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# Past as prologue: Lessons from the Lamont-Doherty Earth Observatory Diversity, Equity, and Inclusion Task Force

Kailani Acosta , Benjamin Keisling  and Gisela Winckler 

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## ABSTRACT

Past and current institutional cultures have contributed to the overrepresentation of white men in geoscience. Acknowledging and learning from this history is critical to building a forward-looking, innovative, and anti-racist geoscience community. To change institutional culture and address inequities and exclusion, the first step for many institutions is to establish a committee or task force focused on diversity, equity, and inclusion. In this manuscript, we reflect on our successes, challenges, and experiences co-chairing the Diversity, Equity, and Inclusion Task Force at Columbia University's Lamont-Doherty Earth Observatory in 2020. We organized a transparent, community-driven effort that lasted for six months with clear expectations around outcomes. We identified priorities, goals, and recommendations for institutional change, ranging from large-scale structural changes to individual actions. Specifically, we found that (1) considering power dynamics, (2) striking a balance between tone and content, (3) addressing how financial constraints intersect with institutional values, and (4) respecting the power and politics of data were critical to our work. Here we present a roadmap for creating robust and visionary institutional change. In addition, we discuss the obstacles, barriers, and opportunities we encountered through our process, in order to provide strategies that other institutions can use to address their own needs, and to advance justice in geoscience as a whole. Moreover, we discuss how this structure and lessons learned are broadly applicable to academic institutions at various scales and beyond geoscience.

## ARTICLE HISTORY

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Demographics; DEI committee; recommendations

## Introduction

Modern geoscience was founded on the exclusion of, marginalization of, and violence against Black, Indigenous, and other people of color (Yusoff, 2018). The geosciences were historically dominated by white men, which began to change in the latter half of the 20th century as cisgender white women saw gains in representation (Bernard & Cooperdock, 2018). In 2016, 85 percent of US geoscience PhDs were awarded to white men and women, meaning that white people are overrepresented in geoscience by as much as 15 percent—a metric that has changed little in the last half-century (Bernard & Cooperdock, 2018; Bromery et al., 1972). Throughout this time, a number of processes have allowed racism to prosper, including disinterest (Bacon-Bercey, 1978), ignorance (Jones, 2021), gaslighting (Rodrigues et al., 2021), and overt racism (Morris, 2021). The experiences of people of color at geoscience institutions speak to the enduring harm that racism continues to inflict on our communities (Livingston, 2018).

Efforts to broaden participation and diversity in the geosciences have been occurring for decades. One of the earliest

known efforts to specifically bring more people of color into the geosciences is documented in a conference report from nearly 50 years ago. In 1972, the First National Conference on Minority Participation in Earth Sciences and Mineral Engineering held one of the first formal discussions on the lack of diversity in the geosciences. This set the stage for many of the frameworks for institutional responses and action in DEI in the geosciences, including investment in scholarships for “minority” students and introducing geoscience topics at the K-12 level to create a more robust pipeline into geoscience (Bromery et al., 1972). At the same time, subdisciplines of geoscience, like atmospheric sciences, were illuminating obstacles and strategies for broadening participation specifically among Black students (Bacon-Bercey, 1978). Leadership also came from geoscience organizations like the American Geophysical Union (AGU) and the Geological Society of America, both of which established diversity-focused committees in the 1970s. Around this time, groups like the National Association of Black Geoscientists (1981), the American Indian Science and Engineering Society (1977), and Society for Advancement of Chicanos

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and Native Americans in Science (1973) were founded as the first affinity spaces for nonwhite geoscientists to network and build community. Nevertheless, throughout the rest of the 20th century, cisgender white women were the only group that saw actual gains in representation in geoscience (Bernard & Cooperdock, 2018). Since then, institutions have continually rearticulated and reinvigorated their approaches to broadening participation beyond cisgender white women with varying degrees of success. In 2000, AGU wrote its first Diversity and Inclusion Strategic Plan, which was updated in 2018. These plans have largely been forward-looking, and do not directly reference or address historical efforts and their lack of success, even within AGU, to advance racial and ethnic diversity (AGU, 2000, 2018).

Efforts to support, engage, and retain people of color in the geosciences also occur at multiple scales and with different goals. Here we do not attempt to provide an exhaustive list of programs, but to highlight programs that have had a well-documented and outsized impact on the geoscience discipline. Over the last 10 years, the Partnership Education Program (PEP) at Woods Hole has brought 153 students, more than half from minority-serving institutions (MSIs), to Woods Hole for a six-week internship program. In partnership with the University of Maryland Eastern Shore, students receive course credit and a stipend for their participation (Liles, 2019). Dozens of these students have gone on to receive advanced degrees, representing a major pathway for students from MSIs into the broader geoscience community; 63% of PEP graduates that responded to a follow-up survey are still working in STEM (Liles, 2019). The PEP program has also been adaptive and responsive to the particular challenges posed by the COVID-19 pandemic (Scott Price et al., 2020). The Significant Opportunities in Atmospheric Research and Science (SOARS) program at the University Center of Atmospheric Research has also had an outsized impact in providing supportive pathways into geoscience for students of color (Pandya et al., 2007). Within the MSI community, the Howard University Program in Atmospheric Sciences (HUPAS) exemplifies the impact that investment in MSIs can have on the broader discipline (Morris et al., 2012). Through stakeholder support, university investment, and targeted recruitment strategies, the program became a national leader in the retention of diverse cohorts, producing over 50 percent of the Black PhDs and 30 percent of the Latina PhDs in Atmospheric Sciences in the US from 2006 to 2018 (Morris et al. 2012; Morris, 2021). Federal investment has also catalyzed change at a number of institutions. The National Science Foundation (NSF) supported Geoscience Opportunities for Leadership in Diversity (NSF GOLD) Program aims to achieve greater and more systemic diversity by creating a network of leaders building a repertoire of evidence-based best practices and resources to promote belonging, accessibility, justice, equity, diversity, and inclusion (BA-JEDI) in geoscience education and research (Posselt et al., 2019). These programs demonstrate the potential to recruit, support, and retain people of color with the right combination of leadership and investment.

