

# **Report of the DPF Committee on DOE Comparative Reviews**

## **I. DPF Committee on DOE Comparative Reviews Timeline**

In 2011, the DOE instituted a comparative review process as recommended by the Committee of Visitors to the Office of High Energy Physics (OHEP). This process resulted in significant funding changes for many HEP university groups. Some members of the HEP community approached the DPF with concerns about the process and outcomes. As a result, at the initiation of the DPF Chair line, a committee was formed to gather information about the comparative review process, report to the community, and provide feedback and recommendations to the DOE. The committee was formed in June of 2012, and the charge and membership are listed in Appendix A. The committee began work in June, and its first task was to draft a set of questions to the DOE, shown in Appendix B. These questions were sent to DOE on July 9. The committee also set up a web page soliciting comments from the community. The web page (<http://dpfnewsletter.org/?p=792>) allowed for both public and private comments. Appendix C includes the cover letter from the web page. Most of the comments we received were private. In Section III below we report some of the specific concerns raised by members of the community.

On Aug 21 the committee had a phone conference with Glen Crawford and Alan Stone of the OHEP in which they responded to our questions. We did not receive written responses, but in this lengthy phone conference we received answers to many of our questions. On Aug 28 Marj Corcoran made an interim report to HEPAP. At this same HEPAP meeting, Alan Stone gave a presentation that contained the answers to several of our questions. The final report of the committee was submitted to DPF on November 5, 2012.

## **II. Findings**

### **(a) Review process**

The DOE review process was divided into the six areas: theory, detector R&D, accelerator R&D, and the three experimental frontier areas--Energy, Intensity, and Cosmic. The reviews were conducted separately for these areas. Except for detector R&D (which was mail-in only), the reviews were handled in two stages: mail-in reviews followed by panel reviews that met in January 2012. For the Intensity Frontier, the mail-in and panel reviewers were the same, which made the panel fairly large (16 members).

For the other areas, the mail-in and panel reviewers were different, and the panels were in general smaller. The panels ranged in size from 4-16 people.

The reviewers were asked to give a numerical score, not just to each proposal, but to each PI on each proposal. They were also asked to rank the proposals and the PIs. However, there was not a sharp cut-off applied to these scores, and for the most part the scores were tightly bunched ("grade inflation"). The panels discussed all the proposals, but they did not form a consensus, and in fact were instructed not to form a consensus. Rather, after the review was over, each panelist wrote a letter summarizing his/her views taking into account the panel discussion. This process is in contrast to the NSF practice, in which panels do reach a consensus and make specific funding suggestions.

Grants that covered more than one area were sent to more than one panel. The panels were asked to review their specific part of the proposal, although all panels had the full proposal to read. In all, only 12 out of 106 proposals were classified as "umbrella" in that they covered more than one research area. However, many more had multiple PIs in the same area.

#### (b) Outcomes

The outcomes of the reviews and funding decisions were summarized in the HEPAP reports given by Glen Crawford on March 13, 2012 (<http://science.energy.gov/hep/hepap/meetings/previous-meetings/hepap-agenda-march-2012/>), and by Alan Stone (for Glen) on Aug 28, 2012 (<http://science.energy.gov/hep/hepap/meetings/20120827>). The success rate for all PIs HEP wide was 70%. New grants (i.e. those for which the PI was not currently receiving DOE funding) had a success rate of 50%, while PIs currently receiving DOE funding had a success rate of 75%. Twenty research scientists were reviewed, and of those 11 had their funding from the research grant terminated, with a phase-out period. In some cases an individual co-PI at an institution was singled out for funding cuts, or in some cases PIs were not funded at all. In cases where the funding of a PI was terminated, students and postdocs under this PI were also terminated, although bridging funds were made available to continue to support students, postdocs and research scientists for periods up to a year. In some cases scientists who were deemed to be doing critical work for running experiments were moved from DOE research support to support from operations funds.

#### (c) Community reaction

The community (at least those who communicated with us) was surprised by the large number of research scientists who were terminated, and by the large number of PIs who either had large funding cuts or had funding terminated. In the past, changes in DOE funding levels have been gradual, so the community did not see such major changes coming. However, in spite of the surprise, the community supports the principle of a comparative review process.

### **III. Specific issues raised by the community**

There is strong support in the community for the concept of comparative reviews, as a means to overcome what is viewed by many as too much inertia in funding decisions. Despite the general support for DOE's moving to comparative reviews, there is concern in the community that the changes made this year were too abrupt, and that the transition times for those whose funding declined were too short.

