

Computing Community Consortium

Reverse Site Visit held on June 17-18, 2014

Review Panel Report

Introduction

Over the last two years, the Computing Community Consortium (CCC) has undertaken major steps to transition from what can be described as a “*startup operating mode*,” an operation that depends critically on the vision and connections of its founding leadership team, to a “*stable operating mode*,” an operation that leverages a broad and deep engagement with the computing research community. To a large extent, CCC has been successful in this transition: bringing on board a stellar group of leaders, broadening its CCC Council membership, and developing a well-thought-out leadership training and succession plan.

Transitioning from a startup to a stable mode of operation also requires other changes to ensure that the CCC is recognized by the research community, funding agencies, and industry as a major conduit for the articulation and development of compelling research visions that are aligned with national challenges and opportunities. Securing such recognition is a tall order given the significant and arguably unique breadth and depth of “computing”. Towards that important goal, this report includes a number of recommendations about suggested changes that we think the CCC should consider. These recommendations should be taken in the context of the panel’s strong belief in the continuing importance of the CCC’s mission, the panel’s admiration of the CCC’s successes, and the panel’s hope that the CCC will expand its reach even further.

CCC Goals, Strategies and Priorities

The CCC is an incredibly valuable resource for the computing community and is already carrying out activities that support its mission to “*catalyze the computing research community and enable the pursuit of innovative, high-impact research*.” While the CCC has demonstrated exceptional successes by its nimbleness in reaction to immediate needs and developing opportunities, the committee noted the need for a more proactive, deliberate, and purposeful (as opposed to reactive) approach to ensure continued and increased impact moving forward.

To this end, the CCC’s strategic goals need to be succinct, and the processes to prioritize and achieve these goals should be well documented and institutionalized in order to guide intentional and transparent decision-making and operations.

Specifically, the panel offers the following recommendations:

- (1) Develop and publicize a more concise strategic plan focused on specific goals and strategies intended to support the mission of the CCC.**

The CCC should revise its Strategic Plan to be clear and concise, with specific objectives that can effectively guide the selection of activities, metrics, and assessment instruments. While the history and examples in the current strategic plan are interesting and useful, we feel they are out of place in a strategic plan and make it hard for a reader to focus on the goals and strategies. (They would be valuable in a retrospective report, for example.)

(2) Articulate and maintain a well-thought-out implementation/execution plan to institutionalize and guide CCC's operational, decision-making, and evaluation processes.

The CCC should develop an Implementation Plan, as specified in the Cooperative Agreement, consistent with and tied to the Strategic Plan. The Implementation Plan should contain a top-down integration of goals, activities, outcomes, metrics, and assessment. It should spell out decision-making processes as they relate to choice of activities and the nomination and selection of council members. Also, it should spell out expectations of various stakeholders, criteria and metrics for evaluation of proposed/completed activities, mechanisms for solicitation of community feedback, and communications. This will serve as a guide to present and future Council members; and equally importantly, it will foster transparency and help the computing community and others understand the purpose, operation, and value of the CCC.

(3) Align the evaluation criteria and metrics of CCC activities with its mission and goals.

Ensuring that the evaluation, prioritization, and assessment of CCC activities, events, and/or other initiatives are aligned with the mission of the CCC as well as the articulated strategic and implementation plans of the CCC will serve to reinforce the community's understanding of the role and value of the CCC.

CCC Leadership and Succession Plan

The CCC (and the CRA as its hosting organization) addressed the challenge of transitioning from "startup" to "stable" operation by establishing an organizational structure and identifying members of this structure for the period from 2014 to 2016. This period encompasses a one-year transition phase followed by the first two years under the envisioned "steady-state" organization structure. The CCC organizational structure consists of two bodies: the council (the CCC Chair, the CCC Vice-Chair and 18 members, each for at most two consecutive 3-year terms) and the executive committee. The executive committee consists of the CCC chair, CCC vice-chair, CCC director, three at-large members chosen amongst the council members and the CRA executive director. In the context of this organizational structure, the succession plan consists of having the Vice-Chair become the Chair after two years, having a new Vice-Chair chosen by the previous Chair, Vice-Chair and CCC Director (with broad confidential consultation). In the Executive Committee, three at-large members are chosen for 1-year terms by the CCC Chair, Vice-chair and Director.