In order for such efforts to lead to real change within the geoscience discipline, it is critical to ensure that all geoscience

institutions are welcoming and supportive environments for students, staff, and scholars of color (see Mogk, 2021 and references therein for a recent review). Studies have shown that geoscience organizations stand to benefit from becoming more equitable (Núñez et al., 2020; Ali et al., 2021). Yet, geoscience organizations have struggled to achieve this. For example, in 2004, the leaders of six Woods Hole science institutions signed a memorandum committing their institutions to work together to attract and retain a more diverse workforce, establishing the Woods Hole Scientific Community Diversity Initiative. The Diversity Initiative created the Woods Hole Diversity Advisory Committee to make recommendations and coordinate initiatives such as lectures on diversity and inclusion, Black History Month events, community discussions, Diversity Awards, and listening sessions. The Diversity Initiative commissioned a report on the state of diversity within Woods Hole, utilizing a methodology that relied on personal narrative as a source of knowledge (Livingston, 2018). The report revealed a gulf between perceptions of inclusivity in the scientific community within Woods Hole and the lived realities of the few people of color employed in scientific positions in a major marine science hub (Livingston, 2018). Similar efforts became widespread in 2020, which was a year of institutional introspection and commitment to change, leading many administrative structures to create frameworks that could accelerate change toward equity and inclusion both within geoscience and more broadly. Students in Massachusetts Institute of Technology (MIT)'s Department of Earth, Atmospheric, and Planetary Sciences (EAPS) created a DEI Action Plan, a list of recommendations and action items following a department-wide discussion on #ShutdownSTEMDay on June 12, 2020. They created the EAPS Toward Inclusion, Diversity, and Equity (TIDE) scorecard to keep track of progress toward DEI goals, with scores ranging from zero to one (MIT EAPS, 2020). At a broader scale, the University of Toronto commissioned a Task Force to advise on action-oriented measures and solutions to address anti-Black racism and to promote Black inclusion. The Task Force delivered 56 recommendations to address anti-Black racism and create a more inclusive and welcoming community for all. University of Toronto's leadership accepted all 56 recommendations a mere 15 days after the report was received and implementation started immediately (Thorold, 2021).

Despite these broad and concerted efforts, the path to achieving equity is often institution-specific and affected by many local factors. As shown in these examples, when moving to address DEI concerns, the first step that many institutions take is to establish a committee or task force. For us, it was important that our institution's prestige and historical leadership extended into efforts to broaden participation in geoscience; we were also passionate about creating community buy-in and investment in the process without sacrificing a vision of the future that centered our community's most marginalized.

### **Lamont-Doherty Earth Observatory**

Lamont-Doherty Earth Observatory (LDEO/Lamont) is a scientific research and educational institution specializing

in geoscience studying the origin, evolution, and future of the natural world, under the larger umbrella of the Earth Institute of Columbia University. LDEO has five main divisions, including Biology and Paleoenvironment; Geochemistry, Marine Geology and Geophysics; Seismology, Geology, and Tectonophysics; and Ocean and Climate Physics. LDEO is home to over 300 scientific researchers, more than 90 graduate students, and many support staff. Despite the institution's large size, due to logistical and geographical barriers, there are relatively few undergraduates on LDEO's campus. Though LDEO is located in one of the most diverse metropolitan areas in the US, LDEO lacks diversity. Throughout its history, LDEO's scientists, community, and science have not been wholly inclusive of (and equitable for) people from all backgrounds, races and ethnicities, genders, or sexual orientations. LDEO is not unique in this regard, and previous work at the institution has addressed some elements of its legacy of exclusion (e.g., Bell et al., 2005; Dutt, 2015). In 2005, the Earth Institute received a \$4.2 million grant for the ADVANCE program at Columbia University (2005–2009), which focused on increasing the recruitment, retention, and advancement of women scientists through institutional transformation (Bell et al., 2005). From 2005–2011, the number of white women scientists on the newly expanded Research Professor track increased from 10 (~14 percent of Lamont's researchers) to 16 (~22 percent of Lamont's researchers) (Bell et al., 2005; Dutt, 2015). During the same time frame, the number of women of color (two) remained the same. This failure to attract and recruit women of color highlights a fundamental flaw at Lamont that persisted despite the institutional and cultural changes catalyzed by the ADVANCE program for women in STEM—though the number of women scientists increased over time, the number of scientists from ethnic and racial minorities did not, even when there was a focus on institutional transformation and recruiting underrepresented groups. At the start of the ADVANCE program in 2005, a work environment survey showed that “in general, men and women do not strongly believe that diversity is a goal of their department/unit” (OAAD, 2005). Fifteen years later, this same sentiment persists; a 2020 survey found that “employees generally do not feel steps have been taken to establish resources and accountability mechanisms for promoting and tracking diversity and fairness within LDEO” (Earth Institute, 2020).

The overrepresentation of white geoscientists became a focal point for the geoscience community following the amplification of calls for racial justice sparked by extrajudicial police killings of George Floyd, Breonna Taylor, and other Black people in 2020 (Bell & Lozier, 2021). This catalyzed the establishment of the Lamont Diversity, Equity, and Inclusion Task Force through a charge created by Dr. Maureen Raymo, Interim Director, in July 2020. In addition to three co-chairs, the Task Force had 18 voting members and four non-voting *ex officio* members appointed by the administration. The voting members spanned the five divisions of LDEO, administration, facilities, and the two other scientific institutes that share Lamont's campus (International Research Institute for Climate and Society (IRI) and the Center for International Earth Science Information Network (CIESIN)) (Figure 1A).

