Computing Community Consortium
Response to the Reverse Site Visit Review Panel Report

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on behalf of the Computing Community Consortium

Version 8, March 27 2010

We thank the Review Panel for the effort they have invested in assessing the Computing Community Consortium.

We are delighted with their conclusion (pages 7 and 8 of the report):

> "The CCC provides vital national functions. It successfully helps policy-makers understand the role of computing research in progressing important societal issues. It helps develop new leaders in the computing research community. It accelerates the pace of the computing and information sciences by convening appropriate internal communities and encouraging them to set appropriately ambitious goals. The reviewers note the success of the CCC white papers, the huge interest in the Computing Innovation Fellows program from both faculty members and applicants, and the CCC's close and useful connections with the National Science Foundation …

> "The unanimous consensus of the panel is that the CCC is an excellent project that has huge potential payoff not only to the computing research community but to all of science. It recommends the NSF should continue to fund the project at the requested level through year 4. Done well, the benefits of the CCC are likely to extend into the foreseeable future."

All aspects of the review process were extremely beneficial – in honing our own thinking, and in allowing us to benefit from the thinking of other leaders of the computing research community.

We embrace all aspects of the report and its recommendations, with the sole exception of comments related to "prioritization" and "grand challenges" – specifically, the first and third paragraphs on page 2 of the report, and the first sentence of recommendation 2 on page 7. Otherwise, our philosophy, activities, and plans are nicely aligned with the findings and recommendations of the report.

Why a Computing Community Consortium?

In the mid-2000's, NSF CISE leaders and computing research community leaders had similar deep concerns:

–   The federal commitment to research in general, and to computing research in particular.
–   Public and policymaker perception that computer science was "yesterday's news."
–   Failure to articulate and coalesce around exciting research visions in computer science – research visions that would galvanize the public, policymakers, researchers, and students.

–   The need to groom leadership for the field.
–   A decrease in student interest.
–   The direction of the GENI initiative.

These concerns led to increased NSF CISE and computing research community focus on these issues, a solicitation from NSF CISE to establish a Computing Community Consortium, and an eager response by a group of computing research community leaders under the auspices of the Computing Research Association. Today's Computing Community Consortium is the result.

The CCC is a catalyst and "proxy organization" for the computing research community. Its mission is to make computing research more visionary, more impactful, and more powerful. In doing so, the CCC pursues seven specific goals:

–   Establish the CCC as a widely accepted catalyst and voice.
–   Bring the computing research community together to envision our future research needs and thrusts.
–   Communicate these challenges, needs and thrusts to the broader national community.
–   Create within the computing research community more audacious thinking.
–   See the ideas developed in (1) and (3) turned into funded research programs.
–   Increase the excitement within computing research and use that excitement to attract students.
–   Inculcate values of leadership and service.

The accomplishments and vision of the Computing Community Consortium are best described in two documents: a "Self-Assessment and Annual Report" prepared in July 2009 (http://www.cra.org/ccc/docs/CCC_Self_Assessment_AR_09.pdf), and a presentation prepared for the Review Panel in February 2010 (http://www.cra.org/ccc/docs/CCC_Self_Assessment_AR_09.pdf).

Takeaways from the review process

We continue to be guided by the seven goals listed above and enunciated in our original Strategic Plan (http://www.cra.org/ccc/docs/CCC_Strategic_Plan_V9.pdf). Our near-term plans are as described in our most recent annual Implementation Plan (http://www.cra.org/ccc/docs/CCC_Implementation_Plan_V3.pdf).

In our presentation to the Review Panel, we highlighted a specific set of actions for the near-term future, including:

–   Drive forward the formal assessment of CCC and CIFellows.
–   Assimilate Erwin Gianchandani as a full-time staff Director.
–   Formalize and budget the Vice Chair position.
–   Take advantage of Peter Lee and Regina Dugan to re-build the community's relationship with DARPA.
–   Establish the role of computing research in biomedicine and health care; strengthen ties to NIH/HHS.

- Establish the role of computing research in the nation's energy future; strengthen ties to DoE.
- Identify younger thought leaders and recruit them to the CCC Council and other CCC activities.
- Provide more comprehensive guidance and follow-through for community visioning exercises.
- Increase focus on dissemination/communication.

