Community Actions to Implement the NASEM Recommendations

XAG EDIA Working Group Discussion

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Consensus Study Report

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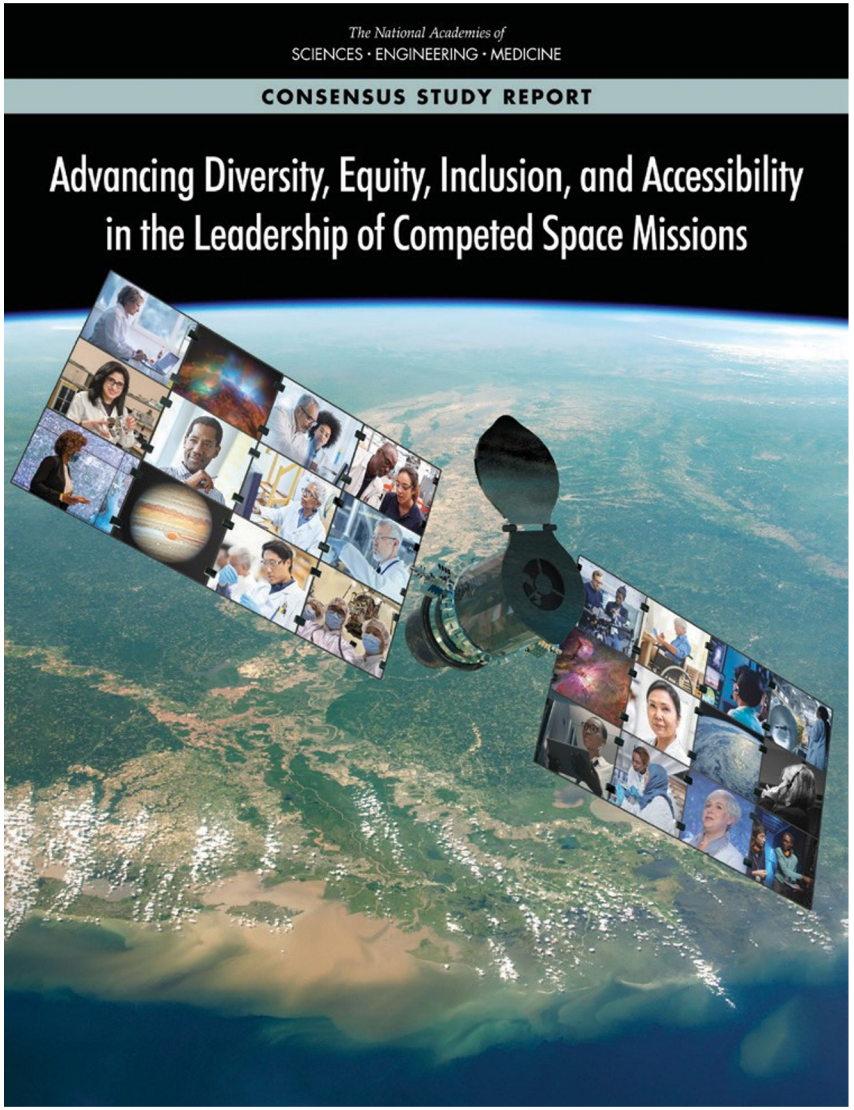
HIGHLIGHTS



Read or download the full report at https://nap.edu/26385

- Fostering diverse and inclusive teams that are highly skilled, innovative, and productive is critical for maintaining U.S. leadership in space exploration.
- In recent years, NASA has taken steps to advance diversity, equity, inclusion, and accessibility (DEIA) in their workforce by releasing its equity action plan, emphasizing how diverse and inclusive teams help maximize scientific returns, and requiring DEIA plans as part of announcements of opportunities.
- To further its efforts to advance DEIA, the Agency requested the National Academies undertake a study to evaluate ways NASA can address the lack of diversity in space mission leadership.
- Advancing Diversity, Equity, Inclusion, and Accessibility in the Leadership of Competed Space Missions outlines near and long-term actions NASA can take to make opportunities for leadership and involvement in competed space missions more accessible, inclusive, and equitable.
- Report recommendations range from changes to the mission proposal process to investments in STEM education and career pathways.
- The report makes 15 recommendations for advancing DEIA within NASA's Science Mission Directorate (SMD) divisions that support competed space mission programs.
- However, many of the report's recommendations could also be applied broadly to research at NASA and other federal agencies and institutions, leading to a more diverse research workforce.

