

Advice to Panelists:

The following is a general set of advice to NSF panelists, originally written at the request of a first-time panelist, who asked for a bit more guidance than FastLane provides on how to write reviews. It goes a bit beyond documented NSF policy, to reflect some personal views which may not be shared by all NSF program officers. However, a number of NSF program officers have read and agreed with the content.

As an NSF proposal reviewer, you are not reviewing a paper for a conference or journal, grading a student paper, or debugging a program. You are advising the US Government on how to invest taxpayer research dollars. So, try to think like an investor. We can all find faults with anything, and computer programmers and engineers are especially good at finding bugs. That is not the objective here. Every proposal has some defects. The NSF does not want to fund projects just because the proposal is well written. The goal is to fund research that is innovative and likely to have a positive impact. It is OK to take some risks, if the potential payoff is high. So, a potentially transformative idea may deserve funding even if the proposer has not worked out all the details or dotted all the "i"s in the proposal. The NSF also funds some incremental work, if it is needed to bring earlier work to fruition, but is not just interested in paying people to write research papers.

Remember that you are evaluating the proposal, not the proposer; while the qualifications and prior work of the investigators are important considerations in judging whether they can successfully execute the project, the reputation of the PI should not be considered as a primary factor in evaluating the proposal.

Allocate enough time to thoroughly read and digest the proposal far enough ahead of the panel meeting that you can write a thoughtful review. It is essential that all reviews be entered into FastLane before the panel meeting date. Once you have submitted your review, should read the other reviews. People who arrive at the panel meeting without their reviews entered waste the time of the entire panel, waiting for the reviews to be entered before the meeting can start.

Keep in mind that both the NSF staff and the authors of the proposal will read your comments. If you think the proposal should be funded, provide supporting evidence for the NSF staff. If you don't think it should be funded, or if you have reservations, explain in terms that the proposal's author will understand. Remember that the author may revise the proposal and resubmit it next year, based on your comments. You will be doing a serious disservice to the author if you provide false encouragement for an inherently weak proposal, just much as if you discourage a fundamentally good idea. Take as much care in your writing as you expect of the proposals' authors.

You don't need to write a lot, but avoid ambiguity. Be as specific as you are able. Make your comments evaluative. Don't beat around the bush. If there is something wrong with the proposal, state it clearly, but avoid phrasing criticisms in a sarcastic or insulting way. Also avoid vague criticisms, like "the authors are not aware of relevant prior work". If that is true, give some examples of relevant prior work that is not mentioned. Identify what is good, and point it out, but avoid making vacuous positive-sounding statements, like "the proposed research is interesting" just to have something nice to say. Avoid comments that identify you or your institution. Sometimes a proposal will contain a potentially transformative idea, which should not be lost, but the proposal will have enough major defects that you don't think it should be funded exactly as proposed. If so, explain both clearly, in case the NSF should want to negotiate a modification.

Given the diversity of proposals submitted to the NSF, it is inevitable that some reviewers will find some aspect or part of the proposal where they have little or inadequate expertise. If you find yourself in such a situation, it is good to take some time to browse through the related literature prior to writing the review, but if you cannot do that or still feel unqualified to comment on some aspects of a proposal, limit your comments to what you believe you can say with confidence. *Never* write any self-deprecatory comment like “Such and such is outside of my area of expertise, but” You will find that the coming together of experts from multiple domains into a panel provides opportunities for panelists to combine their knowledge, and to rethink their take on portions of proposals where they may have had questions. You should be ready to use that new knowledge to update your review and/or change your individual rating of a proposal, when appropriate.

Also keep in mind that we sometimes receive proposals that are not a good fit for the program to which they are submitted. If there is another program that is a better fit, we attempt a transfer. Sometimes that is not possible, such as when it would violate that program’s deadline or limit on number of submissions per PI. If the PI feels the proposal is in-scope for the program and chooses not to withdraw it, we assign it to the panel that seems to be the closest fit. In such cases, even if you are not particularly expert on some aspects of the proposal, you should be expert enough in the domain of the program to which the proposal was submitted to provide an opinion on the fit of the proposal to the scope of the program solicitation.

When you come to evaluate a proposal with respect to Broader Impacts, be realistic both in terms of both your expectations of investigators and their claims of what they will do. That is, be just as critical of the plausibility of claims for broader impacts and plans to achieve broader impacts as you are of the plausibility of the research plan. This is particularly true of outreach, industry adoption, and curriculum upgrades. For example, the industry goes through an enormous amount of fuss in even adopting internally developed technologies; the bar is much higher for something “not invented here”. Distinguish individual efforts directly related to the project from institutional programs that may have no direct connection to the proposed project. Look for specific plans, including commitments of time and budget, and assessment of impact, to back up any proposed outreach activities.

Be sure to meaningfully address each of the two official NSF review criteria (intellectual merit and broader impacts) and the five official review elements under each, namely:

1. What is the potential for the proposed activity to:
 - a. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or institution to conduct the proposed activities?

5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?

The instructions for entering reviews are at

https://www.fastlane.nsf.gov/NSFHelp/flashhelp/fastlane/FastLane_Help/fastlane_help.htm#introduction_to_fastlane.htm.

Evaluate the above in the context of the solicitation of the program for which you are reviewing. Read the solicitation before you read the proposals. Most solicitations have a section, near the end, on Solicitation Specific Review Criteria. Those are especially important.