The panel unanimously felt that leadership and succession plan are largely reasonable and offer a good balance of continuity and renewal of CCC leadership. It is also reasonable to expect that adjustments to this plan are likely to be necessary depending on the "realities" on the ground, and the panel felt that the CCC knows how to effectively manage these adjustments.

One area of concern is the absence of clearly stated expectations for the Council members' roles and duties which might lead to inconsistent levels of contribution by these members and reduced CCC capacity. The panel felt that the senior leadership is experienced enough to manage potential problems due to non-responsive members and that the term-limited membership in the Council will partly mitigate the negative impact of any low-performing members. That said, the panel believes that setting expectations has many other "positive" effects. Along these lines, the panel offers the following recommendation.

(4) Develop a clear, written statement of expectations of Council members that exemplifies the various ways in which council members could/should support the CCC mission and activities.

Articulation of “what it takes to be, and what it is expected of” a CCC council member will go a long way not only in the identification and selection of the right candidates for council membership, but also in justifying renewal of membership, which should be premised on meeting, or exceeding these expectations. More importantly, this will help the CCC express (and communicate with the community) the various capacities in which Council members contribute to its mission. Having a more explicit set of assigned roles and best practices will also contribute to the operational effectiveness of the Council.

CCC Branding and Communication

Issues of effective communication with various stakeholders came up in a number of ways throughout the panel deliberations and discussions, especially as it relates to how the CCC is perceived and how its identity is branded. The CCC identity (and how the research community perceives it) is defined more or less by how the CCC projects itself and its activities through various communication channels. The overall sense was that there is room for much needed improvement on a number of dimensions, namely:

- Defining and nurturing a CCC brand identity that leverages but is not subsumed by the CRA brand;
- Exploring and leveraging different channels of communication, and recognizing that the various targets of CCC communication may require the use of different venues and possibly combinations of venues;
- Communicating not only messages related to initiatives and activities, but also those related to operational, decision-making, and performance evaluation processes and outcomes; and
- Ensuring that two-way communication channels are open by providing the means for the community to provide public feedback.

Tackling these four aspects of branding and communication will take time, but the panel feels that recognizing and prioritizing the need to make progress on these fronts is necessary.

(5) Develop a more purposeful communication strategy and should consider the impact of that strategy on the identity and perception of the “CCC Brand”.

The CCC should consider what level of engagement to aim for, choose the appropriate medium for engagement, accordingly, and devise means to evaluate communication effectiveness on an ongoing basis. Along these lines, the remainder of this section provides suggestions that the CCC leadership might want to consider.

The panel felt that the CCC web presence and communication channels should reflect the multi-faceted ways in which the CCC may want to present itself to its many constituents – e.g., CISE versus non-CISE researchers, academia versus industry, researchers versus research administrators, senior versus junior versus future faculty, etc. A key consideration is the extent to which the CCC may want to keep a distinct identity from that of the CRA. Specifically, the panel believes strongly that CRA is the right “home” for the CCC, but also believes that within that home, the CCC should strive to develop and maintain a distinct

identity that appeals to constituents who may not have a natural affinity to CRA (e.g., non-CISE researchers, non-IT industries), or constituents who may perceive CRA as representing more of the administrative aspects of computing research and education, as opposed to development of specific research visions/thrusts (i.e., chair and director roles versus research-active roles).

The panel felt that CCC should distinguish between communication for the purpose of engaging the community in its activities, and communication meant to make transparent the operational processes of the CCC as an organization. For the former (e.g., report from a visioning workshop), the focus should be on ensuring that the message reaches its target audience. For the latter (e.g., activities or responsibilities of council members as points of contact for various roles), the focus should be on completeness and ease of access. Clearly, depending on the nature of communication, the venue must be carefully selected. For example, a short article or a regular column in CACM might be much more effective for the former, whereas a CRA-hosted blog or web portal is preferable for the latter.

The panel noted that evaluation of communication strategies is very important, but felt that the simple metrics presented were not sufficiently convincing or informative. For example, the identification of the top 10 CCC blog posts, while interesting, sheds little light as to who accessed these blog posts and why they accessed them. Simple metrics related to frequency of access can also be misleading, since they need to be correlated with the size of the community – a post on a cool technology may get a very different reaction from a report on an elaborate multidisciplinary new endeavor or a narrow basic research result. Also, the panel noted the importance of using a multi-pronged approach to effective communication – for example by cultivating/using the social network of existing researchers (e.g., through Twitter feeds or Linked-in groups) as “amplifiers” for CCC messages.

