

Review of Travis Metcalfe's Appeal of the Non-selection of Proposal 10-KPS10-0026

Conducted at the request of Charles J. Gay
Acting Associate Administrator for Science Mission Directorate

Conducted by Paul Hertz
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Submitted November 3, 2011

On October 3, 2011, Travis Metcalfe appealed the non-selection of proposal 10-KPS10-0026, "Precision Asteroseismology of Kepler Exoplanet Host Stars," hereafter the proposal. Per SPD-09, *Requesting Reconsideration of NRA Proposal Declination*, this appeal was submitted to the Associate Administrator (AA) for Science Mission Directorate (SMD). The merits of the appeal have been investigated by Paul Hertz, Chief Scientist of the Science Mission Directorate. This document is the result of that investigation.

1. Executive Summary

Travis Metcalfe requested a review of the non-selection of his Kepler Participating Scientists Program (KPSP) proposal. The proposal was deemed selectable based on its intrinsic science merit as determined by peer review. However it was declined because of programmatic reasons, specifically that the need for a participating scientist in the area of asteroseismology was not as pressing as it was in other areas.

Metcalfe challenged this rationale on two bases: (i) The work being done in asteroseismology outside of the Kepler Science Team should not have been included in any consideration of whether additional asteroseismology work is needed within the Kepler Science Team. (ii) By expanding work in asteroseismology outside of the Kepler Science Team in May, the Kepler Science Council (which provides leadership for the Kepler Science Team) did indicate that asteroseismology is a pressing need of the Kepler Science Team. Metcalfe used the term "conflict-of-interest" to describe the Kepler Science Council's role in satisfying the Team's need for asteroseismology by getting help from outside of the Kepler Science Team, thus reducing the Team's need for additional asteroseismology investigations, thus (in Metcalfe's view) tainting the Council's role in advising the Program Scientist that additional asteroseismology work within the Team is a lower programmatic priority.

The Kepler Project, including the Kepler Science Council, is responsible for successfully executing the Kepler science mission and meeting the Kepler science goals within the limited resources that are available. It is appropriate that the Project should collaborate widely to attain these goals. The partnership with the non-NASA funded Kepler Asteroseismology Science Consortium and the Kepler Asteroseismic Science Operations Center are excellent examples of leveraging investments by partners to extend the science reach of a NASA project.

I find that it is appropriate for the Kepler Project to acquire partners, and it is appropriate for the Kepler science leadership (not the Kepler Science Council as asserted by Metcalfe) to advise the

Program Scientist that certain areas of science are being adequately covered by partners, and that it is a low priority to expend limited NASA resources on duplicating (or supplementing) those activities. Rather than portraying the Kepler science leadership's involvement as a conflict-of-interest, I would describe it as a vested interest: the Kepler science leadership has a vested interest in maximizing the science return from Kepler, and that interest includes making partnerships and advising that duplicating (or supplementing) the work of those partners is lower priority.

I therefore find that Metcalfe's concern that the Kepler science leadership had a conflict-of-interest is not correct, that it was proper for the Kepler science leadership to provide input on programmatic priorities to the Program Scientist, and that the rationale for non-selection of Metcalfe's proposal is well founded and well documented.

I recommend that the non-selection be sustained.

In the course of my review, I found several areas where processes and practices can be improved.

2. Background

The proposal was submitted to NASA on February 11, 2011, in response to ROSES-2010 program element appendix D.13, *Members of the Kepler Participating Scientists Program (KPSP)*. The evaluation of the proposal was managed by the Kepler Program Scientist, Douglas Hudgins, of the SMD Astrophysics Division. The proposal recommendation of non-selection was presented by Hudgins to the Selection Official, Geoff Yoder, Deputy Director of the Astrophysics Division, during a selection decision meeting held on June 15. The Selection Decision Document was signed by Yoder as Selection Official on June 17.