FINDINGS and RECOMMENDATIONS for 5 AREAS of CONSIDERATION when COMPETING SPACE MISSIONS

- ❑ **OVERSIGHT OF DEIA IMPLEMENTATION AT NASA**
- ❑ **PROPOSAL PROCESS AND REVIEW**
- ❑ **DATA COLLECTION, ANALYSIS, AND REPORTING**
- ❑ **TRAINING AND MENTORING POTENTIAL PRINCIPAL INVESTIGATORS**
- ❑ **INVESTMENT IN CAREER PATHWAYS FOR UNDERREPRESENTED GROUPS**

OVERSIGHT OF DEIA IMPLEMENTATION AT NASA

- For NASA SMD to increase DEIA in competed missions, a cultural change is needed to continue to promote newer mindsets, policies, and practices.

- The NASA Advisory Council (NAC) has the opportunity to set the tone from the highest levels of the Agency and ensure that broadening participation in space missions remains a critical focus.

Recommendation

NASA should empanel an ongoing NAC committee specifically focused on DEIA to directly advise top NASA leadership.

PROPOSAL PROCESS AND REVIEW

- NASA's competed space missions are selected from proposals submitted in response to a public Announcement of Opportunity (AO). Mission team formation and concept development often occur years before an AO is released and require significant resources from proposers and institutions. This process is opaque, often personality-driven, and influenced by "who knows whom" in the community, which directly impacts the diversity of the Principal Investigator (PI) candidate pool.

- One demanding component of the mission proposal process is a site visit at the proposing institution, requiring institutional resources.

- NASA has taken steps to require DEIA plans as part of the competed mission AOs. However, DEIA criteria are not evaluated consistently and systematically, making it challenging to identify barriers in the mission proposal process.

PROPOSAL PROCESS AND REVIEW

Recommendations

NASA work to make the pre-proposal process transparent and accessible and use its own resources to expand support for pre-proposal and proposal efforts for diverse, external PIs.

NASA reconsider requirements for site visits, eliminate unnecessary elements, and disallow supplemental funding that may result in inequities across teams.

NASA SMD should require AOs to describe how DEIA dimensions are key for mission success, establish scorable proposal criteria for DEIA, and provide training so that reviewers can appropriately evaluate them.

NASA engage with DEIA experts to implement the new requirements in ways that broaden participation of underrepresented groups in missions and establish processes to continually measure the impact of the new requirements on NASA's DEIA goals.

DATA COLLECTION, ANALYSIS, AND REPORTING

- Inadequate data gathering, monitoring, and reporting are critical barriers to NASA's understanding of the demographics of its proposer pool, its ability to identify and eliminate barriers in the mission proposal process, and its ability to measure improvements.

- There is a strong need for demographic data on participation in the earth and space sciences across the whole career pathway to regularly assess the state of the profession, from undergraduate programs to the professional workforce.

Recommendations

NASA Headquarters should develop a systematic and transparent process to track proposal submissions and selections and seek professional statistical expertise to set in place the needed infrastructure. Additionally, it should generate an annual report on dimensions such as funding rates and diversity in participation in PI-led missions and grants. The report should be delivered to the DEIA subcommittee of the NAC as well as made publicly available.

NASA SMD should provide funding for professional organizations (e.g., American Institute of Physics, American Astronomical Society, etc.) to systematically carry out surveys of the space sciences workforce. Such surveys would inform the Agency of the level of participation from different demographic groups as well as barriers and opportunities for advancement along the entire career pathway.

