



24 May 2018

Dr. Paul Hertz  
Astrophysics Director  
Science Mission Directorate  
National Aeronautics and Space Administration (NASA)

Dear Paul,

The NASA Astrophysics Advisory Committee (APAC) met at NASA Headquarters (HQ) on April 11-12, 2018. The following members of the APAC attended some or all of the meeting in person: Natalie Batalha, Marshall (Mark) Bautz, James (Jamie) Bock, Patricia (Padi) Boyd, John Conklin, Asantha Cooray, Neil Cornish, Brenda Dingus, Scott Gaudi (APAC Chair), Kelly Holley-Bockelman, William Jones, Jason Kalirai, Victoria (Vikki) Meadows, Leonidas Moustakas, Feryal Özel (APAC Vice Chair), Paul Scowen, Yun Wang, and Beth Willman. Hashima Hasan (APAC Executive Secretary) attended the first day; Patricia Knezek (APAC alternate Executive Secretary) attended the second day. Laura Brenneman and Debra Fischer were unable to attend. Dr. Hasan noted that Jamie Bock, Neil Cornish, Jason Kalarai, Scott Gaudi, and Yun Wang were rotating off the APAC and thanked them for their service.

Dr. Hasan opened the meeting by welcoming the APAC members, noting in particular the new APAC members Laura Brenneman, Kelly Holley-Bockelmann, John Conklin, Leonidas Moustakas, and Vikki Meadows. She noted that a few APAC members had conflicts of interest with specific topics on the agenda. During those presentations, the conflicted members would remove themselves from the members' table as an indication of their recusal; they would be allowed to listen to the presentation, but they could not participate in the discussion. In particular, all members of the APAC except for Neil Cornish, John Conklin, Brenda Dingus, and Kelly Holley-Bockelmann were considered conflicted on topics related to the Wide Field Infrared Survey Telescope (WFIRST). Dr. Hasan then reviewed the Federal Advisory Committee Act (FACA) rules. Dr. Gaudi added that offline conversations cannot form the basis for APAC recommendations.

The agenda consisted of the following presentations:

- Astrophysics Division Update – Paul Hertz
- ExoPAG/PhysPAG/COPAG Updates – Alan Boss, John Conklin, and Paul Scowen
- HabEx STDT Report – Scott Gaudi
- Lynx STDT Report – Feryal Ozel
- OST STDT Report – Asantha Cooray
- LUVUOIR STDT Report – Aki Roberge
- APAC Report on High Risk/High Reward R&A Charge – Scott Gaudi
- Balloon Report Update – Debra Fairbrother
- Diversity and Inclusion – Michael New
- Wide Field Infrared Survey Telescope Update – Jeff Kruk



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- Senior Review Terms of Reference - Jeffrey Hays
- NICER (Science Talk) - Zaven Arzoumanian
- James Webb Space Telescope Update – Eric Smith
- Transiting Exoplanet Survey Satellite Update – George Ricker
- Update on NAS Astrobiology and Exoplanet Studies – Vikki Meadows

The APAC would like to thank all of the presenters.

In addition, the APAC discussed one additional topic.

- Application of the conflict of interest rules.

As these presentations will be available online, as will the minutes of the meeting and thus the discussions about these presentations, and the additional topics mentioned above, we will not review them here, except as necessary to introduce our findings, recommendations, requests, and concerns.

### APD Report by Dr. Hertz

The report by Dr. Hertz on the Astrophysics Division did not include any information on research and analysis (R&A) funding. The APAC requested a summary of this topic, which was provided by Paul Hertz.

**The APAC would like to thank Dr. Hertz for providing information on the APD R&A funding.**

Due to the additional delay of the James Web Space Telescope (JWST) launch, **the APAC looks forward to hearing the results of NASA’s ongoing discussions with respondents to the Request for Information for continuation of Spitzer beyond the “Spitzer Beyond” extension (November 2019).**

Regarding the language in the FY18 budget regarding the Stratospheric Observatory for Infrared Astronomy (SOFIA), which indicates that SOFIA shall not prepare for 2019 senior review and its prime mission will be 20 years starting in 2014, **the APAC suggests that SOFIA should undergo a comprehensive review within the next two years and, if feasible, would like to have a chance to review the terms of reference of that review beforehand.**

Regarding the additional delay of JWST, **the APAC requests the chairs of the three PAGs collect information through their constituents as to the impacts of delaying the decadal survey versus not delaying the survey on their science, and provide that input to the CAA.**

### PhysPAG Report

Dr. John Conklin asked for approval of a new PhysPAG SAG 3 on “Multimessenger Astrophysics (MMA)”

**Recommendation: The APAC unanimously recommends approval of the new PhysPAG SAG 3: Multimessenger Astrophysics.**

### COPAG Report

Dr. Paul Scowen asked for approval of a new COPAG SAG10 on “Great Observatories”