CCC Organizational Structure and Processes

The CCC’s organization is designed to reflect its mission, which can be summarized as catalyzing and strengthening the computing research community, helping the community to articulate compelling research visions, and aligning those visions with pressing national and global challenges. The CCC also aims for proactive, rapid response; a community-based approach; and to serve as a leadership incubator. An earlier RSV review panel had recommended that the CCC modify and formalize its organization, primarily with the goal of ensuring a smooth succession plan. We have thus reviewed this new, modified organization.

This new organizational structure has only been in place for about a half year. As such, the panel feels that it is too early to draw definitive conclusions about its success. Nevertheless, the panel was unanimous in underscoring the view that the CCC has done a very good job in establishing the succession plan, and that the current CCC organization appears to be well-suited to its mission.

The panel identified a few areas in which there may be possibilities for improvement, and we encourage the CCC Executive Committee to think about how they might try to accomplish them. First, we start with the panelists understanding of the CCC structure as gathered from reading the various documents supplied, and also from the briefing and interactions with CCC leadership.

- *CCC Chair, Vice Chair, and Executive Committee:* The Chair and Vice Chair serve for a two-year, synchronized term, with the Vice Chair becoming the presumptive Chair after that term. They are supported by an Executive Committee (ExComm) drawn

from the broader Council and from the CRA's staff members (CCC Director and CRA Executive Director). The Executive Committee consists of Chair, Vice Chair, 3 Council members for one-year terms (which may be renewed), and the CRA personnel.

- *CCC Council:* Roughly 20 members (including the Chair and Vice Chair) serve 3-year terms, staggered so that one-third of the membership is turned over each year. A member's term can be renewed once, unless that member becomes Vice Chair or Chair. Council members are expected to be very actively engaged in the CCC's activities (e.g., shepherding workshops), and serve as an opportunity for leadership development and inculcation of a broad community perspective. The Council meets three times per year face to face, with biweekly teleconferences.
- *CRA-supplied personnel:* The CRA supports the CCC by supplying some effort by the CRA Executive Director, the CRA Director of Government Affairs, and other support staff. The CCC Director and Program Associate, although technically employed by and budgeted through the CRA, are funded by CCC and supervised by the CCC Chair and CRA Executive Director. These personnel provide the day-to-day management of CCC activities such as keeping track of actions and providing follow-through, making workshop arrangements, finding government agencies that might be interested in new workshops, etc.

The panel notes that the above organization could be improved as it relates to the selection of Council and Executive Committee members, and the administrative/management roles of CCC versus CRA personnel.

First, the current processes used for the nomination and selection of the Council's Executive Committee do not appear to be documented. This lack of transparency may cause some to question how open the CCC is to new members. Section 7 of the CCC's Cooperative Agreement with the NSF specifies that the CCC document plans and processes for the Executive Committee. In reviewing all the materials provided, the panel did not find any evidence of such a document.

(6) Document the current processes used for nominations and selections for the Council and Executive Committee, make these documents publicly available, and update them as needed.

Second, our understanding is that the process for selecting executive committee members is still somewhat inward-looking. As we understand it, the community provides nominations for potential Council members, with the selections then made by a committee consisting of the Vice Chair and some non-executive-committee members. The Executive Committee is selected from the Council members, with this selection performed by the Chair, Vice Chair, and Director. There are many good reasons for this type of selection process, including careful selection for potential leadership ability as well as many kinds of diversity. However, it could potentially lead to an organization that is not as open as it could be, or which is perceived as a "club."

(7) Consider ways that allow the nomination and selection process for council members to "cast a broader net" without adverse impact on CCC effectiveness.

The panel was encouraged by what it saw in the presentation: there are already some good steps in this direction – such as taking nominations from SIGs and department chairs – and further concrete steps in this direction may prove helpful: More connections with professional societies, universities, and industry may help to leverage a number of existing

organizations in this regard. Also, PIs of large NSF Frontier and Expedition awards can be seen as a cohort of active “big ideas” researchers from which the CCC might be able to identify and recruit potential candidates.

CCC Administration, Management, and Budget

The CCC appears to have developed and implemented reasonable management and administrative processes, including budget and personal. The panel saw no evidence of management deficiencies.

Looking forward, and as the CCC transitions from a startup mode of operation to a stable operating mode, the panel feels that the CCC Director must play an increasingly more central role in active outreach to government agencies, professional societies, and universities. This will be particularly crucial given that the Chair and Vice Chair can only devote a fraction of their time to CCC responsibilities (compared to the almost-full-time dedication of the CCC’s founding leadership).

