

DIVERSITY, EQUITY, INCLUSION AND ACCESSIBILITY INITIATIVES ON THE MARS 2020 SCIENCE TEAM AND IMPLICATIONS FOR NASA PLANETARY SCIENCE MISSIONS. A. Vaughan¹, E. Ravanis², C. Newman³, E. Jensen⁴, P. Patel⁵, C. Herweigh⁶, K.M. Stack⁶, J. I. Simon⁷, C.D.K. Herd⁸, S.A. Connell⁹, J. Bell III¹⁰, E.A. Cloutis¹¹, ¹Apogee Engineering, LLC, Flagstaff, AZ, ²University of Hawai‘i, Mānoa ³Aeolis Research ⁴Malin Space Science Systems, ⁵University College, London, ⁶Jet Propulsion Laboratory, California Institute of Technology, ⁷NASA Johnson Space Center, ⁸University of Alberta, ⁹Purdue University, ¹⁰Arizona State University, ¹¹University of Winnipeg.

Introduction: For the first time, the most recent NASA Decadal Survey for Planetary Science and Astrobiology includes an entire chapter devoted to the state of the profession [1]. Understanding that people are NASA’s greatest resource, it specifically looked into issues of Diversity, Equity, Inclusion, and Accessibility (DEIA) to make recommendations for recruiting and retaining the best talent. It calls on both NASA leadership and the NASA community to engage with these recommendations to advance the state of the profession.

Prior to this call, the Mars 2020 Science Team (M20ST) created a DEIA working group (WG) in September 2020 to discuss DEIA issues as they relate to our team practices and behavior, and to facilitate initiatives that support the broader team. These initiatives include: DEIA discussions within each instrument team; creating a statement of team values and expected behaviors; a team-wide mentoring program; Bystander Intervention training; and collecting data through a team-wide survey. We report here on those initiatives and barriers we see to implementing DEIA initiatives on a NASA mission comprised of representatives from many different institutions and countries.



Figure 1: Mars 2020 Perseverance rover Science Team during the June 2023 team meeting in Paris. Credits: JC Domenech/MNHN Paris.

DEIA Initiatives: *DEIA Investigation Discussions.* Given the large size of the M20ST (500+ team members), it is difficult to engage the entire team at one time in reflective and open discussion on DEIA topics. To facilitate these discussions, a small group of ~10 DEIA WG members met regularly between September 2020-

February 2021 to draft a Mars 2020 “Values Statement” and articulate team-specific definitions of “diversity,” “equity,” “inclusion,” and “accessibility.” Team members within each payload investigation team, as well as the JPL Science Office and participating scientist groups, then led meetings for their investigation’s team members to discuss these draft statements and definitions, M20ST DEIA goals, and barriers to achieving these goals. Discussion leads from each investigation reported the results of these discussions back to the DEIA WG. One series of these discussions has been held since the rover landed in February 2021.

Mars 2020 Positive Behaviors and Values. Guidance from the Decadal Survey stated that mission teams should have Codes of Conduct in addition to their usual “Rules of the Road” to enable a culture of safety and inclusion. Building upon the initial DEIA WG draft of a values statement, input from the investigation discussions, and the Code of Conduct draft created by the Europa Clipper team, the DEIA WG drafted a thoughtfully named document, “Positive Behaviors and Values on the Mars 2020 Science Team” as opposed to a Code of Conduct. This document includes a Values Statement, strategies to implement those values, positive behaviors we expect from team members, and reporting guidelines for team members to follow in case they experience or witness any negative or harmful behaviors. The document was created collaboratively keeping in mind recommendations from the Decadal Survey and related white paper submissions. It was sent for three external reviews to planetary science community members outside the M20ST who are involved in DEIA work, and reviewed by JPL project science management and Human Resources to reach a final draft that was approved by team leadership and implemented in August 2023.

Mentoring Program. We set up a teamwide mentoring program to facilitate connections between team members across different instrument/investigation teams. After discussion about mentoring approaches that drew upon experiences of mentoring programs at team members’ respective institutions, we designed this mentoring program to be flexible according to available time commitments and wants/needs. A spreadsheet allows mentors to volunteer and detail the kinds of mentoring they are available to provide (e.g. career advice,

general support, scientific expertise) and their available time commitment. Mentees contact mentors individually to arrange a meeting. This kind of mentoring allows all team members to seek guidance outside of their institutions and/or main area of study or practice to broaden their experiences and build inclusion. As of December 2023, 33 team members have signed up to act as mentors. The program will be evaluated via regular surveys of the full team.