**Recommendation: The APAC unanimously recommends approval of COPAG SAG 10: Great Observatories.**

Senior Review Terms of Reference

**Recommendation: The APAC unanimously recommends approval of the Senior Review Terms of Reference.**

Response to the Request for Input on the High-Risk/High-Impact R&A Charge

The APAC has been charged to “Determine how SMD’s Research and Analysis (R&A) program can foster and enable, in the best way, potentially high-impact and highly innovative endeavors, while preserving important foundational and/or more gradual research activities, to the benefit of the nation and scientific community.” In particular, the NASA Astrophysics Advisory Committee (APAC) has been charged by NASA with addressing the question of whether the community feels that NASA has the correct mechanisms and processes in place to adequately and fairly deal with proposals that address high-risk / high-reward or interdisciplinary subject matter.

The COPAG, ExoPAG, and PhysPAG solicited input on this charge. The COPAG and PhyPAG solicited input via surveys, while the ExoPAG solicited input in free form. The ExoPAG received no responses.

The COPAG and PhysPAG surveyed roughly ~60 people each, focusing on the following two questions:

- Does the SMD R&A program have effective processes in place to solicit, review, and select high-impact/high-risk projects?
- Does the SMD R&A program have effective processes in place to solicit, review, and select focused, interdisciplinary, and interdivisional projects?

There was a large diversity of responses, and a general lack of consensus on most issues. There was general agreement that APD R&A committees tend to be somewhat too risk averse, although there was also generally no consensus on why this was the case.

**The APAC concluded that there is a need for more high risk/high reward (HR/HR) programs in all areas to be funded, including technological, observational, and theoretical R&A programs, although there was no consensus on whether this should be taken from existing funding, or whether additional funding should be devoted to HR/HR proposals. Similarly, there was no consensus on the need for additional funding for interdisciplinary or interdivisional proposals.**

**The APAC essentially felt that most of the input from the COPAG and PhyPAG surveys was purely anecdotal, and therefore were uncomfortable using this input to make any substantive recommendations.**

**APAC recommends that we wait until the outcome of the experiment by the SMD becomes clear, namely:**

- **“We are now asking peer review panels to identify HR/HR proposals (started recently).”**
- **“After a year or two we can show some statistics (e.g., do proposals that the panel think are HR/HR have lower average grades?)”**

Application of the Conflict of Interest Rules

The APAC was generally dismayed by the conservative application of the conflict of interest rules, particularly in the case of WFIRST.



Summary of Major Discussions, Notes, Actions, Requests, and Recommendations

Discussions:

- **Members of the APAC suggested that the senior review subcommittee be populated with the membership of the "rest of missions" panel to insure balance and fairness by the subcommittee as they develop recommendations and write a report. As this was not part of our final "actions and recommendations" discussion at the end of the last day, we suggest simply that this topic be discussed at the next APAC meeting.**

Acknowledgments and Notes:

- **The APAC would like to thank Dr. Hertz for providing information on the APD R&A funding.**
- **The APAC looks forward to hearing the results of NASA's ongoing discussions with respondents to the Request for Information for continuation of Spitzer beyond the "Spitzer Beyond" extension (November 2019).**

Actions:

- **The APAC unanimously recommends approval of the new PhysPAG SAG 3: Multimessenger Astrophysics.**
- **The APAC unanimously recommends approval of COPAG SAG 10: Great Observatories.**
- **The APAC requests the chairs of the three PAGs to collect information through their constituents as to the impacts of delaying the decadal survey or not delaying the survey, and provide that input to the CAA.**

Recommendations:

- In regards to Michael New's presentation on Diversity and Inclusion:

**The APAC recommends that Michael New continues to work with the NASA Centers to communicate and coordinate with them about what SMD is learning about the pathways taken by successful women PI's, and what approaches they are taking to increase the pool if necessary. The APAC further encourages him to communicate directly with Center Division Directors and Branch Heads/Lab Chiefs, as these individuals have direct influence on the make-up of project teams.**

- In regards to SOFIA Senior Review:

**The APAC suggests that SOFIA should undergo a comprehensive review within the next two years, and would like to have input into the terms of reference of that review.**

- In regards to the High Risk/High Reward Charge:



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**The APAC concluded that there is a need for more high risk/high reward (HR/HR) programs in all areas to be funded, including technological, observational, and theoretical R&A programs, although there was no consensus on whether this should be taken from existing funding, or whether additional funding should be devoted to HR/HR proposals. Similarly, there was no consensus on the need for additional funding for interdisciplinary or interdivisional proposals.**

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Sincerely,

Scott Gaudi  
APAC Chair  
The Ohio State University

Feryal Özel  
APAC Vice Chair  
The University of Arizona