While the central role and responsibilities of the CCC Director are clearly documented in the Cooperative Agreement, the panel expressed concerns that there was no evidence that the CCC Director position is evolving to assume more leadership responsibilities (as it should). A related concern that the panel discussed at some length is the extent to which the CCC Director is empowered and recognized (by the council and by the community) as an integral part of the leadership team. For this recognition to develop, the CCC Director should be afforded significant independence to work with the CCC Chair and Vice Chair in setting and executing the CCC strategy and agenda, and that the Director must be viewed in that role as a full partner.

The panel believes that a potential major hurdle along these lines is the administrative structure of the CCC as an embedded entity within the CRA. The panel could not find in the materials it was given details about staff reporting and review processes. Based on information relayed later from the CCC team as an answer to a question that came up during the Reverse Site Visit about the reporting structure of the CCC, the panel understands that “the CCC Director reports dually to the CCC Chair and the CRA Executive Director, and the CRA Executive Director oversees all CCC staff positions and conducts periodic performance reviews.”

(8) Adopt a reporting structure that reflects the singularly central role that the CCC Director must play, especially in a self-sustaining operating mode.

The panel expressed a particular concern regarding the time commitments necessary to sustain many of the CCC activities related to direct outreach and engagement by its leadership with various organizations (both on a regular basis and on demand). While the CCC founding leadership dedicated a significant commitment of time and effort in support of such activities, it is not realistic to assume that the same level of engagement can be sustained by a fraction of time/effort of the Chair and Vice Chair on an on-going basis. Thus, the panel believes that it is essential that the Director’s role be scaled up and empowered to help in similar capacities, and that it be viewed as an extension of the Chair/ Vice Chair team.

Along these lines, the panel believes that the CCC Director should report to and should be primarily reviewed by the CCC Chair (with input from other members of the CCC leadership team as well), and that other CCC staff report directly to the CCC Director, or dually to the CCC Director and to the CRA Executive Director for shared staff members.

Regarding the CCC budget request, the panel received a pie chart that provides a basic breakdown of CCC spending to date. While this is not a formal financial document, it gives a basic indication of how CCC has been spending its money. This graphic indicates that about 25% of the budget has gone to workshop support, somewhat less than 25% to paying Council members for their time, about 1/3 to CRA staff support, and the remainder to miscellany and overhead.

Based on the panel examination of the budget request and based on the CCC presentation and discussions that ensued, the panel believes that the CCC budget is adequate. In particular, budgetary issues do not seem to constrain the CCC capacity or limit its activities. The panel notes that this situation may change, in the future. For example, if the CCC develops a set of options with pros and cons related to communication strategies, it may well be that the option of recruiting a dedicated staff for professional writing and/or for managing public relations would require an increased budget, whereas the alternative option of relying on “Blue Sky” tracks at major conferences for communication purposes (an approach that the panel believes would be very effective) would not.

Overall, the panel feels that the CCC is doing an adequate job with its budget, and sees no reason to make any recommendations in this area. However, this area obviously requires constant, ongoing management and oversight as new workshops are organized, as the need for staff evolves, etc.

Coverage and Scalability of Community Engagement

Computing research is a very broad field, with innumerable sub-fields, and more fields arising all the time. The question then arises as to how the CCC will scale to gradually encompass more fields within computing research, including those that are sometimes classified as “adjacent” fields (such as signal processing).

The panel recognizes that uniform coverage of computing research broadly conceived is not only challenging, but also complicated by the need to ensure engagement of different types of institutions (public versus private, big versus small) and of different organizations (universities versus regional consortia), etc. Here it is important to note that the panel felt strongly that coverage should not be at the expense of quality of representation: The CCC should always strive to engage the best researchers and visionaries.

The CCC has been thoughtful about how they will scale accordingly as time progresses. They do not intend to expand the Council size, as a larger Council could easily become less focused, and thus ineffective. Rather they expect the set of “CCC alumni” to grow steadily over time – this group includes former Council members, CCC-sponsored post docs, researchers who organized or participated in CCC-sponsored workshops, etc. These alumni will have some familiarity with CCC goals, may have a broader community view as inculcated by CCC activities, and will serve as a growing social network. As a result, the alumni may continue to ramp up the number of visioning workshops, without the need to grow the Council. They will also contribute to broadening the set of research communities engaged with the CCC.