Metcalfe was notified of the proposal's non-selection on June 17 and was provided with a copy of the written evaluation report on August 18. Following receipt of the written evaluation report, he asked for further clarification from Hudgins regarding the rationale for the proposal's non-selection. Hudgins provided clarification in response to Metcalfe's specific questions, culminating in an "email debrief" by Hudgins to Metcalfe on August 31.

Metcalfe submitted a written request for reconsideration to the Selection Official on September 1. In the request, he requested an investigation into two specific questions concerning the proposal's non-selection for programmatic reasons. On September 26, Yoder responded and reaffirmed the non-selection decision.

Metcalfe submitted a written appeal to the SMD Acting AA, Chuck Gay, on October 3. In the appeal, Metcalfe stated that he was not satisfied that his highly ranked proposal was treated fairly during the selection process, he challenged the programmatic assessment of his proposal, he requested an investigation of the rationale behind the programmatic assessment, and he appealed the non-selection decision. The appeal was assigned to the SMD Chief Scientist, Paul Hertz, on October 3 for investigation and recommendations.

This document is the result of that investigation and contains the recommendations.

3. Relationship of the Kepler Participating Scientists Program to other Kepler Science Teams

One of Metcalfe's key concerns is the role that the leadership of the Kepler Project played in the formulation of the selection and non-selection decisions. It is useful to describe how the team is organized, and what role they had in the KPSP evaluation process. "You can't tell the players without a program."

The Kepler Project is managed by NASA Ames Research Center (ARC) for SMD. The project manager is Roger Hunter of ARC. Different aspects of the science leadership are assigned to the project scientist Nick Gautier of JPL) and deputy project scientist (Steve Howell of ARC), the science principal investigator (Bill Borucki of ARC), and the leader of the Kepler Science Team (KST; Ted Dunham of Lowell Observatory).

- The project scientist is responsible for ensuring that the Kepler data meets its requirements and can thus support the science for which Kepler was selected and implemented; the project scientist is helped in this endeavor by the Kepler project and the members of the KST.
- The science PI and the KST are responsible for using the Kepler data to carry out the mission's selected science of the frequency of exoplanets.
- The members of the Kepler Participating Scientists Program (KPSPs) are selected to compliment the capabilities of the KST in carrying out the Kepler mission's prime science. KPSPs are competitively selected for two or three year terms through ROSES, and they become full members of the KST for the duration of their KPSP grant; the 2011 selection was the second round of KPSPs since Kepler was launched.
- The Kepler Asteroseismology Science Consortium (KASC) is a European-led consortium to use Kepler data to study, for their own sake, the Kepler target stars using the technique of asteroseismology. The KASC is studying the brightest Kepler target stars; the stars were selected for their asteroseismology interests which are independent of whether the stars have a transiting exoplanet. When the KASC studies stars that have known or suspected exoplanets, the transit data is removed because that is proprietary to the KST. However the KASC does provide service to the KST by studying bright stars that are exoplanet hosts among the many bright stars that they are studying. The KASC has over 500 members; no NASA funding is provided to the KASC per se. One member of the KST, Ron Gilliland (currently at Penn State having recently moved from STScI) interfaces with the KASC as one of his KST duties; Gilliland is funded by NASA as a member of the KST.
- Part of the Kepler science mission is to understand the host stars for exoplanets, so the KST spends part of its effort studying stars that are known or suspected exoplanet hosts (one needs to know the star's effective temperature and radius to infer the mass and radius of a transiting exoplanet). So there are members of the KST who do asteroseismology of exoplanet host stars for that purpose.
- The Kepler Science Council (KSC) acts as the executive committee of the KST. It is made up of the project scientist, deputy project scientist, project manager, science PI, and representative members of the Kepler Science Team and the Kepler Science Office at ARC.

4. Investigation of Metcalfe's Specific Points

Metcalfe states in his October 3 appeal that NASA “appear[s] to have made selection decisions impartially, based on an evaluation of scientific merit from the panel review, and an evaluation of programmatic relevance from the science leadership of the Kepler mission.” The proposal was ranked high enough by the panel review to be funded but was declined due to programmatic considerations following consultation by the program officer, Hudgins, with the leadership of the Kepler project.