Several individuals expressed concern that grants or PIs whose work spanned more than one area would not get a fair evaluation. Each panel that reviewed them would see only part of their efforts. Reviewers received the entire proposal, but reviewers were concentrating on a specific area, so they may not have read and evaluated the full proposal carefully.

Several people also expressed the sentiment that "a group is more than the sum of its parts". Singling out one PI on a grant for cuts ignores the cooperation and cross-fertilization that occurs within groups. We heard that this is particularly true for larger grants where there is activity in more than one of the panel review areas. Such umbrella grant proposals bring a degree of flexibility that is needed in an era when the scientific and funding landscape is in flux. The practice of segregating portions of such umbrella proposals into different panel reviews can undermine the assessment of the total worth of the proposal.

The committee received expressions of concern about the level of expertise within the panels and within DOE itself for evaluating theory proposals. While it is clear that every effort has been made to assure that the panels are made up of leading theorists, given the difficult choices that the comparative review process necessitates, there was some sentiment from the theory community that DOE should consider increasing the number of program officers with a background in theoretical physics research.

### **IV. Recommendations**

We give here several recommendations based on the above findings. We believe that for many of these, DOE already intends to follow the general principles underlying these recommendations; however according to the input the committee has received, we think that there could be improvement in implementation.

(a) We recommend that large funding changes not be too precipitous. Groups and PIs should be given time to adjust to the funding changes and to respond appropriately to negative reviews. People who are losing their positions should be given sufficient time to find a new position.

(b) When PIs have their funding cut, every effort should be made to ensure that graduate students previously supported by the grant suffer as little as possible. This situation should be treated very carefully on a case-by-case basis. In many situations, the supervision of students and postdocs is shared among senior PIs so that curtailing support for a PI should not necessarily result in termination of the young physicists under her/his supervision. For students within a few years of graduation, funding through the completion of their degree should be provided. For students who are just beginning their studies, funding should be provided for sufficient time for them to find new advisors and projects. Situations where students must fall back to university funds on short notice should be avoided as much as possible. DOE has made some efforts in this direction, but anecdotal indications are that in some cases students needed to be at least partially funded from departmental or other funds.

(c) DOE should solicit information from spokespersons and high-level managers of ongoing experiments as to which groups and individuals are doing critical work for the experiment. This information should be made available to the review panels. We recommend that the impact of funding changes on international commitments also be taken carefully into account. Care should be taken to ensure that loss of personnel or funds by a university group do not impede the fulfillment of any important collaboration responsibility.

(d) A research group is more than the sum of the individual parts. Treating each PI separately, and each research area separately, ignores the synergy, cooperation, and cross-fertilization that are common in the best groups. In reviews, a major consideration should be the accomplishments of the entire group, as well as individual contributions. We recommend

that DOE ask the review panel explicitly to consider this point and to evaluate the impact of each person in the context of the entire group's output.

(e) A person who splits her/his time between areas may look less effective if viewed through the lens of a single area. Some individuals make valuable contributions to the infrastructure of the group's activities. We advocate that the review process be tuned so that an evaluation of these multiple responsibilities is examined in their totality.

(f) No review process is perfect, and the consequences of error or procedural unfairness in the review process can be harsh. We recommend that the DOE develop some mechanism such as a peer-reviewed appeal process, designed to ensure that the applicant has been treated fairly and consistently in the context of a program that has limited funds.

(g) PIs should receive feedback from the review process in a timely manner, and the feedback should be as complete as possible.

(h) Care should be taken in the choice of the mail-in reviewers and review panels, so that the necessary expertise is represented. This consideration is especially important in the case of theory, which has many different areas of emphasis, possibly requiring larger review panels.

(i) To the extent allowed by DOE regulations, it would be useful for the panels to attempt to develop a collective opinion and ranking on the proposals it reviews. This collective view should not replace the current practice of requiring individual letters from panelists following the review, but the discussion of relative merits will be beneficial for program managers in making their decisions.

(j) As the overall research program of OHEP evolves, there will naturally be changing emphases of the program funding priorities. A clear statement of these changes should be made available to the community.

(k) The recommendations of mail-in reviewers and the panels, and the action taken by program managers should be documented internally and periodically reviewed by the Committee of Visitors to monitor the appropriateness of the decisions taken. The CoV review of the new method for reviewing, with its full view of advice given and decisions taken will be an important step in refining the new procedures.