The charge to the Task Force was to identify recommendations that would achieve three goals: 1) create a diverse community committed to the inclusion and success of traditionally underrepresented groups; 2) ensure a research and teaching environment free from explicit and implicit bias; and 3) create a safe and welcoming campus where everyone thrives.

When moving to address DEI concerns, the first step that many institutions take is to establish a committee. Here we reflect on the process and outcomes of chairing the Task Force and authoring a report outlining recommendations for institutional change, using our institution as a case study on creating frameworks for DEI within geoscience institutions. These DEI concerns are common to nearly all higher education institutions and DEI-focused committees, and our intention is to create a shared path for individuals and institutions alike for more inclusive and diverse communities. We are sharing our experiences as Task Force co-chairs to reflect on what worked well, what challenges we faced, and how we overcame them. In the methods, we detail how we structured the Task Force, collected data, and authored a report. In the results, we outline our findings from each Working Group and created a roadmap that will be useful for institutions, groups, and individuals working toward DEI goals. In the discussion, we reflect on our experiences and provide specific recommendations for individuals and institutions to progress toward improving DEI. While the LDEO context is unique in some ways, we also reflect on how the lessons we learned can be applied in both similar institutions, other institutional contexts, the field of geoscience, and other academic fields more broadly.

## Methods

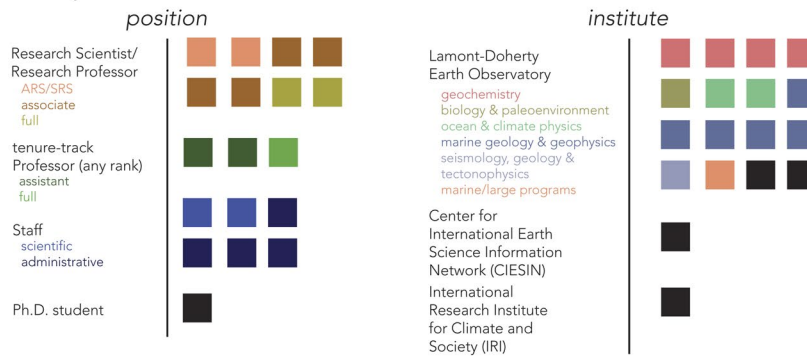
### *Researcher positionality statement*

Kailani Acosta is a cisgender woman of color from Long Island, New York. Acosta was a third-year PhD student studying biological oceanography at the institution when this work occurred and is now a fifth-year PhD candidate. Acosta created the Seminar Diversity Initiative, a program focused on broadening the diversity and inclusivity of departmental scientific seminars, and worked to enhance and create DEI-focused courses, cultural activities, and more equitable and inclusive science for all. She is interested in broadening access to science and creating longstanding frameworks focused on changing institutional norms.

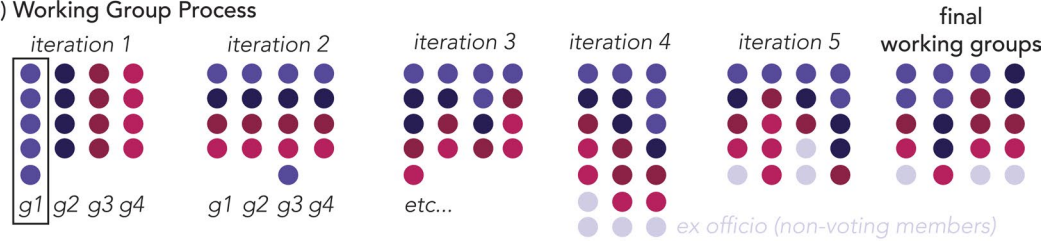
Benjamin Keisling is a cisgender, queer, white man from the Pacific Northwest. Keisling was a Postdoctoral Fellow at the institution when this work occurred. Keisling was an advocate and activist for broadening participation as a graduate student (2013–2019), and in particular built coalitions across the graduate student community at UMass-Amherst to foster microenvironments of support for members of historically excluded groups. One of his active research interests is the history of brave leadership, activism, and coalition building within the geosciences.

Gisela Winckler is a cisgender white woman originally from Germany. She is a climate scientist studying climate change and marine biogeochemistry and is the Associate Director of

## A) Task Force Composition



## B) Working Group Process



## C) Working Group Template

WORKING GROUP TOPIC/THEME: \_\_\_\_\_  
 Working Group Members: \_\_\_\_\_

As a working group, develop answers to the following questions based on the Working Group Topic/Theme listed above. All of the resources that have been shared with the Task Force so far are compiled in this folder. Suggested resources especially relevant to your assigned topic can be found under that topic in the Scope of Work.

- DREAM: What does our "ideal Lamont" look like?
- INVENTORY: Which LDEO initiatives currently address this theme, and what are the barriers/friction points to their full success in supporting the Charge?
- RESEARCH BASED APPROACHES: What are other institutions doing to address this theme, and what best practices, including in peer-reviewed literature and published books, have been developed around implementation, accountability and sustainability of that work?
- LDEO D&I PLAN: What is missing from LDEO's strategy for addressing this theme?
- How will we keep track of progress and action taken towards each goal? How will LDEO be kept accountable going forward?

