develop a game plan for a funded program; it is no longer just researchers formulating ideas. One test for readiness is that there are some ongoing projects that would fit into this program if it existed. There are lots of possible paths forward during this stage, ranging from a small funded program, to coalescing and expanding existing activities, to a new effort mostly drawing on existing funding, to a major effort backed by Congressional appropriations. The role of the CCC is to help funding agencies define programs and, when appropriate, also to work with industry and foundations. The output of this stage is a concrete proposal for one or more funded research programs.

Program realization and execution occurs when a program is incorporated into the budget of one or more agencies and actual implementation of the funded research program begins.

PREPARING A PROPOSAL

A **Visioning Proposal** may be submitted by any group of individuals who are affiliated with organizations that are members of the CRA or that are eligible to be members. The proposing group is expected to have the research expertise and leadership skills that will be required to make the effort a success. A small group of people might have the germ of an idea and want to work with a larger community to try to nucleate a vision. A larger group might already have conceived of an exciting idea and desire to crystallize it into a compelling vision and possible research program by working with a broader segment of the research community—e.g., technical interest groups of professional societies—to broaden the scope of the vision and community interest in it. The outcome of a visioning project will be a conceptual description that is made available to the community for comment and possible further action.

A proposal should describe the existing or potential vision; explain the proposed activities in detail, including how the larger community will be engaged; specify the goals of the project, including how they will be assessed; and specify the expected outcomes of the visioning activities, including documents and web sites that will be produced. The length of the project description should be commensurate with the scope of the proposed activities, but not longer than six (6) pages. The project description should identify earlier reports that might be informative on the proposed visioning topic, identify how participants in the planning effort will be selected, and describe how the proposers will ensure that key people in the topic area participate. Note that we seek visions for broad research agendas for the field, not proposals that seek primarily to secure future funding for the participants.

Each proposal should also include a budget, budget justification, and biographical sketches of the personnel who are leading the visioning activity. Projects are expected to last from one to two years. Requested support can range from funding for one or two small workshops to funding for a lengthy study group. Budgets can range in size from \$10,000 to as much as \$200,000, depending on the size and scope of effort that will be supported. The PIs are expected to lead the effort on behalf of the community, so the CCC will not cover salary support for PIs. Salary support can be requested for staff to help organize and run workshops and to support the effort, but it must be well justified. Exceptions to these guidelines need to be very well justified. Budget questions should be sent to the email address below.

REVIEW PROCESS AND REVIEW CRITERIA

Proposals may be submitted at any time. The CCC Council will review them on at least a quarterly basis in January, April, July, and October. Proposals should be submitted by the first of January, April, July, or October to be reviewed during that month.

The CCC welcomes creative ideas from all segments of the computing research community. Our intent is to support all reasonable ideas that have potential. Each proposal will be reviewed on its own merits based on its potential to be a compelling vision and to engage a large segment of the research community. Larger proposals must be further along the visioning pipeline than smaller proposals, and they must have greater potential.

Proposals should be submitted by email to CCCRFP@cra.org as an attachment in PDF, Postscript, or Word. Questions about this RFP should also be sent to CCCRFP@cra.org. A copy of this RFP and additional information as it becomes available (such as a FAQ) can be found at <http://www.cra.org/ccc/rfp>.

This RFP will remain in effect at least until the July 2009 review cycle.

DELIVERABLES FOR FUNDED PROJECTS

Each funded project is expected to produce a set of “deliverables” that will be put on a CRA-managed web site for the project. These items are listed below, together with the people responsible for each task. One CCC Council member will serve as liaison to each project and workshop to facilitate communication and to ensure that items are produced in a timely fashion.

Overall Project

- Broad, one-page vision statement for this project due one week after the project is funded (lead PI on the project)
- Supplemental funding requests, if required (project leaders)
- Final report within one month of completion of the project (lead PI)

Each Workshop

- Vision for the workshop and tentative dates (workshop leader or project leaders)
- Work out workshop logistics (workshop leader and CRA staff)
- Call for participation giving dates and location (produced by workshop leader; approved by CCC liaison)
- Posting for CCC blog highlighting call for participation (workshop leader)
- List of participants (provided by workshop leader right after the workshop is held)
- Workshop highlights; one page summary of key findings of the workshop (provided by workshop leader soon after the workshop is held)
- Workshop report; provided by workshop organizing committee in a timely fashion after the conclusion of the workshop