TRAINING AND MENTORING POTENTIAL PRINCIPAL INVESTIGATORS

- Preparation for competed mission leadership starts early in an earth and space science career. Training and mentorship opportunities are valuable tools for developing a diverse pool of future mission leaders.

- Acquiring the necessary information about proposing and navigating the informal preproposal process presents critical challenges to aspiring PIs, particularly for those from less-resourced institutions.

- Women and racially minoritized space scientists report less access to mentors, less access to networks, and lower quality relationships with their doctoral advisors and senior colleagues. Inequitable access to high-quality mentoring relationships is a barrier to increasing diversity in the leadership of competed space missions.

Recommendations

NASA should expand and increase the frequency of training programs that are aimed at encouraging women and historically minoritized communities to become more involved in mission leadership.

NASA should help aspiring PIs gain leadership experience and connect with individuals with mission experience for mentorship. This could include integrating aspiring PIs as mentees in roles on mission teams, encouraging aspiring PIs to gain leadership experience via lower-cost mission opportunities such as suborbital rockets/balloons or cubesats, and expanding networking opportunities to connect aspiring and experienced PIs.

INVESTMENT IN CAREER PATHWAYS FOR UNDERREPRESENTED GROUPS

- NASA needs long-term, sustained investment in effective activities that inspire, educate, train, and mentor, to ensure that the current small pool of scientists of color has every opportunity to engage in NASA mission-related work and leadership.

- These investments should reflect a pathways approach spanning the academic and career continuum from post-secondary through post-PhD years to establish flexible and robust education-to-career trajectories into the earth and space sciences workforce and ultimately into PI-led missions.

- Historical underinvestment in the space science research infrastructure at HBCUs and other MSIs has limited the capacity at these institutions to compete for a NASA space mission. Further partnerships among NASA SMD, OSTEM, and MSIs, as well as with other federal agencies (such as recent partnerships with the National Science Foundation), would help advance the important work already underway at MSIs while strengthening participation from underrepresented groups in missions.

Recommendations

NASA SMD, in collaboration with NASA's Office of STEM Engagement (OSTEM), provide consistent and adequate funding for STEM initiatives that are explicitly centered on DEIA, address recruitment and retention challenges in the earth and space sciences, and support and expand opportunities for individuals from underrepresented groups.

NASA reinvest in talent development programs in partnership with MSIs, increase engagement via research opportunities for students and early-career researchers, and provide funding to sup- port mission-related work and activities as a means of enhancing research capacity at HBCUs, HSIs, and other MSIs. NASA should also finance collaborations between MSIs and NASA Centers and/or Research 1 universities currently active in space missions.

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This Report Highlights was prepared by the National Academies' Space Studies Board (SSB) in partnership with the Board on Science Education (BOSE) based on the report ***Advancing Diversity, Equity, Inclusion, and Accessibility in the Leadership of Competed Space Missions*** (2022). The study was sponsored by NASA. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of the sponsors. Download the report at **nap.edu/26385**.

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Possible Additions to PAC Presentation - what do we want the PAC to know about this? And which of these recommendations do we want to push to PAC.

Looking for comments from XAG EDIA working group:

1. **As far as we know NASA has not officially responded to this report. The PAC might be interested in the first recommendation from this report, which is for an EDIA position on the NAC. We suggest that the PAC consider a similar EDIA position on the PAC. Should this be a recommendation to NASA? Do they control the composition of the PAC?**

1. **We also note that the report recommendations on data collection are very similar to the first recommendation in the workforce finding of the planetary decadal. At least 2 NASEM studies have indicated the necessity of collecting demographic information of the field, which should make it a top priority. How does NASA plan to address these recommendations?**
    a. **We understand that the Paperwork reduction Act makes it difficult for NASA to implement its own survey, but other government agencies, such as NSF and NIH have been able to do it, can NASA follow their lead on this?**

1. **While support all the report's recommendations to NASA, we also realize that it is easier to make progress when a top-down approach is combined with a bottom-up approach. As such, we have taken the report's recommendations and come up with recommendations for Universities, Mission building institutions, etc. that will hopefully help NASA and the community to move forward on this issue.**

What Can We Do as a Community?