## V. Broader Issues and concerns.

While the new comparative review process provided the impetus for the creation of this committee, some of the discussions of the committee and input from the community focused on other issues relevant to DOE's stewardship of the U.S. HEP program. We include a brief discussion of some of these issues here.

As noted in our Findings Section, the review process was divided into five areas: theory, detector and accelerator R&D, and the three experimental frontier areas – Energy, Intensity, and Cosmic. This reflects the way the HEP office is now organized and apparently how the HEP budget is constructed by DOE. While it is certainly true that DOE should manage the program in a way that assures strategic balance between these different areas of research, we are concerned that the boundaries between these areas, particularly the three frontier areas, have become too rigid. In reality, the boundaries between these frontiers are artificial and at best can only be roughly defined. Having separate budgets for these areas that are managed by different people may result in a balkanized, or at least compartmentalized, program. It lacks flexibility. It complicates the evaluation of the work of individuals who are active on more than one frontier. Large groups that are active on multiple frontiers are particularly concerned that this system is mismatched to the reality that they share resources and staff, often moving back and forth between activities on different frontiers quickly and seamlessly. The term "stovepiped" seems to aptly describe how the U.S. HEP program is now organized and managed within DOE. We do not believe this is progress. Needless to say, it also complicates the implementation of the comparative reviews, as indicated by some of our comments elsewhere in this report.

In short, while the Energy/Intensity/Cosmic Frontier paradigm is useful, particularly for helping to communicate the breadth of our field to other communities, it is not clear to us that it should have become the template for the HEP budget.

Another significant issue, which is not new, is how the DOE balances the funding of research groups in national laboratories with those in universities. While it was outside our purview to address the review mechanism that DOE applies to the laboratory research programs, we believe the general principle of comparative review should be applied as consistently across the field as is practical. Also, over many years a trend has been in

place that reduces the technical infrastructure in the university groups in favor of a greater concentration of such resources in the national labs. This may facilitate sharing of such resources across projects and experiments, but there are some long-term negatives that should be recognized. For instance, when less detector development, fabrication, and debugging work is done on campus, it becomes harder to give graduate students a good training experience. In addition, opportunities to involve younger undergraduates in these activities are diminished, making it harder to channel the best and brightest physics students into high energy physics.

Another issue is the increasingly bureaucratic distinction between research and operations on high-energy physics experiments. In the past it was a given that all collaborators would contribute toward the operations of their experiments and that they would also participate in the data analysis. There have always been specialists, but this sharing of activities was the norm. Over time this model has eroded to some extent, particularly on large collider experiments, but very recently there seems to be movement toward rigid boundaries between supporting the operations of these experiments and analyzing the data. Over the long-term this separation may have profoundly negative consequences for the field. It creates first and second class physicists. Naturally young physicists will be attracted toward the first class, but having little or no role in making their experiments work, they may gain only a superficial understanding of how experiments are actually done. On the other side, it will be harder to motivate good physicists to contribute to the running of experiments, leading ultimately to less successful experiments.

## **Appendix A --committee charge (May 15, 2012) and membership**

Charge to DPF Committee on the DOE OHEP Comparative Review for FY12 Funding

Recently one third of all HEP DOE funded groups were comparatively reviewed.

<http://science.energy.gov/hep/funding-opportunities/physics-research-university-program-hep-guidelines/comparative-review-applications/>

The result of the review are summarized here

<http://science.energy.gov/hep/hepap/meetings/previous-meetings/hepap-agenda-march-2012/>

There will be a similar review this year for FY 13 funding, and next year for FY 14 funding. The due date to respond to the next comparative review is expected to be September. One of the effects of these reviews is that a significant number of PIs, and the people they supported including senior scientists, post docs and students, have lost their funding. A significant number of new PIs have been added. Given the magnitude of these changes the committee will consider the review and its methodology, and the changes it has produced and write a report (length a few pages) to be sent to the DOE on behalf of the community through the DPF by July 31 (2012). (date to be discussed)

It is envisaged that, as the committee do their work, they may: (a) distribute an early working draft of the report to the community (b) set up a web page where community input can be given both on the draft report and in general (c) use survey software to poll the community if they deem it necessary, or otherwise consult directly with the community (d) meet with the DOE to be briefed (e) request from DOE such information not already in the public domain as deemed necessary for the committee to carry out its charge

Committee membership:

Marj Corcoran and John Cumalat, co-chairs

Chip Brock

Michael Dine

Paul Grannis

Klaus Honscheid

Jack Ritchie  
Kate Scholberg  
Stew Smith  
Rick van Kooten  
Mike Witherell

## Appendix B--Questions sent to DOE

### Questions for DOE from the DPF Committee on Comparative Reviews

1. The committee would greatly benefit from a list of proposals funded in FY12, their funding level, activities supported, and personnel breakdowns (faculty, senior scientists, postdocs, students, technical, administrative).