(a) Conflict of Interest in Programmatic Assessment of Metcalfe's Proposal

Metcalfe is concerned that the leadership of the Kepler project had an inherent conflict of interest that prevented them from providing an impartial programmatic evaluation of my proposal, thus misleading both the program officer and the selecting official. The program officer told Metcalfe there was a firewall between the Kepler science team and the panel review, and Metcalfe states that consultation with the leadership of the Kepler project regarding programmatic priorities made that firewall operationally ineffective. [See further discussion below on the firewall in part (c).]

After discussions with Steve Howell and Doug Hudgins, I understand that the programmatic weighting of the selectable proposals was arrived at as follows.

Since the selected KPSPs would be joining the KST for the purpose of supplementing and complimenting its capabilities, Hudgins asked the science leaders of the Kepler project, referred to here as the Kepler science leadership (project scientist Nick Gautier, deputy project scientist Steve Howell, science PI Bill Borucki, and science team lead Ted Dunham) to rank the selectable proposals based on programmatic value to the KST. Howell led this activity and provided the ranked list to Hudgins. Hudgins then combined the programmatic value (as recommended by the Kepler science leadership) with the science merit (as determined through peer review), applied his own judgment, and formulated a selection recommendation that could be funded within the available funding for the new KPSP awards.

Howell said that the Kepler science leadership looked at the selectable proposals and discriminated between them based on what the KST needed but did not have already. The KPSP proposals are focused on exoplanets as the KST is prohibited from working on other science using their KST funding – that science is reserved for Kepler guest investigators and Kepler archival data analysts. Metcalfe's proposal, which involves asteroseismology studies of exoplanet host stars, is focused on exoplanets. However, Howell reported that additional asteroseismology work is not as high a priority for the KST right now as other highly rated proposed investigations: there is already significant activity in this area, and studying the host stars is not the highest priority science for the KST (to be clear, the Kepler science team cares about the host stars, but not enough to use their limited resources to study them). There appear to be two areas of science where the KST has sufficient capability, and this adding additional KPSPs in these areas are low priority: asteroseismology of exoplanet host stars and radial velocity measurements of exoplanet host stars.

Does the Kepler science leadership have a conflict of interest as suggested by Metcalfe? And if so, did that COI inappropriately impact their consideration of the programmatic priority of Metcalfe's proposal? Metcalfe raises several concerns under the banner of COI.

Metcalfe correctly notes that the KST itself is light on asteroseismologists. The KST relies on the KASC to do asteroseismology analysis of Kepler target stars. By making suspected exoplanet host stars available to the KASC, a recent development, the KST is leveraging off the capabilities of the KASC rather than expending its own resources.

Metcalfe correctly notes that only a tiny fraction of the KASC is permitted to study possible exoplanet host stars (this is the KASOC). He believes that he would provide a significant supplement to the capabilities of this group.

Metcalfe correctly notes that members of the KASC (and KASOC) are funded by their home countries. As a member of the KASC (and KASOC), Metcalfe must propose through the KPSP in order to receive NASA funding for his work on the KASC (and KASOC).

Metcalfe does not specify clearly why these true statements constitute a COI. My interpretation is that he believes the Kepler science leadership is swayed by all the free analysis they are getting from the KASC without expending any Kepler funds. He may feel this is a conflict because the Kepler science leadership should be looking at the work that needs to be done, and if that work needs to be done they should be willing to pay for it, even if they can get it for free elsewhere. Their conflict may be that they are interested in preserving the Kepler budget for science that they cannot get for free.

I do not find this to be a conflict of interest by any definition. It is correct for the Kepler science leadership to define programmatic priority as being those proposals that will add the most value to the KST's goal of completing the Kepler science investigation. I find it an appropriate application of programmatic decision making for the Kepler science leadership to conclude that selecting Metcalfe's proposal would make an incremental increase in the amount of exoplanet host star asteroseismology that is being conducted, and selecting other proposals would make a qualitatively new addition to the KST's capabilities. The relative value of those choices is a legitimate area for subjective judgment. I recognize that Metcalfe states the KASOC is so small that the "incremental" increase is a large fraction; however that does not change the nature of my conclusion.