Fictional Example Review:

FastLane will ask you to fill out four different text boxes, from which it assembles a review that looks something like what I have reproduced below. We are not allowed to release actual reviews except to the authors of the proposals, so this illustrative example is entirely fictitious. Pardon my weak attempt at inventing slightly humorous nonsense for comments. As a result of an effort to include examples of both positive and negative comments, some of the comments are contradictory. We hope that will not occur in any actual review.

Keep in mind that each program may provide a specific review template that you should follow, which may go beyond this example.

Proposal : ...filled in by FastLane..

Proposal Title : ...filled in by FastLane...

Institution : ...filled in by FastLane...

PI Name : ...filled in by FastLane...

Program Name : ...filled in by FastLane...

Rating : ...filled in by FastLane, based on what you assign using the checkboxes.

[You may select more than one rating if you feel it is on a borderline, like "G/F". Please don't be afraid to use the higher and lower extremes of the scale. Use "Excellent" if you feel strongly that the proposal should be funded, and are prepared to argue for it. Use "Fair" or "Poor" if you find serious enough deficiencies in the proposal that you believe it should not be funded, or may not even be suitable for the program to which it was submitted. Pay attention to the potential effect of your rating if you have been told that a triage rule will be applied to your particular panel. Please avoid fence-sitting. If you change your mind on a rating as a result of the panel discussion, you should go back and change the rating in FastLane.]

[The first box will ask you to evaluate, in the context of the five review elements, the strengths and weaknesses of the proposal with respect to intellectual merit. Start with a sentence or two summarizing what the proposal is about. Then enumerate strengths and weaknesses. Use complete sentences. The following is a nonsense example.]

Summary:

The proposal is to investigate the relationship between barometric pressure and workload on social media websites, in order to model and forecast power demand and better allocate processing resources, making use of hybrid Hamiltonian Markov jump processes.

Strengths:

- + The idea of using barometric pressure to forecast datacenter load is new, and could potentially transform the management of cloud services.
- + The Hamiltonian Markov jump process (HMJP) is a brilliant innovation in stochastic modeling.
- + The research tasks outlined are appropriate.
- + The team is well qualified to conduct the proposed activity. The PI has a strong record of successful work in stochastic modeling.
- + The letters of collaboration from Facebook and the National Weather Services indicate access to the necessary data.
- + The plan to use undergraduates in the assessment may cause psychological trauma, and hence needs IRB approval; there is no indication in the proposal that the PI understands this risk or has applied for such approval.

Weaknesses:

- The proposal does not provide an exact definition of HMJP, or how it will be applied to the specific modeling problem here, so it is difficult to predict how well this approach will work.
- The proposal does not address some apparently relevant prior work, and in particular does not explain the relationship of the HMJP to the MHJP, defined by Professor Josephus M. Clarke at the University of the Hebrides, in a paper presented at the 2012 SMFDC Symposium.
- There is no preliminary data to support the hypothesis that barometric pressure and Facebook activity are linked.
- The proposal does not say what metrics will be used for assessing success, nor is there a plan for empirical validation of the technique on an actual datacenter.
- Some of the proposed activities, such as the expedition to Antarctica, do not seem closely related to the datacenter load modeling problem, and could logically be considered in a separate proposal. They are also outside of the scope of the CSR program.

[The second box will ask that you evaluate, in the context of the five review elements, the strengths and weaknesses of the proposal with respect to broader impacts. The following is more nonsense example text.]

Strengths:

- + If successful, this project could result in significant reduction in datacenter energy usage.
- + The innovations in stochastic modeling have potential applications in many other fields, including forecasting the results of elections and health care costs.
- + In addition to the usual involvement of graduate students in the research, disadvantaged K-12 students from Appalachia will be recruited to validate the code.
- + A workshop will be held to publicize the research.

+ A new exhibit at the Dirac Science Museum will disseminate the results of the research.

Weaknesses:

- No specifics are provided on how the K-12 students will be recruited, or how they will be trained in software validation.
- No budget is provided for the workshop, or for development of the science museum exhibit, nor are these included in the personnel assignments of the management plan.
- Software will be produced, but the software is not mentioned in the Data Management Plan. It should be released as open source for maximum impact.

[There is a third text box, for solicitation-specific review criteria. You can find a statement of such criteria in the section Additional Solicitation-Specific Review criteria of the solicitation. You may also use this box to comment on the fit of the proposed research to the scope of the solicitation. The program for which you are reviewing will probably provide you more detailed guidance on what to put into this box. I am not providing any specific example text, but some of the comments above, such as on educational and outreach activities and on the poor fit of the expedition to Antarctica, have been put into this box if the program required educational and outreach activities, or had no relationship to Antarctica. It is often the case that you will already have made comments relevant to these criteria under Intellectual Merit or Broader Impacts. If so, you should not duplicate the comments, but just make reference to them, and then provide a word or two summarizing the degree to which the proposal meets each of the criteria, e.g., "strong", "adequate", "weak", "inadequate".]

[The last text box will ask for a "Summary Statement". Do*not* summarize the content of the proposal. Instead, summarize your opinion of the proposal. That is, summarize why you finally decided to rate it "Excellent", "Very Good", or whatever you chose. Since most people will have both positive and negative observations, your goal here is to explain how you reconciled those. The following might be a positive example.]

I believe this project should be given top priority for funding. The potentially transformative impact of the new HMJP modeling technique, along with the potential positive economic impact on power savings, outweigh the risks embodied in the weaknesses noted above. The K-12 and science center outreach activities are also laudable, but the lack of specific resource commitments to them is a concern.