From our discussions with the Review Panel, we took away the following additional actions:

- Take great care with the external evaluation being handled by SRI to ensure that it correctly measures what is important rather than what is easy to count. Also, recognize that the assessment represents an opportunity to shape the community's view of CCC – the survey must be "aspirational." Some responsible Council member must be a very active liaison to SRI in this process – we cannot let them run open-loop.
- One way to increase agency understanding of the importance of computing to their missions is by working to get computing researchers onto their many advisory committees. We should take this on.
- Strive towards the articulation of truly innovative/far out/audacious research goals through a variety of mechanisms:
  - Encourage leading conferences to run "far-out ideas" sessions. The leaders of these sessions should produce "highlight" documents that CCC disseminates.
  - Encourage major subfields to emulate the database community, in periodically enumerating "five topics about which enough papers have been written" and "five topics about which we should see more papers." Again, CCC should disseminate these.
- Work to disseminate appropriate CCC materials (for example, the Library of Congress Symposium) to undergraduates. Use ACM's student chapters as a dissemination mechanism. (Must discuss with ACM leadership.)
- Develop a *process* for getting traction for the results of the visioning exercises. And then we need to execute on that process. We have formalized the process of getting written materials produced, but not the process of translating these into action. (Three visioning exercise leads participated in the review; discussions with them prior to and during the review highlighted our inconsistent record here.)
- Extract lessons learned in order to figure out what makes visioning activities successful (or not). Robotics would be a good place to start.

The Review Panel report contained seven explicit Recommendations, which we embrace (with one exception). In short-phrase form these Recommendations are:

- Focus on connections.
- "Blue Book" (the exception – discussed below).
- Seek cross-agency funding for CCC.
- Take advantage of the SRI evaluation. Request separate reports for the CCC and CIFellows.
- Translate visioning into crisp funded research agendas.
- Don't forget to bring along the needed basic research.
- Groom the next set of CCC leadership.

The proposed "Blue Book"

As noted, we embrace all aspects of the report and its recommendations, with the sole exception of comments related to "prioritization" and "grand challenges" – specifically, the first and third paragraphs on page 2 of the report, and the first sentence of recommendation 2 on page 7.

We believe in the five goals stated in our original proposal and the two additional goals stated in our strategic plan (repeated on the first page of the report). We feel that these are essential, and that they are consistent with the Cooperative Agreement, which states:

> "The CCC will facilitate the development of a bold, multi-themed vision for computing research and education and will communicate that vision to a wide-range of major stakeholders."

Our role was always envisioned as that of a catalyst – we don't agree that our "original mission" was "defining grand challenges in computing," and that there has been a shift to "helping others to define challenges."

Our strategy has been "multi-themed" – as stated in the Cooperative Agreement. For example:

– We have worked to establish the essential role of computing research in achieving national priorities, in areas such as health care, energy, transportation, education, and cybersecurity. This involves work in both directions – communicating the role of computing research to the policymakers spearheading these national initiatives, and communicating the opportunities for fundamental research in computing to those in the field. Are these "grand challenges in computing"? If so, then maybe we're in violent agreement (except for the idea of the "blue book").

– We have worked to define research agendas in major branches of computing such as network science and engineering, cyber-physical systems, robotics, and global development. (We have also defined research agendas in many of the areas noted in the previous paragraph, but those are less "core" themes for the field.)

– We have embraced a diversity of approaches: some topics initiated by CCC Council members themselves, some initiated by policymakers or funding agencies, and some initiated by members of the research community. This diversity seems important.

– We believe in "letting 1000 flowers bloom," as long as none of the flowers are weeds. One of the hallmarks of our field has been innovation – major new directions arising as byproducts of research in other topics. It is important to maintain the flexibility that has enabled those efforts to flourish.

We do not feel that the field would be well served were we to "issue a 'blue book' on the grand challenges in computer science." There are several reasons for this:

– Because the role of computing is ever-expanding and ever-evolving, we believe in an ever-expanding and ever-evolving set of "grand challenges." The publication of a "Blue Book" is antithetical to this – it represents some sort of "closure."

– We do not believe that the computing research field needs to have priorities asserted. Our field does not – by and large – rely on very large instruments to do our work, which tend to drive prioritization in other fields. The importance of information technology continues to grow in our society. We see no reason to prioritize among health care, energy, transportation, and cybersecurity, even if we knew how to do it. Our future is bounded only by the number of great ideas.

– Any attempt to produce a "book of grand challenges" is doomed to be highly contentious (due to the inclusions and exclusions), and the result is probably doomed to be ineffective (because such a document will not respond to the priorities of the times, and because compromise / accommodation will dilute the message). Moreover, the ill will that we would engender by alienating segments of the research community through our prioritizations might well undermine the other roles that the CCC serves. CCC would no longer be seen to represent the entire community, it would have difficulty recruiting experts to provide quick-turnaround guidance and feedback to government agencies that we seek to aid, and it would have difficulty empowering younger folks and helping them grow to become leaders if associating with CCC could be seen as an act of betrayal against some specific disciplines that are not being accorded "high priority" by the "blue book."

Obviously, we believe wholeheartedly in "communication." We just don't think that a "blue book" of "grand challenges in computing" is the way to go about this.

Summary

Once again, we thank the Review Panel for the effort they have invested in assessing the Computing Community Consortium. We are delighted with their conclusion.

Our quest is an exciting, essential, and extremely high leverage one: to align computing research with a number of pressing national priorities, to advance additional high-excitement computing research topics, to empower many members of the computing research community to advance compelling visions, and to facilitate the translation of those visions into funded programs.