The fact that Metcalfe is applying for funding to conduct research that the KST is getting for free through an international collaborative agreement is unfortunate for Metcalfe. It is expected that missions with international partners will have some fraction of the science done by the partners, not by NASA. This leaves U.S. scientists out of that science, just as international scientists are excluded from doing the science that is reserved by NASA for U.S. scientists.

However this does raise in my mind an important question. Was the call for proposals misleading by implying in some way that additional expertise in asteroseismology was desired for the KST? See below for a discussion.

(b) Correctness of the Programmatic Assessment of Metcalfe's Proposal

Metcalfe challenges the conclusions of the programmatic assessment of his proposal, specifically that declining his proposal would not "leave an unacceptable technical gap within the Kepler Science Team" and that "the need for a participating scientist in the area of asteroseismology was not as pressing as it was in other areas."

These are clearly subjective determinations. What is "unacceptable" or "pressing" is a matter of opinion, and the fact that Metcalfe has a different opinion than Hudgins or the Kepler science leadership is not necessarily an indication of error.

Metcalfe states that the KST demonstrated the existence of that technical gap when it expanded the membership of the KASOC in May, including admitting Metcalfe as a (unfunded) member. Metcalfe states that "the KST either felt their need had been satisfied by the expanded KASOC (see objection 1 [conflict of interest] above), or they deliberately misled the program officer about the programmatic relevance of my proposal in order to fund their favored projects."

In my discussions with Howell and Hudgins, I find it incorrect to state that the KST expanded the KASOC to fill in a technical gap because the KST has no control over the KASC; rather the KST agreed to let the KASOC have data from additional exoplanet host stars. Nevertheless the KASC was expanded, and any technical gap is diminished. I do not find any reason to conclude that there was any "misleading" between the Kepler science leadership and Hudgins.

(c) Whether Metcalfe was Misled by the Program Scientist

Although Metcalfe did not call this out explicitly when he listed in his appeal the two reasons that he is challenging the non-selection, it is worth looking at whether Metcalfe was misled when he accepted membership on the KASOC in May. He states that he asked Hudgins whether doing so would have an impact on the handling of his proposal, and Hudgins assured him that it would not as there was a "firewall" between the KST and the KPSP panel review.

Certainly Hudgins was correct, as the KST itself, and the Kepler science leadership's programmatic priorities, had no impact on the panel review. Metcalfe's high rating, well in the selectable range, is evidence of that. There is, however, the appearance of a circular feedback loop that might be bothering Metcalfe. The KST identified a need for more asteroseismology of exoplanet host stars, they expand the KASOC, the need is mitigated, and selecting additional (funded) proposals in this area becomes a low programmatic priority. Metcalfe had identified the same need which is why he was proposing that science. By being a part of the KASOC expansion, it may feel to Metcalfe that he contributed to the lowering of the programmatic priority for his proposal. This is understandable. However the truth is that the KASOC would have expanded even if Metcalfe had declined to join the KASOC, and the programmatic priority of Metcalfe's proposed investigation would have declined as well even if Metcalfe had not joined the KASOC.

I also think it would have been reasonable for Metcalfe to interpret Hudgins statement that there is a firewall between the KST and the KPSP panel review to imply that there was a firewall

between the KST and the entire selection process. Hudgins did not say that, and clearly there was no such firewall as the KST (through the Kepler science leadership) did play an important role in providing programmatic priorities. It is unfortunate if the use of a fuzzily defined term like “firewall” and perhaps also “peer review process” led to a misunderstanding by Metcalfe that contributed to an impression that improper input was used to decline his proposal.

5. Review of the Selection Process beyond Metcalfe’s Request

In the course of my review, I identified three additional areas to look into.