## RECOMMENDATIONS

What recommendations relevant to the theme of this working group would you propose, in the following categories:

Recommendations for Immediate Action

Recommendations for Short-term (<6 mo) Action

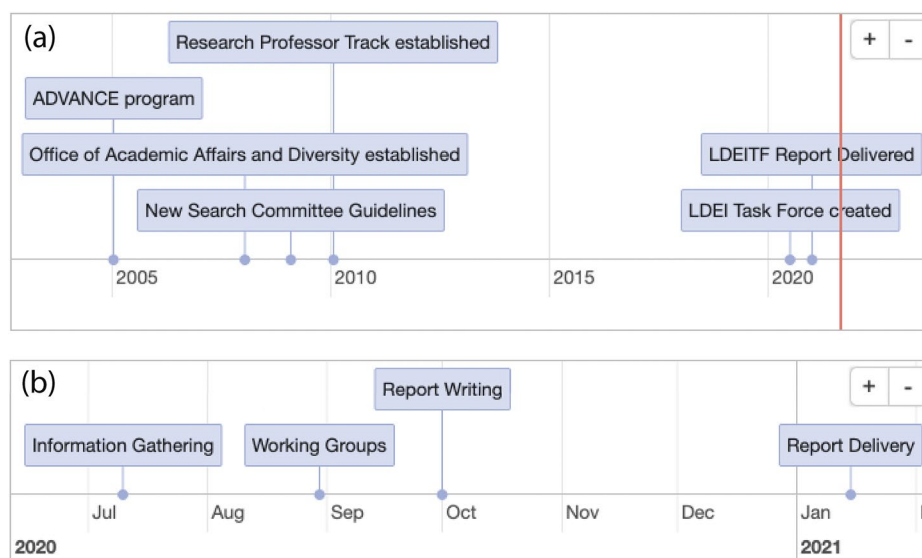
Recommendations for Long-term (>6 mo) Action

**Figure 1.** Lamont Diversity, Equity, and Inclusion Task Force Makeup 2020. The Lamont Diversity, Equity, and Inclusion Task Force was appointed by the administration and made up of 18 members, four exofficio members, and three co-chairs from different levels of the Lamont community. (a) Task Force Composition. The composition is broken up by position, institute, and division; (b) Working Group Process. The second phase of the Task Force process, Working Groups, was determined after five iterations of practice rounds with different groupings of Task Force members until the final Working Groups were free of harmful power dynamics and optimal for research progress; (c) Working Group Template. Each Working Group worked through this template to develop ideas and compile resources around their Working Group theme.

the Geochemistry Department at the institution. She teaches classes on oceans and climate science, and has been a faculty facilitator for a Seminar on Race, Climate Change, and Environmental Justice. She is interested in creating sustainable BA-JEDI-focused research, education, and communication pathways toward climate action, including improving relationships with communities most affected by climate change.

**Task Force governance**

Here we share our detailed methodology for other institutional contexts and other Task Forces to come. The co-chairs structured the work of the Task Force into three phases: Information Gathering, Working Groups, and Report Writing (Figure 2). Each phase lasted about seven weeks. We



**Figure 2.** Institutional DEI History and Task Force Timelines. (a) Lamont’s history of action on DEI started in 2005, with the ADVANCE grant, which focused on institutional transformation and increasing the number of women scientists. As a result of the ADVANCE program, the Office of Academic Affairs was established in 2008, new search committee guidelines were implemented in 2009, and the Research Professor track was established and expanded in 2010. Other DEI actions were spearheaded by the Office of Academic Affairs and Diversity (OAAD) after its creation, but the next largest institutional step focusing on DEI was not until July 2020, when the LDEI Task Force was created. The Task Force Report of recommendations for institutional and individual action on DEI was delivered to the administration on January 15, 2021. After this, the Task Force was no longer in action (the vertical red line denotes the end of the LDEI Task Force); (b) Lamont Diversity, Equity, and Inclusion Task Force Process. The Task Force was created in July 2020 and began with Information Gathering, doing research on DEI actions and running practice working groups (see Figure 1). After deciding on four specific themes around which to organize, we split into Working Groups to deeply delve into themes to create specific recommendations. Report writing commenced in October, and culminated in a Report that was delivered to the administration on January 15, 2021.

structured our final report around a core set of recommendations, refined through the three phases of the process. To create these recommendations, we held weekly virtual meetings with agendas and meeting minutes made publicly available to the broader community whenever possible.

Personal relationships (i.e., staff members and their supervisors) were embedded within the Task Force and had to be navigated in a way that allowed us to advance our collective goals without putting individuals in compromising positions. While cognizant of differing levels of comfort and experience with discussing these topics and power dynamics, we made two important choices to promote safety and cohesion. First, during the “Working Groups” phase, we separated the Task Force into four groups of about five individuals who were tasked with deeply researching one of four different themes: 1 - Inclusive Culture, 2 - Supporting Success, 3 - Recruitment, Retention, and Promotion, and 4 - Building Bridges (Figure 4). Deep research into each theme included reading and discussing relevant literature, identifying friction points and best practices both at the institution and beyond, creating a strategy for improvement via specific recommendations, and suggesting ways to monitor progress toward stated goals (Figure 1).

### Phase 1: Information gathering

Prior to the separation of the Task Force into Working Groups, we conducted practice rounds for the Working Groups (Figure 1B) that allowed individual members to determine how they worked with others, and allowed members to engage with and learn about potential DEI themes

and ideas. We developed a practice worksheet that guided members by defining overarching goals, issues/friction points, and helped to develop recommendations (Figure 1B). We conducted five rounds of Working Group combinations before settling on the final Working Groups and solicited feedback after each round to determine whether there were conflicts based on institutional positionality. Based on feedback and thematic preferences from the members, the chairs structured the final Working Groups to minimize harmful power differentials (i.e., staff members and their supervisors) and personality conflicts and maximize the potential for productive and constructive teamwork.

Second, when defining and ratifying our expectations around governance, we created an anonymous voting structure whereby all recommendations would need the support of greater than 70 percent of the voting members present in order to be approved by the Task Force and forwarded to the administration for implementation. This meant that once a particular recommendation could be approved by a significant majority of the Task Force, we could move on to discussing other recommendations.