- Next slide shows suggested implementation levels (Funding agencies, Institutions, Research Teams, Missions). This is a first attempt at generating some discussions on how we as a community can advocate for some of these recommendations from the bottom up, rather than waiting for NASA to implement them from the top down.

- To add your thoughts and, eventually, some suggestions on how you can advocate for these recommendations at the level at which you have some influence, use the “Insert Comment” feature in the toolbar (circled below in red) for the “Comments” column in the spreadsheet. (The “Comments” column is not shown in the next slide to conserve some space).

- The Google spreadsheet can be found here. Please do not share it past the EDIA XAG Working Group.

Implementation Level for 5 Areas of Consideration - Findings and Recommendations:	Funding Agencies (e.g. NASA)	Institutions (e.g. JPL)	Research Teams (e.g. SSERVI)	Missions (e.g. Europa Clipper)
OVERSIGHT OF DEIA IMPLEMENTATION AT NASA				
NASA should empanel an ongoing NAC committee specifically focused on DEIA to directly advise top NASA leadership.	X	X		
PROPOSAL AND PROCESS REVIEW				
NASA work to make the pre-proposal process transparent and accessible and use its own resources to expand support for pre-proposal and proposal efforts for diverse, external PIs.	X			
NASA reconsider requirements for site visits, eliminate unnecessary elements, and disallow supplemental funding that may result in inequities across teams.	X			
NASA SMD should require AOs to describe how DEIA dimensions are key for mission success, establish scorable proposal criteria for DEIA, and provide training so that reviewers can appropriately evaluate them.	X			
NASA engage with DEIA experts to implement the new requirements in ways that broaden participation of underrepresented groups in missions and establish processes to continually measure the impact of the new requirements on NASA's DEIA goals.	X	X	X	X
DATA COLLECTION, ANALYSIS AND REPORTING				
NASA Headquarters should develop a systematic and transparent process to track proposal submissions and selections and seek professional statistical expertise to set in place the needed infrastructure. Additionally, it should generate an annual report on dimensions such as funding rates and diversity in participation in PI-led missions and grants. The report should be delivered to the DEIA subcommittee of the NAC as well as made publicly available	X	X		
NASA SMD should provide funding for professional organizations (e.g., American Institute of Physics, American Astronomical Society, etc.) to systematically carry out surveys of the space sciences workforce. Such surveys would inform the Agency of the level of participation from different demographic groups as well as barriers and opportunities for advancement along the entire career pathway.	X	X	X	X
TRAINING AND MENTORING POTENTIAL PRINCIPAL INVESTIGATORS				
NASA should expand and increase the frequency of training programs that are aimed at encouraging women and historically minoritized communities to become more involved in mission leadership.	X	X	X	X
NASA should help aspiring PIs gain leadership experience and connect with individuals with mission experience for mentorship. This could include integrating aspiring PIs as mentees in roles on mission teams, encouraging aspiring PIs to gain leadership experience via lower-cost mission opportunities such as suborbital rockets/balloons or cubesats, and expanding networking opportunities to connect aspiring and experienced PIs.	X	X	X	X
INVESTMENT IN CAREER PATHWAYS FOR UNDERRPEPRESENTED GROUPS				
NASA SMD, in collaboration with NASA's Office of STEM Engagement (OSTEM), provide consistent and adequate funding for STEM initiatives that are explicitly centered on DEIA, address recruitment and retention challenges in the earth and space sciences, and support and expand opportunities for individuals from underrepresented groups.	X	X	X	X
NASA reinvest in talent development programs in partnership with MSIs, increase engagement via research opportunities for students and early-career researchers, and provide funding to support mission-related work and activities as a means of enhancing research capacity at HBCUs, HSIs, and other MSIs. NASA should also finance collaborations between MSIs and NASA Centers and/or Research 1 universities currently active in space missions.	X	X	X	X