(a) Appropriate application of, and rationale for, using programmatic priority to select proposals

The relative weight of programmatic considerations and peer review ratings is an important factor in the non-selection of Metcalfe’s proposal. Hudgins said that he weighted the peer review results more heavily than the programmatic input from the Kepler science leadership. That is, the proposals rated most highly by peer review were likely to be selected independent of the Kepler science leadership’s programmatic priority, while the proposals rated less highly were unlikely to be selected unless they had very high programmatic priority.

The following table shows how many proposals had combinations of peer review rating (using the median grades) and Kepler science leadership programmatic priority (using the Kepler science leadership’s rank order list and binning proposals into groups of 5). For each bin in the table, I indicate the number of proposals; the number selected is in parentheses.

	1-5	6-10	11-15	16-20	21-25	26-30
E	4 (4)					
E/VG	1 (1)	4 (4)	2 (0)			
VG		1 (1)	3 (2)	5 (0)	2 (0)	
VG/G						
G					3 (0)	2 (0)
Below G						3 (0)

Several things are apparent. Peer review results and programmatic priority are highly correlated, but they are not exactly the same. Also programmatic priority was a factor in discriminating among proposals near the line between funded and unfunded (this line is well above the line between selectable and non-selectable). For instance, programmatic priority discriminated between the selected E/VG proposals and the non-selected E/VG proposals. I conclude that Hudgins did properly weight peer review rating and programmatic priority in recommending selections.

I also reviewed the rationale for selecting the one VG proposal over the two E/VG proposals, as well as the rationale for non-selecting the two E/VG proposals. All of these rationales are appropriate. Metcalfe received the rationale for the non-selection of his proposal in his email debrief from Hudgins.

SMD program officers are instructed, by officials from the Associate Administrator to the Chief Scientist, Lead for Research, and Division Director, that it is not their job to merely rubber stamp the peer review ratings. Rather applying programmatic priorities is a part of assembling a research program portfolio. This criterion is clearly called out in the Guidebook for Proposers. Hudgins application of program scientist judgment is a part of his job as a research program officer.

(b) Clarity of Solicitation

Programmatic considerations were key in the decision not to select Metcalfe's proposal. I reviewed whether the KPSP solicitation (ROSES-10, Appendix D.13) was clear about the role of programmatic priority in discriminating among otherwise compelling and selectable proposals, especially as applied to asteroseismology.

Section 1.1 of the solicitation states that "The Kepler PSP is designed to augment the skill set of the Kepler Science Team ..." and Section 1.3 includes asteroseismology in a list of mission related activities of the Kepler Science Team. Section 2 describes the role of Kepler Participating Scientists. It lists examples of analytical or observational programs for participating scientists, and asteroseismology is not included as an example. Section 2 also links to a list of current participating scientists tasks which are terminating and notes that these are good areas for follow-on investigations; none of these terminating investigations involves asteroseismology.

Taken together, there is nothing here that endorses or solicits asteroseismology specifically as a fertile area for a Kepler participating scientist investigation. Rather it states that the KST includes asteroseismology and it leaves asteroseismology off every list of examples for Kepler participating scientists.

There is nothing in the solicitation that specifically states the role of programmatic priority. That may be found in the Guidebook for Proposers, Appendix C, where it states "Following peer evaluation, the cognizant NRA Program Officer will consider the competitively rated proposals in the context of the programmatic objectives and financial limitations stated in the NRA. The Program Officer will present a recommendation for selection based on the entirety of these factors to the NASA Selection Official identified in the NRA. The Selection Official will select proposals as judged against the evaluation criteria, the objectives of the NRA, programmatic considerations, and the available financial resources." (Section 1.2.3) Similar statements are also found in Sections C.1, C.5.1, C.6, and F-18. The role of programmatic priorities may also be found in the ROSES-10 Summary of Selection, Section V – but not very clearly.