### Phase 2: Working Groups

We distilled our recommendations from the second phase of the Task Force process, “Working Groups.” After iterating through a number of different themes during the practice rounds, we settled on four themes that were sufficiently distinct from one another to encompass the range of processes that impact DEI at the institution. The following four themes that emerged as optimal were: Inclusive

Culture; Supporting Success; Recruitment, Retention, and Promotion; and Building Bridges. These themes and Working Groups were created because they best fit the current environment at the institution and our vision for the future; however, these topics can be used in a variety of institutional contexts and molded to best fit the needs of all communities.

### Phase 3: Report writing

The four Working Groups were tasked with identifying recommendations that would outline a roadmap for robust and visionary change at the institution. We synthesized these greater than 100 recommendations into approximately 40, based on similar themes and approaches, and provided them back to the full Task Force for approval. The recommendations that were approved following the voting process outlined above were sent back to the individual working groups to be framed as “Specific, Measurable, Achievable, Realistic, and Timely” (SMART) goals (Doran, 1981). Finally, we summarized these SMART goals (Table 1) by developing 15 overarching “Priorities” that could simplify and streamline the recommendations into a digestible number of high-level items for immediate implementation.

### Demographic data synthesis

The goals of our data collection were twofold; first, to provide necessary context for DEI-focused recommendations for change, and second, to show how much still needs to be done. Although not specifically a part of the charge, the

coauthors decided to compile institutional demographic data to provide a starting point, against which future change could be measured. Despite past efforts to create systemic change in the makeup of the institution, and the measurable increase in participation of white women, the institution is still excluding people of color (Bell et al., 2005; Dutt & Matthews, 2019). We chose to focus on what the Task Force found to be the two most salient data points for motivating change: 1) fewer than 10 percent of the institution’s professors are underrepresented minorities (URM), and 2) the institution has never employed any Black or Indigenous Research Professors or Research Scientists (Figure 3).

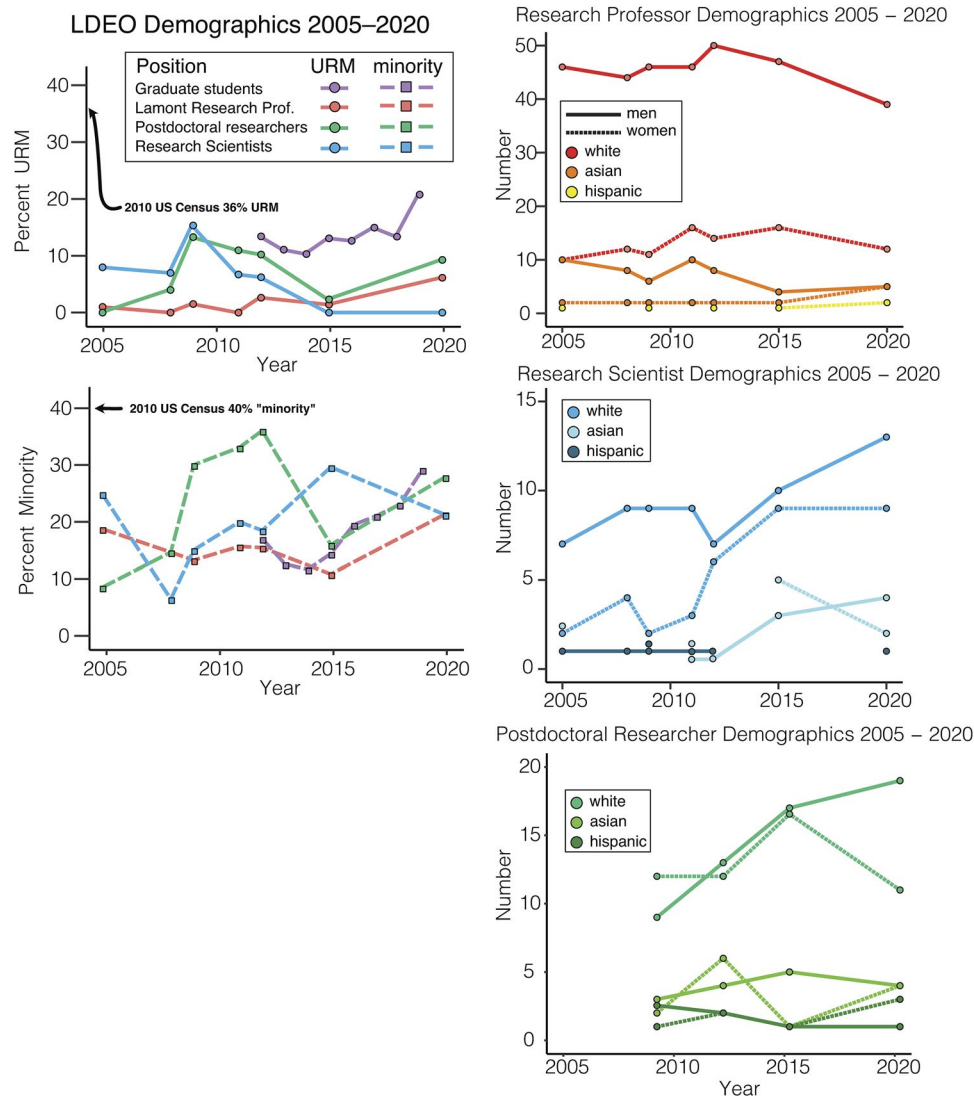
We compiled available demographic data for the institution from a range of sources including reports and surveys from the Earth Institute, the Lamont Office of Academic Diversity and Inclusion (OAAD), and the Department of Earth and Environmental Science (DEES) at Columbia University. We directly requested all available demographic data from administrators and staff who oversee collection of these data, and then compiled the gender, race, and ethnicity data for Graduate Students, Postdoctoral Researchers, Research Scientists, and Research Professors at the institution. This resulted in a time series of race and ethnicity data from 2005 to 2020 for the institution (Figure 3). Because of our charge, we did not synthesize data for which gender was the only parameter of focus (e.g., Bell et al., 2005). Gender data were binary, and race and ethnicity data were collected according to the US census classification system.

