

Earth Science Advisory Committee Meeting on High Risk/Impact Science Within the ESD R&A Program

May 29th 2018 Meeting

From: The NASA Earth Science Subcommittee – J. Marshall Shepherd (Chair, marshgeo@uga.edu), Roland Burgmann, Gregory Carmichael, Andrew Dessler, Thomas Herring, Ian Joughin, Christian Kummerow, Anne Nolin, Richard Rood, Ginny Catania, Nancy Glenn, Kathleen Green, Daven Henze, Lucy Hutyra, Jasmeet Judge, Colleen Mouw, Ying Fan Reinfelder, Anastasia Romanou, Ray Schmitt and Sara Tucker.

To: Michael Freilich, Director Earth Science Division

Cc: Lucia Tsaoussi (Earth Science Advisory Committee Executive Secretary), Sandra Cauffman (ESD Deputy Director), Jack Kaye (ESD Associate Director for Research), Eric Ianson (ESD Associate Director for Flight Program), Lawrence Friedl (Associate Director for Applied Sciences), Pamela Millar (Associate Director for Earth Science Technology Office)

Date: May 31st, 2018

Dear **Dr. Freilich:**

The Earth Science Advisory Committee (ESAC) met via teleconference on May 29, 2018 to discuss ESD's practices regarding high-impact and high-risk research. This particular topic was a request made by the Science Mission directorate to ESAC, along with the other SMD Division Advisory Committees.

In particular at the ESAC meeting on March 14-15th, 2018 at NASA Headquarters, the committee was charged with responding to the following two questions:

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

The working definitions as specified by SMD are:

High-Impact: Research whose outcome, if confirmed, would have a substantial and measurable effect on current thinking, methods or practice.

High-Risk: Research that tests novel and significant hypotheses for which there is scant precedent or preliminary data or that are counter to the existing scientific consensus.

Multidisciplinary: Research in which contributions from two or more different disciplines *are independently or sequentially applied, providing additive contributions* to the solution of a common problem.

Interdisciplinary: Research in which contributions from two or more different disciplines are *jointly applied, providing interactive contributions* to the solution of a common problem.

Interdivisional: Research that simultaneously advances the strategic objectives of more than one SMD Division. Such research may be multi- or inter-disciplinary but need not

The ESAC considered an analysis of 2017 R&A panels. The provided analysis was made by considering various statistics of review panel information collected for ROSES 2017 solicitations. A total of 474 proposals across 11 different programs were considered. Approximately 25 to 33 percent of the proposals were considered multi-disciplinary or inter-disciplinary. The majority of proposals were also deemed to be of medium to high impact with some intellectual risk. A number of proposals were evaluated as high intellectual risk and high impact. Though it represented a programmatic snapshot, the analysis was broadly representative of ESD R&A programs.

Findings:

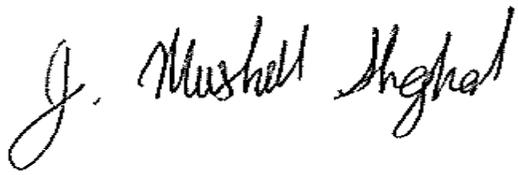
- ESD R&A program has effective processes in place to solicit, review and select high-impact/high-risk projects. The data clearly confirm that ESD consistently selects projects that are considered high risk and high impact. The data indicate systematically higher selection rates for both high-impact and high-risk proposals.
- The ESD R&A program has effective processes in place to solicit, review and select focused interdisciplinary projects. ESD inherently is interdisciplinary in Earth System Science and related focus areas. ESD has also offered for more than a decade an Interdisciplinary Science program with many ROSES solicitations. While there are isolated efforts to identify or conduct interdivisional work, there was no clear process or guidance within ESD.

Recommendations:

- To maintain the positive track record articulated within the two findings, the ESAC recommends that ESD program managers continue to provide explicit guidance to panel reviewers on programmatic goals related to impact and interdisciplinarity.
- The ESAC recommends that program managers provide explicit wording in calls for proposals and charge to review panels, for identifying cross-or interdivisional work across SMD, or otherwise identify effective strategies to meet this objective.
- The ESAC recommends that ESD set objectives for diversity in population of review panels, considering career stage, race, gender, and other cultural factors. Diverse panels may provide unique perspectives on impact and risk.
- The ESAC also recommends that ESD also separately analyze and track proposals to the New Investigator Program in future “risk/impact” studies to better understand the trajectory and likelihood of early career scientists to propose high-impact/high-risk projects in subsequent solicitations.

The next committee meeting is planned for Fall 2018.

Sincerely,

A handwritten signature in black ink that reads "J. Marshall Shepherd". The signature is written in a cursive style with a large, looped initial "J".

J. Marshall Shepherd, Chair
Earth Science Advisory Committee