The lack of attention within the KPSP ROSES appendix to this aspect of the post-peer review selection recommendation and selection process is completely within family of all ROSES appendices. A quick review could not find the importance of programmatic factors being explicitly discussed in any of them. As I mentioned before, SMD recognizes the importance of programmatic factors explicitly and program officers receive frequent direction from SMD management to take them into account. However this could be made much clearer to proposers.

Recommendation: (a) The importance of programmatic considerations in selection decisions should be stated clearly in the ROSES Summary of Solicitation starting with ROSES-12. (b) Specific ROSES program elements that will include programmatic considerations beyond the language in the ROSES Summary of Solicitation should state this in the applicable program element appendix.

(c) Firewall between the Kepler Project and ARC Proposers

There are other kinds of conflicts-of-interest than the one that Metcalfe was concerned about. One is the institutional conflict-of-interest. It is standard SMD policy that reviewers do not review proposals from their own institution.

However members of the Kepler project work for ARC and its contractors, and these same organizations are also proposers. Is there an adequate firewall between the Kepler Project and proposers at ARC to ensure that proposers at ARC do not have an unfair advantage?

Let me state clearly that there is no evidence of such an advantage. There were no proposals from ARC in this round.

It would be a good practice for the Kepler Project and ARC management to write down a firewall agreement with key provisions that would assure the proposing community that ARC proposers would have no advantage over proposers from the rest of the community. Such provisions should include, at a minimum, statements that: (i) Members of the Kepler Project who provide support for this competition are precluded from proposing. That includes providing technical reviews of proposals, providing programmatic priorities to the program scientists, and any other role. (ii) Members of the Kepler Project should not provide information regarding this proposal opportunity to potential proposers; rather all information for proposers must come from the SMD program scientist as the single POC to the community for the proposal opportunity.

Recommendation: A firewall agreement between the Kepler project and ARC management, with concurrence by SMD, should be written down to show how NASA is ensuring that ARC proposers have no advantage over proposers from the rest of the community. This firewall agreement should cover the Kepler Participating Scientist Program, the Kepler Guest Investigator Program, and any other proposal opportunities that require Kepler Project support for SMD in conducting the competition.

6. Conclusion (repeat of Executive Summary)

Travis Metcalfe requested a review of the non-selection of his KPSP proposal. The proposal was deemed selectable based on its intrinsic science merit as determined by peer review. However it was declined because of programmatic reasons, specifically that the need for a participating scientist in the area of asteroseismology was not as pressing as it was in other areas.

Metcalfé challenged this rationale on two bases: (i) The work being done in asteroseismology outside of the Kepler Science Team should not have been included in any consideration of whether additional asteroseismology work is needed within the Kepler Science Team. (ii) By expanding work in asteroseismology outside of the Kepler Science Team in May, the Kepler Science Council (which provides leadership for the Kepler Science Team) did indicate that asteroseismology is a pressing need of the Kepler Science Team. Metcalfé used the term “conflict-of-interest” to describe the Kepler Science Council’s role in satisfying the Team’s need for asteroseismology by getting help from outside of the Kepler Science Team, thus reducing the Team’s need for additional asteroseismology investigations, thus (in Metcalfé’s view) tainting the Council’s role in advising the Program Scientist that additional asteroseismology work within the Team is a lower programmatic priority.

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I find that it is appropriate for the Kepler Project to acquire partners, and it is appropriate for the Kepler Project (through the Kepler Science Council) to advise the Program Scientist that certain areas of science are being adequately covered by partners, and that it is a low priority to expend limited NASA resources on duplicating (or supplementing) those activities. Rather than portraying the Kepler Science Council’s involvement at a conflict-of-interest, I would describe it as a vested interest: the Council has a vested interest in maximizing the science return from Kepler, and that interest includes making partnerships and advising that duplicating (or supplementing) the work of those partners is lower priority.

I therefore find that Metcalfé’s concern that the Kepler Science Council had a conflict-of-interest is not correct, that it was proper for the Kepler Science Council to provide programmatic priorities to the Program Scientist, and that the rationale for non-selection of Metcalfé’s proposal is well founded and well documented.

I recommend that the non-selection be sustained.