In the compiled race and ethnicity dataset, we applied specific definitions of “minority” and “URM” to the data

**Table 1.** Example of a few compiled priorities, SMART goals, and recommendations.

| Priority (P)   | SMART goal (SG)  | Progress measurement  | Who will achieve?   | Timeline                          | Individual actionable recommendations  |
|--|--|---|---|-----------------------------------|--|
| <b>P3.2</b> Ensure accessible training on core- and supplemental DEI topics are available yearly, and encourage everyone (especially supervisors) to participate in at least three per year. | <b>SG22</b> Ensure accessible training on core and supplemental topics are available yearly and accessible online and encourage PIs and officers to participate in at least three per year.  | <ul style="list-style-type: none"> <li>Track all available trainings (in person and online)</li> <li>Track attendance at each training</li> <li>Track number of trainings each PI attends</li> </ul>  | Office of Academic Affairs & Diversity (OAAD)                       | Short Term (less than six months) | Inclusive Culture:<br>We recommend <i>training tailored to leadership roles</i> , e.g., unconscious bias training in search and admission committees.  |
| <b>P2.4</b> Encourage a broad curriculum that reaffirms our DEI commitments and goals.   | <b>SG33</b> Provide support for Lamont affiliates leading cutting-edge curriculum development that reaffirms our DEI commitments and goals (e.g., Race, Climate Change, & Environmental Justice Seminar; workshops run by DEES faculty who are imbuing DEI in their existing classes). | <ul style="list-style-type: none"> <li>Evaluate how many current courses include DEI in their curriculum</li> <li>Support the development of new and expanded curricula to further incorporate DEI into courses</li> <li>Ensure inclusivity and DEI support are made clear to faculty, TAs, and students</li> </ul> | Administration, Department of Earth & Environmental Sciences (DEES) | Short Term (less than six months) | Supporting Success:<br>Encourage DEI efforts of interested Graduate Research Assistants (GRAs) to become a publishable effort/thesis chapter to better recognize the value of these efforts within and outside LDEO. |

The Priorities are 15 overarching goals identified within the Working Groups, which must all be addressed to meet the challenges we face within and beyond our institution. The SMART Goals are Specific, Measurable, Achievable, Reasonable, and Timely Goals that summarize individual recommendation themes and goals outlined within the Working Group recommendations. The LDEI Task Force Report first lays out the Priorities, then delineates SMART Goals, and finally provides individual recommendations in a narrative context within the Working Group chapters. This table compiles each of these component parts of our roadmap for action and change on specific topics, and is not an exhaustive representation of the recommendations provided in the full report (See Supplement).



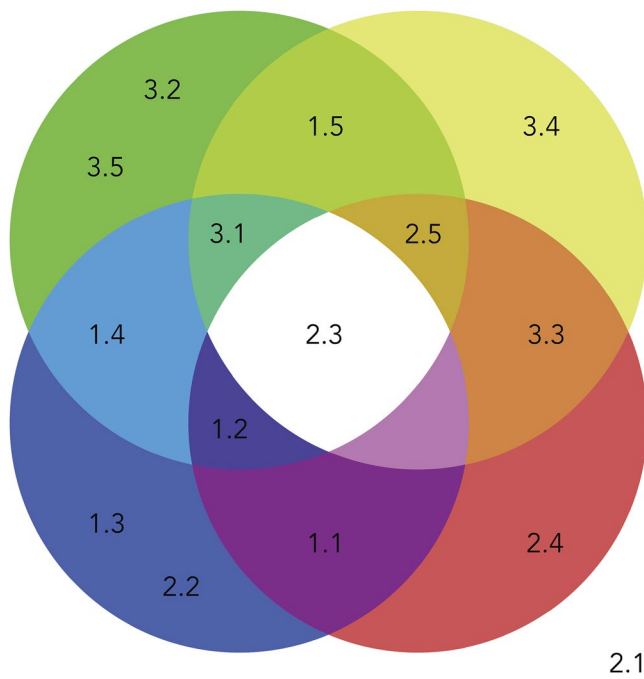
**Figure 3.** LDEO Demographics 2005–2020. Data from OAAD, 2020 and the Department of Earth and Environmental Sciences (DEES). Graduate student demographics, provided by DEES, is in the format used for reporting to the NSF/National Institutes of Health, and as such includes US citizens only. All other populations shown here (Research Professors, Postdoctoral Researchers, Research Scientists) include people of any nationality. The left column shows compiled demographics from 2005 to 2020 in percent URM and percent minority for Graduate students, Lamont Research Professors, Postdoctoral Researchers, and Research Scientists. The right column shows numerical demographics broken down by position, race, and binary gender for Lamont Research Professors, Research Scientists, and Postdoctoral Researchers from 2005 to 2020.

to analyze demographic change. In the US, 40 percent of the population is classified as “minority”, which is defined as Black, Hispanic, Native American (including Alaska Native and Pacific Islander), Asian, or two or more races (US Census, 2010). 36 percent of the US population falls into categories classified by the NSF as URM, which includes those that identify as Black, Hispanic, or Native American (US Census, 2010). Explicitly, the only difference between “URM” and “minority” in the presentation of data is the inclusion of people who select “Asian” and/or “two or more races.” While both of these systems have flaws, they are widely used in the US and provide a framework for comparing US-based institutions with national demographic data. In particular, this framework provides a way to synthesize and compare historical demographic data collected over the last two decades (e.g., Dutt, 2015).