Bystander Intervention Training. The DEIA WG was able to organize two Bystander Intervention virtual trainings for M20ST members. These four-hour workshop-style trainings are federally-approved and provided by facilitators from the USGS at no cost to planetary science groups. The small-group setting allows for scenario-based discussions to develop, for participants to learn about harmful behaviors and comments to be aware of, and provides tools for participants to respond in the moment when those harmful behaviors occur. Invitations to attend these training opportunities were first sent to science operation leaders on the team who facilitate most of the science meetings, and available spots beyond that were open to anyone on the M20ST, including graduate students and early career researchers. In total, 31 team members participated in these initial opportunities.

Team-Wide DEIA Survey. To meet several goals including 1- gauging team members' understanding of DEIA values, 2- reminding them of the new Positive Behaviors and Values documentation and reporting guidelines, and 3 - collecting feedback on areas of team strength and areas the team would like to see the DEIA WG focus on, an anonymous team-wide survey was distributed. Seventy-two team members completed the survey, and work is in progress to organize those results, including producing an anonymous summary of written comments, to share with the science team.

Meeting accessibility: Day to day operations for Mars 2020 are conducted with a large remote component given the spread of instrument teams across the globe, and all team meetings are conducted online. Science discussions and working group meetings are recorded. Closed captioning is available on WebEx, and best practices for running meetings were included in our Mars 2020 Positive Behaviors document. These include respectful behavior, acknowledging a wide range of time zones represented by participants, and ensuring the chat is monitored for those who feel more comfortable typing questions/comments rather than speaking aloud. Full science team meetings, which occur ~once a year, resumed as of 2021 in person, but are hybrid so a virtual option is available and all meetings are recorded. The use of pronouns in WebEx names and on badges is encouraged.

Future Plans and Implementation Barriers:

Meeting Observer program: The Mars 2020 DEIA WG has as a future priority the desire to develop a Mars 2020 Meeting Observer program similar to the InSight mission's successful "Seers" program [3] which was itself inspired by pilot programs on the Europa Clipper, Dragonfly, and Psyche missions. This program would consist of funding the in-person attendance, at one M20ST meeting per year, of ~10 Early Career Researchers (ECRs) from institutions/departments with no or minimal existing links to planetary missions. The goal is to broaden the diversity of ECRs involved in future planetary missions by providing an opportunity to observe a mission team meeting and network with team members. Funding for Meeting Observer programs has historically come from mission teams themselves, hence can be difficult to implement from a budgetary perspective. We thus encourage the continuation of NASA calls for proposals that are able to fund such initiatives for NASA missions.

Barriers: Despite support from both Mars 2020 project science leadership and at the instrument PI levels, the Mars 2020 DEIA WG and the PSG faced difficulties in implementing a "Code of Conduct" due to concerns about clashing with institutional codes of conduct, legal ramifications, and enforceability. We found it a challenge to provide a specific reporting chain outside of the instrument team PI structure when everyone is at different institutions and spread across different countries. This is an issue that is not unique to the Mars 2020 mission and ideally needs to be addressed by NASA Science Mission Directorate, perhaps facilitated by NASA's Chief Scientist Office. Selected DEIA recommendations are being implemented at various Mars 2020 team members' host institutions on a best effort basis.

New badging requirements at NASA mean that Mars 2020 team members have to travel in-person to NASA Centers or JPL to obtain a badge, without additional funds being designated to the team for such travel. This will make it harder to bring in a wide variety of ECRs to give experience on planetary missions. For NASA to continue to adhere to its commitment to the recommendations listed in [1] these considerations need to be front and center of such changes and work to mitigate such undesirable effects.

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References: [1] Committee on the Planetary Science and Astrobiology Decadal Survey (2022) The National Academies Press. [2] Diniega, et al., (2021) *AAS Bulletin*, 53,4. [3] Daubar et al., (2022) *LPSC*, abstract #2146.