A SYSTEMS APPROACH TO DEIA: WE ALREADY KNOW HOW TO DO THIS. D. Scalice[1], S. Domagal-Goldman[2], M. Kirven-Brooks[1], and A. Gronstal[1]. [1]NASA Ames Research Center (daniella.m.scalice@nasa.gov), [2]NASA Goddard Space Flight Center (shawn.goldman@nasa.gov).

Introduction: Lack of diversity, equitable access to opportunities, and authentic participation of people with marginalized identities in spaces traditionally defined by white supremacy is well documented and understood as a systemic issue rather than an individual one. Programs alone aren't the answer. They're easy to cut as political climates and leaders change, are more reliant on individual efforts that may fail or fall short or intended purposes, and do not foster "lessons learned" from past efforts. A "programs-only" approach can foster tokenization and create a frame of separate/extra/isolated around DEIA that reinforces imbalanced power dynamics. While representation may be increasing, the resulting environment isn't automatically safe for applicants/participants of marginalized identities, and many end up leaving. DEIA needs to be incorporated into everything we do, and baked into the foundation of our culture and value system, so much so that it ceases to need to be named.

Here we present ideas and case studies to help inform systems-based thinking toward ensuring our workplaces are actively expressing diversity through equitable access and anti-racist culture.

Models for Systemic Success: From our perspective within NASA, we see two main examples of systemic integration of new values from which to draw inspiration and direct guidance on how to implement systemic change toward expression of DEIA ideals.

First, NASA has five very broad, stated values underpinning its mission: Safety, Integrity, Teamwork, Excellence…and the newest: Inclusion. In terms of a systemic infrastructure supporting the expression of these values, the most concrete is that serving Safety.

NASA has invested in a tremendous amount of infrastructure to ensure a "zero-harm culture" around physical safety and cybersecurity, by standing up an Office of Safety and Mission Assurance and an Office of the Chief Information Officer, installing experts, mandatory trainings, enrichment classes, messaging (posters, etc.), events, documentation processes, and routine meeting practices into the everyday life of its employees and contractors, as well as management and oversight to ensure this value is implemented.

We see the expression of DEIA ideals and values as essential to a safe workplace. If we take classes on how to safely use our devices or sit at our desks so we can be ever mindful of safety, we should be similarly trained on how to de-program from white supremacy to help build a better, safer environment for participants of marginalized identities. Many of the other frameworks and tools used by our safety culture may also help. For example, such tools are regularly used to identify the severity and likelihood of specific risks, to develop plans to reduce their likelihood and/or severity, and to track progress on those plans. These systemic approaches to technical and information risks can and should also be applied to the cultural risks individuals are exposed to in our workplace.

The second example comes from within the Science Mission Directorate's prior Education and Public Outreach (E/PO) system. At the head of this system was policy that directly outlined how E/PO was to be implemented, including a funding guide at 1% for missions and 5% virtual institutes. E/PO plans were solicited as part of these RFP's. Once funded, other R&A program PI's had access to E/PO funding via special solicitations within ROSES. An Explanatory Guide was developed to support those proposals [1, 2]. A position for a dedicated leader within the SMD "front office" was established and filled.

A robust piece of the system was the installation of E/PO Leads within the mission and research teams – a collaborative approach that recognized the interdisciplinary nature of E/PO. These leads were professionals from both traditional education and science backgrounds, united in bringing the science of NASA's research to learners of all shapes and sizes. They were embedded within the scientific teams, participating in all team activities, ensuring their educational products and programs reflected cutting edge research and incorporated the greatest asset—the scientists themselves. Even more robust was the ecosystem in which these professionals communicated, coordinated, collaborated, and cooperated, which ensured nothing was done in isolation, duplicative efforts were avoided, and the caliber of their work was always elevated through ongoing professional development.

E/PO efforts were budgeted and managed within the mission lines themselves, allowing for flexibility, creativity, and lithe transitions when new opportunities or partnerships to grow the work became available. This also ensured that the E/PO leads and their teams had access to the most recent scientific theories and data. The system was bolstered by significant support and advocacy at all levels of leadership in SMD, from

mission leads to Division Directors, to the Associate Administrator.

In a long-term way, such as was with the NASA Astrobiology Institute (NAI), there was capacity and time to fully express this E/PO system into a lasting cultural change in the astrobiology scientific community since part of the NAI's mission was to grow and build that community from the ground up. Over time and via cultivation of these values in the early career/next gen segment of our community, an identity of "science educator/communicator" evolved along with "scientist." These values continue to be passed on as that generation is now mentoring students in their new places and spaces, thereby creating a system and culture that encourages and uplifts E/PO in ways that reach far beyond the original funded efforts.

Applying Successes to DEIA: We envision a similar system for DEIA values and ideals that may draw directly or indirectly from these two systems within NASA. The most important first step is to bring together relevant voices, to co-create new systems that will create immediate successes in DEIA, and create a culture that will further expand on these successes. This requires answers to many questions: What elements does it need? How will we decide? What communities and experts have a stake in or experience with these discussions? How can we best include their voices? Within NASA, we advocate for co-creativity of the system between the agency and the community/local/awarded team level. Scholarship and a strong knowledge base of historical and contemporary issues is critical. Processes and policies will need to be implemented at all levels: at NASA HQ, at the interface of HQ and the community, within teams and projects, and at the community level with review over time [3]. Long-term investment toward lasting cultural change will take patience and commitment [4].

We suggest beginning with co-creative processes (workshops, retreats) that bring together the grassroots perspectives and experiences of the scientific community and its institutions with scholarship and leadership that represents the realities of those whom our work in DEIA (and our culture change) will ultimately serve. We must develop shared goals and objectives, milestones, and benchmarks, and agree to start where we're at and let go of white supremist expressions such as perfectionism.

We must co-create the system as a community, wherein individual growth, shared in community, leads to long term cultural change.

References: [1] NASA (2010) Explanatory Guide. [3] A. Krishnamurthi and L. Cooper. (2011) Bulletin of the AAS, Vol. 37, p.505. [4] D. Scalice et al. (2021). Bulletin of the AAS, 53(4). [5] D. Gray et al. (2020) Nature Reviews Gastroenterology and Hepatology, Vol. 17, p. 589-90.