The panel found this to be a well-considered and interesting approach, and one that may well serve the CCC’s goals without requiring the Council to become of unmanageable size; creating and nurturing this cohort of CCC alumni is a great idea and the panel commends the CCC leadership for pursuing this approach. It will be interesting to watch this process unfold.

The panel felt that in addition to the coverage provided by the CCC council members and alumni, it may be prudent to consider complementing this cohort as recommended below.

(9) Increase community engagement and connections with existing organizations.

In addition to the current approach of looking from the CCC out to the community (by embedding representatives from the research community into the CCC), the panel suggests that the CCC consider an approach that looks to the CCC from the community (by identifying CCC liaisons or points of contact who are already embedded into existing organizations).

As one suggested mechanism (not at the exclusion of others), it may be interesting for the CCC to reach out to ACM SIGs and IEEE TCs asking for the identification of a point of contact, or ambassadors, within these organizations for dissemination of calls for workshops, reports, nominations, etc. As another example, it may be interesting for the CCC to reach out to CRA department chairs and directors asking for the identification of a CCC ambassador (preferably, junior or mid-career faculty members) who may not only serve as a conduit for CCC communications, but who may also be expected to blog about notable research ideas/projects/results/initiatives “on the ground”.

Not only would such ambassadors act as CCC “tentacles” (significantly contributing to the scalability and capacity of the CCC), but also they would contribute to addressing any perceptions of cliquishness of the CCC as an organization. Yet another advantage from having such ambassadors is that they could engage with CCC in an advisory capacity that would be much less demanding than CCC Council membership (but possibly as a mechanism for grooming future CCC Council candidates).

(10) Strive to better engage industry, computing professional organizations, and NSF program offices outside of CISE. Each one of these constituencies should provide valuable and distinct perspectives on the future research opportunities in computing.

Industrial outreach would include more interaction with industrial research laboratories as well as with development organizations. Learning about their visions and concerns should influence decisions on the most pressing research needs. Such interactions should also lead to more industrial participation in workshops and to more interactions among researchers and practitioners, helping to improve understanding about current limitations and problems and short term hurdles.

Professional organizations, such as ACM, IEEE Computer Society, SIAM, AAI, and Usenix, have established communities around different research areas and can use the communication venues and leadership structure of those communities to promote CCC activities. Not only can they help advertise and attract participants to CCC workshops, they can also advertise and help promulgate workshop results.

Computing research is becoming very interdisciplinary and, thus, the research vision should reflect these emerging, interdisciplinary opportunities. Interactions with program offices outside of CISE should help recognize some of these opportunities and the specific research communities that should be approached to discuss future engagement and planning.

CCC Activities as a Reflection of its Priorities

In reviewing CCC activities, the panel felt that these activities were all consistent with the CCC mission. In particular, the activities that the panel reviewed underscored the fact that the CCC is effectively fulfilling several useful roles for the community. They are to be

commended on this success.

- *Responsiveness to national goals:* The CCC makes a considerable effort to understand current and emerging national goals. Their CRA connection works well in this regard, and the Chair and Vice Chair appear to put considerable effort into meeting with appropriate agency staff to understand how their goals might involve computing research.
- *Workshops:* The CCC pursues a “top-down, bottom-up and sideways” approach to creating visioning workshops. That is, ideas may come from government agencies or computing research leadership (top-down), from individual researchers in the community (bottom-up), or from broadening similar efforts in adjacent research fields (sideways). In many ways the CCC acts as the “narrow waist” where research visions have the best chance of developing.
- *Reports and white papers:* The CCC is nimble enough to be very useful in writing necessary reports (NRC studies are excellent but not quick; it can take three years from start to final report). This ability to write high-quality reports very quickly leverages the CCC members’ excellent human network; often a Council member knows someone who can provide expert inputs for a given research area, even when that expertise is not explicitly represented in the current Council membership. The panel is concerned, however, by the drop from 29 white papers (in the period from 2008-2010) to two white papers (in the period from 2011 to date).
- *Ongoing community building activities in conjunction with government, professional societies, and universities:* Such activities, by necessity, are time-consuming and difficult. We note that CCC has had some success in these directions, but we are concerned that more effort is needed. As noted above, we have a particular concern that the Chair and Vice Chair can only devote a fraction of their time to CCC outreach. Thus it is essential that both the Director’s and Council’s roles in outreach continue to be encouraged and if possible increased.
- *Leadership development:* The Council members are expected to play an active role in CCC activities, and this seems like an excellent way to discover new leaders and help them develop. In addition, the CCC runs a yearly leadership development program (LISPI).