What is the recent (10 year) history of university grants in terms of the number of grants and total funding. Is the university program shrinking, static, or growing relative to the OHEP budget?

What is the breakdown of funded proposals that were new starts? Categories that would be helpful include age; theory/experiment; university/other entities; existing DOE grant at the institution or not.

What is the breakdown of proposals which were declined, including large grants in which individual PI's were not funded. Categories of interest as above.

2. Did OHEP have a specific strategy in mind going into the review process? For example, did it have targets for the number of existing grants that would be renewed and the number of new grants that would be funded?

3. What guidance was given to the applicants? Were they made aware of the potential for dropping individual PIs, and of the critical assessment of Senior Research Scientists?

4. What was the charge given to the reviewers, both mail-in and panelists? Were they given information or guidance with respect to OHEP's expected outcomes?

5. Were specific instructions given to reviewers regarding Senior Research Scientists which were different than the instructions given for post docs or faculty members? If so, what were they? What was the profile of activities of the 11/20 research scientists whose funding was terminated?

6. What degree of uniformity was there among the several mail reviewers for a given proposal? Among the panel reviewers? How did program managers resolve varying assessments?

7. Were numerical scores assigned to each proposal, and if so how were the scores determined? Was there a hard cutoff, below which proposals were not funded? If numerical scores were assigned, could we see a distribution of the scores, and the cutoff value if there was one?

8. How were proposals assigned to reviewers? For example, was a single reviewer assigned only proposals of similar size, or only proposals in the same area, or were the assignments random? Were (for example) Energy Frontier proposals reviewed only by people working in the Energy Frontier, or was there a mix?

9. Did the reviewers have available to them any information from the leaders of their collaborations or from group leaders at labs to help them calibrate the contributions of groups or individuals?

10. Many groups contribute to detector development, to operations of ongoing experiments, or to accelerator-related activities. How were these contributions considered?

11. What provision does OHEP make for reviewing those grants or PIs that have multiple activities that cross the energy/intensity/cosmic boundaries? If a single PI was reviewed by different panels (due to his or her being involved in more than one area), how were the separate rankings from different panels handled, especially if they disagree?

12. When a specific PI was not funded, did all the students and post docs under him or her also lose funding? Are there any graduate students who will lose support so that they are unable to complete their degrees?

13. How were shared resources and infrastructure evaluated, especially for large grants that spanned more than one area?

14. The 2009 "Dear colleague" letter cited a criterion that asked for "alignment with programmatic goals". How is this criterion applied in practice? What would be the reaction to a proposal that seeks to establish some new direction in detectors or in physics experiment? How is it applied for theory proposals?

15. Is there a specific policy regarding funding of junior faculty in their first year and subsequent years as assistant professors?

16. For theorists, did the panels/DOE assign particular weights to different areas, such as phenomenology, QCD (collider related), model building, or String theory?

17. Based on the lessons learned from the first round of comparative reviews, what changes in the process if any do you plan to make for the next round?

**Appendix C --Cover letter for DPF web page (web page went live July 29, 2012).**

Dear colleagues,

As many of you know, the DOE has recently begun a comparative review process for university grants. This new process has resulted in substantial changes to funding for many university groups, as well as the termination of more than half of the Senior Research Scientists reviewed.

Some members of the HEP community have raised questions about this process and have expressed concern about the major funding changes for some groups. As representatives of the community, the DPF Executive Committee has put together a committee to gather information about the process both from both the DOE and from the community, then report back to the community our findings, and perhaps make recommendations to the DOE.

With this letter we are inviting input from the HEP community. A web page is set up at <http://dpfnewsletter.org/?p=792> . Individuals can post public comments on this page, or they can also submit private comments which the committee will keep confidential. Individuals are also welcome to send personal emails or to speak in person to any of the committee members listed below.

We expect to write a short report, which will be sent to DOE and distributed to the DPF membership, by the end of the summer.

We look forward to hearing from you.

Sincerely,

Marj Corcoran and John Cumalat, co-Chairs  
for the DPF Committee on Comparative Reviews