### Timeline and demographic data

To alleviate the pressure to work synchronously for people navigating complex professional and personal calendars, we encouraged the Task Force to collaborate asynchronously via shared documents, but this generally did not lead to greater participation. At the end of five months of work, we found that about 80 percent of the Task Force members were still attending meetings and participating in the process, and 20 percent were no longer actively engaged. This attrition was caused by a complex range of factors and attributing their causality is beyond the scope of this manuscript. However, we note that our Task Force was a volunteer effort for which members received no compensation or release from other job duties, and pandemic-related difficulties including caretaking led to nontrivial constraints on the “free time” that Task Force members had to





**Figure 4.** Working Groups and Priorities. Graphical representation of the four Working Groups and the Priorities that were synthesized from their recommendations. Yellow circle, upper right - Inclusive Culture. Green circle, upper left - Supporting Success. Red circle, lower right - Recruitment, Retention, and Promotion. Blue circle, lower left - Building Bridges. The numbers refer to each of the Key Priorities, some of which were drawn from multiple different working group recommendations, as indicated by the overlapping areas in the figure. The full list of Priorities is available in the Supplement.

contribute. Finally, despite our best efforts to establish ground rules that would make the Task Force a “safe space,” we could not fully protect participants against forms of harm (e.g., misogyny, racism, transphobia) even within an environment where the intentions of all participants, to the best of our knowledge, were good.

A number of salient points emerged from the analysis of historically collected demographic data. Fewer than 10 percent of Research Scientists and Research Professors are URMs currently. In addition, decreases in the proportion of URMs on the Research Professor track have been occurring for more than a decade. Research Scientists are fully grant-funded, whereas Research Professors receive partial institutional funding. The Research Professor track has maintained a proportion of about 10 percent minority scientists from 2005 to 2020, while the proportion of URM scientists has increased from zero to under 10 percent over the same time period (Figure 3). The Research Scientist track has seen the most striking lack of retention of diversity at the institution: from 2015 to 2020, there have been zero URMs employed on this track. The proportion of minority Postdoctoral Researchers has increased almost threefold (to almost 30 percent from 2005 to 2020), and the proportion of URMs increased from zero to about 10 percent (Figure 3). Graduate students have consistently had the highest proportion of URMs (2020: about 20 percent), and the proportion of minority graduate students has steadily increased since 2014 (2020: about 30 percent) (Figure 3). In addition, the institution has not employed

any Black or Indigenous Research Professor- or Research Scientist-track employees from 2005–2020.

## Discussion

The process of creating and managing a DEI Task Force with the shared goal of producing recommendations for institutional and community change requires acknowledging and balancing the needs and priorities of many different people and entities. In the following sections, we discuss considerations regarding power dynamics, striking a balance between tone and content, addressing how financial constraints intersect with institutional values, and respecting the power and politics of data that guided our work on the Task Force. We synthesize our recommendations for specific action on DEI into advice for both individuals and institutions.

The issues we encountered in our Task Force are widespread and ever-present in geoscience institutions; by coming at these differences from a variety of angles, individuals and institutions can work together for a better future.

### Navigating power dynamics and differentials

Running the Task Force required navigating a complex landscape that includes institutional specificities, group dynamics, and individual relationships. Each person’s distinct experiences of an institution are impacted by their race, gender, history, etc., which results in differences in how one relates to that institution. Past work has found that individual experience can be a valuable point of entry into developing recommendations for increasing diversity and inclusion, while also noting that the perspectives of different groups (e.g., white people in positions of institutional leadership and students or staff of color) often diverge (Livingston, 2018). For example, more established cohorts may have a stronger perception that the institution has changed over time in ways that have benefited marginalized people. Newer cohorts may have had specific recent experiences of discrimination or marginalization that have an outsized impact their perception of the institution (Jones, 2021; Keisling et al., 2020). At our institution both of these things are true, which presents an immediate disparity in how the institution is perceived.

In terms of group dynamics, academic researchers in general have a greater degree of control over their daily schedule and may be accustomed to a more fluid work/life balance; in contrast, administrative or technical staff may have a more rigid schedule, perhaps determined by their supervisors, and an expectation that work happens during “normal” working hours. It required a conscious and continuous effort to come up with a schedule that permitted all members of the Task Force the opportunity to participate as fully as possible. Finally, factors at the individual level, including caretaking responsibilities, job duties, and pandemic-related difficulties, also impacted participation.

As a Task Force, we developed a number of strategies to sustain momentum toward our shared goal. In developing

the strategy for separating the Task Force into Working Groups (Figure 1; Table 2), where most critical engagement with existing literature and recommendation development would take place, we took into consideration all of the personal relationships present on the Task Force and created groups that minimized potential conflicts while also prioritizing the thematic interests of individual members. At the stage of recommendation evaluation, our anonymous voting procedure was used to determine whether a recommendation would be forwarded to the administration, minimizing the potential for conflict.

However, in some ways the Task Force replicated the same dynamics that plague DEI work in general (e.g., Jones, 2021). The majority of the research, writing, and discussion that took place in developing recommendations was done by the members who were earlier in their careers and/or had experienced one or more forms of marginalization. In contrast, the majority of critical feedback and pushback came from members who were less involved in the research and writing processes (e.g., Gay, 2004; Rodrigues et al., 2021).