Outcomes, Metrics, and Assessment

Assessment of the CCC’s activities will benefit the program elements by providing feedback to the Council and by generating supporting evidence for a renewal proposal. That said, and as mentioned earlier in the report, the current strategic plan is weak on its articulation of goals and strategies.

The absence of an implementation/execution plan – where processes and metrics for assessment would be detailed – makes it hard to properly evaluate progress. Along these lines, the following were specific observations made by the panel.

- Each of CCC’s goals should have activities that support it, activities should have specific desired outcomes, outcomes should have clear metrics, and those outcomes should be assessed.
- Some of the assessments are shallow and should be complemented by meaningful metrics. For example, participant counts do not measure the true impact of an activity. In contrast, the CIFellows program had a well-documented short-term impact.

- Some of the CCC's activities have outcomes that may not become evident in the short term. In those cases, longer-term follow-up and assessments should be conducted when feasible. Seven years after CCC's inception, the longer-term effects of the early visioning workshops should be observable.
- Some goals may be challenging to assess, particularly the creation of a culture of audacious thinking. The CCC is encouraged to be creative in its generation of outcomes, metrics, and assessments of this goal.
- Assessment should not be onerous and should not be conducted at the expense of accomplishing the CCC mission.

Overall, the CCC provided good evidence that many of its goals are supported by specific activities. However, the desired outcomes for many CCC activities (and how to measure or evaluate these outcomes) were not clearly articulated or evident.

The panel also reviewed the reported/perceived performance of the major CCC activities summarized in the annual report and in the CCC presentations. A summary of the panel feedback on the assessment (and methodology for assessment) of these activities is provided below.

- *Workshops, including LiSPI:* The outcomes of the CCC workshops should be clearly documented. The National Robotics Initiative is one such positive example. The status of other programs that have resulted from Visioning Workshops should be documented, as should workshops that did not lead to programs. Another outcome of the workshops is the establishment of new collaborations. The impact of LiSPI beyond numbers of participants will be harder to measure. CCC is encouraged to think creatively about longer-term assessment of these impacts. As a recurring activity, workshops should become part of a continuous improvement process.
- *White Papers:* It may be an even greater challenge to document the impact of white papers. That observation notwithstanding, the drop-off in white paper production since 2012 is a concern.
- *CIFellows:* This activity is being assessed effectively. There is an opportunity to demonstrate even greater effectiveness as the early fellows who chose academic careers enter their tenure decision years.
- *Community Building:* It would benefit the CCC to have specific desired outcomes from community engagement, including industry, other federal agencies, and the broader computing community, beyond computer science. Recognizing that outreach requires the long-term relationship building, this activity cannot fall to a single individual with a two-year term.

The panel had a few concrete recommendations that it believes can be implemented during the next year regarding the above activities. If implemented, these recommendations should have a significant impact on demonstrating the "value proposition" from these activities and of the CCC's ability to fulfill its role in general.

(11) Develop a Best Practices Report for those planning or considering proposing workshops.

Such a report would help clarify possible goals of a workshop, alternative organizational workshop structures, plans for post workshop activities, and evaluation expectations. It is important that organizers realize that the impact of a workshop is of great concern and that workshop results are expected to be polished and widely publicized. In addition, organizers should be expected to engage in or support post workshop activities that promote the findings of the workshop to funding agencies and other influential entities. The panel

believes that it is a good practice to spell out such expectations and to make sure that post-workshop follow-ups are part of the workshop proposal development/selection process.

(12) Elevate the prestige of workshop reports so that they are viewed as a major contribution to the community.

The panel encourages the CCC to consider mechanisms that would make its reports viewed as significant contributions to the community (e.g., in the same way that NRC reports are viewed as influential or noteworthy) and would attribute recognition (and thus provide incentives) for authors of such reports. This would encourage the most accomplished and promising researchers to become engaged in long range planning, which in itself would greatly benefit the whole research community. These reports could be published as an on-going series in a major publication venue, such as Communications of the ACM. This would have the benefit of increasing visibility of the individual reports, as well as increasing visibility of CCC and their efforts to energize the community to engage in long range planning and community building.

(13) Engage in longer-term evaluations of the CCC activities, individually and collectively: The CCC should develop creative means to evaluate the long-term outcomes of its activities (longitudinal evaluation).

Although each workshop is distinct, there are enough similarities so that each workshop could utilize a common core of survey questions, which of course could be expanded to include workshop specific questions as well. In addition to a post workshop evaluations, follow-on evaluation should be conducted a year or two afterwards to determine the longer-term impact of a workshop. Do participants feel that a coherent future research agenda emerged from the workshop and post workshop efforts? Did the workshop lead to increased research collaborations or to new research efforts in the identified research areas? Concrete evidence such as co-authorship, grant proposals, or grant funding could be measured to determine impact.

Such evaluations, if done thoughtfully, should provide valuable feedback about best practices and the most promising ways to influence future research directions.

With an eye on the upcoming anticipated renewal of the CCC, the panel makes one additional recommendation regarding overall evaluation of the CCC going forward.

(14) Plan for an evaluation near the end of the current award, and consider making the results of this evaluation public.

An evaluation of the CCC near the end of the current award should serve both CCC and NSF very well. For CCC, it will provide it with an opportunity to solicit feedback and to make the case for new funding. For NSF, a final review would allow NSF to gauge its expectations of the role of CCC as a major voice for the computing research community, and whether alternative models might be possible to explore to complement that voice.

The panel leaves it to CCC and to the NSF the specific way in which such an evaluation is to be conducted, noting that conducting another NSF Reverse Site Visit deprives the CCC and the NSF from the opportunity to have an “open” evaluation that allows reviewers to solicit feedback directly from the community, and deprives the community from the opportunity to “see” the evaluation and develop a sense of appreciation for the value of the CCC.

Conclusion

The panel was extremely pleased with the progress of the CCC so far, and believes that as an institution the CCC is well on its way to transitioning from a startup mode to a stable operating mode: The CCC has instituted a sound leadership succession plan with a highly-capable leadership team in place, and its activities appear to have had significant impact. The panel recognizes these achievements and commends the CCC leadership for its efforts.

To fully realize its mission to serve as a widely accepted catalyst and valuable voice for the computing research community, the panel encourages the CCC leadership to consider the various recommendations presented throughout this report. These recommendations are based on the panel's review of the materials available to it as well as the reverse site visit presentation and discussions that followed.

The panel feels that it is important to conclude this report with a broader view that puts these recommendations (many of which are cross-cutting and dependent) in context. Despite its best effort, the panel recognizes that its evaluation may be based on limited understanding of various details, and thus it expects that some of its recommendations may need tweaking. That said, and independent of the specifics, the panel views its recommendations as falling into four overarching priorities for the CCC's leadership to act on.

- A. **Establish the CCC as a credible and trustworthy voice** by casting a broader network and by adopting more transparent processes for leadership identification and selection (6, 7) and by leveraging the reach and capacity of existing organizations (9, 10).
- B. **Articulate the value proposition of the CCC to the research community** by developing concise strategic and implementation plans (1, 2), informative assessment criteria and metrics (3), and longitudinal evaluation (13, 14).
- C. **Establish a compelling CCC Brand** by adopting a purposeful multi-pronged communications strategy (5) and by setting expectations of exceptional utility and significant prestige attached to CCC products (11, 12).
- D. **Ensure a sustainable and effective institutional operation** by adopting clear internal lines of communication, responsibilities, and control along with clear expectations (4, 8).

Taken together, the recommendations made in support of these priorities are meant to cement CCC's leadership role in the computing community, increasing its effectiveness and ensuring continued support by its stakeholders. And, as noted earlier, these priorities should be taken in the context of the panel's strong belief in the continuing importance of the CCC mission, its admiration of the CCC successes, and its hope that the CCC will expand its influence even further.

The panel unanimously recommends continued NSF support of the CCC, and wishes to extend its gratitude to the CCC leadership for its work on behalf of the entire computing research community.

Reverse Site Visit Panelists

- Azer Bestavros, Professor, Boston University (Chair)
- Lori Clarke, Professor, U. Massachusetts at Amherst
- Teresa Dahlberg, Professor, Cooper Union
- Chip Elliott, Director, Raytheon BBN Technologies
- Jose Fortes, Professor, University of Florida
- Michael Gennert, Professor, Worcester Polytechnic Institute
- Rebecca Wright, Professor, Rutgers University