**Advice for committee members**

De-center yourself. Although individual experience is a valid, valuable entrance point into DEI spaces, it is important to be conscious of how individual experiences can translate into biases. Creating coalitions that include students, staff, and pre- and post-tenure faculty allows individuals to engage in the work on their own terms, and in a productive and mutually beneficial way. This creates an environment that prioritizes empathy and flexibility (e.g., centering the most marginalized to develop strategies that benefit everyone)

over specificity and apathy toward experiences that are not our own (e.g., comparing individual experiences to insist that previous generations had it worse). If you are a vulnerable committee member in any way, this work requires bravery; think about your boundaries, your positionality, and what you will need to do to be brave in this space.

Early career researchers are particularly invested in this work because they need to create spaces for themselves in science where they feel safe. Established researchers may feel that DEI is less urgent work since they have benefited from the status quo. Individuals will make the best contributions to the committee if they approach these conversations with empathy to build across positional divides in order to make progress.

**Advice for institutions**

Ensure that members of every group are offered a seat at the table (e.g., on committees, in planning meetings, by having open town halls). Be aware and cognizant of power dynamics and the impact they have on progress and the ability for open and honest discussions (Hearn & Louvrier, 2016). At the same time, assume that the most marginalized and/or precarious members of groups (such as students of color) will face pushback and retaliation from people in positions of power. Identify ways to diffuse potential negative outcomes of this imbalance by providing extra support (e.g., a teaching release, an additional semester of funding, research funding) to committee members that are coming to this work from a position of precarity. Recognize the additional and unnecessary weights that underrepresented students and staff carry when for example, they must be a student, publish papers, be an active member of the

**Table 2.** Task Force Working Groups—focus areas and results.

| Working Group                         | Focus   | Research areas  | Key Priority examples  |
|---------------------------------------|---|---|--|
| Inclusive Culture                     | <ul style="list-style-type: none"> <li>Building community</li> <li>Training</li> <li>Reporting structure</li> </ul>   | <ul style="list-style-type: none"> <li>Analyze current community events</li> <li>The institution's Code of Conduct</li> <li>The institution's accessibility plan</li> <li>Columbia University's resources</li> </ul>  | Ensure that accessible trainings on core and supplemental DEI topics are available yearly, and encourage everyone (especially supervisors) to participate in at least three per year (P3.2). |
| Supporting Success                    | <ul style="list-style-type: none"> <li>Support for all career tracks</li> <li>Mentoring and training</li> <li>Community support and DEI service</li> <li>Supporting workplace health</li> <li>Infusing DEI into existing funding streams</li> </ul>   | <ul style="list-style-type: none"> <li>Mentoring at all levels</li> <li>Cultural shift toward mutual respect and normalizing community service and DEI work</li> <li>Recognizing and compensating work that goes above and beyond job responsibilities</li> </ul>   | Overhaul mentoring to address current shortcomings and the needs of diverse cohorts, at both the individual (e.g., 360-review) and group (e.g., values statements) levels (P1.5).            |
| Recruitment, Retention, and Promotion | <ul style="list-style-type: none"> <li>Increasing institutional support (strengthening and streamlining programs)</li> <li>Incentivizing and empowering individual and community engagement with DEI infrastructure and activities</li> </ul>   | <ul style="list-style-type: none"> <li>Hiring additional staff who can commit to sustaining successful partnerships and programming</li> <li>A more efficient system to link grant writers to outreach opportunities</li> <li>Long-term commitments to investing funds for DEI</li> </ul>                                     | Invest in underrepresented scholars through cohort-based recruitment at all levels, from graduate students to scientists and staff (P1.1).   |
| Building Bridges                      | <p>Creating partnerships that emphasize the mutually beneficial exchange of ideas, information, and perspectives to connect:</p> <ul style="list-style-type: none"> <li>The institution with external communities</li> <li>Communities and individuals within the institution and the university as a whole</li> <li>The institution with the public</li> </ul> | <p>Primary friction points in developing meaningful, reciprocal relationships with other institutions and members of the broader communities the institution engages with were:</p> <ul style="list-style-type: none"> <li>Funding</li> <li>Incentives</li> <li>Time availability</li> <li>Administrative barriers</li> </ul> | Develop institutional relationships with minority serving institutions (P1.3).   |

All institution specific recommendations can be found in the Supplement. The Priorities, SMART Goals, and recommendations from all Working Groups provide an outline for a scientific community that is fundamentally inclusive, equitable, and anti-racist. These recommendations are meant to create a new foundation for science, transform the culture of institutions, and build a community that has the capacity to continually grow in its reach and scope. Each of the priorities identified has associated SMART goals and detailed recommendations for implementation (see examples in Table 1 and full list of Priorities in Supplement).

scientific community, as well as an advocate for the betterment of all future students of color in the department.

### **The balance between tone and content**

In charting a course for institutional change, we sought to be forward-looking while staying grounded and true to reality. This means acknowledging the harm that has already been done through discrimination and exclusion, and offering actionable recommendations for change. In navigating this, we often found ourselves reflecting on the importance of *tone* and *content*. We also learned how these factors can be conflated in ways that hinder progress toward our shared goals. For example, purely factual statements were perceived by leadership as having an overly negative tone (“There has never been a Black or Indigenous person employed as a permanent member of the scientific faculty”), whereas statements that had a positive tone (“The institution has historically been a leader in diversity efforts in geoscience”) are generally accepted regardless of the data that exist to support or refute them. We navigated this by encouraging everyone on the Task Force to focus on the content of the information rather than the way in which it was conveyed. We found that it was helpful to establish this expectation early in our process, and to employ a voting structure that could move the Task Force past topics once the content of a recommendation had been established.

The stakes were particularly high when navigating these distinctions, because we were concerned that if we communicated certain things “the wrong way,” then it would inhibit institutional progress toward the recommended DEI goals. By considering our own power and positionality, we were able to leverage those privileges to inform our response. Choosing to amplify a statement or perspective that is uncomfortable was a concrete way that we centered our recommendations and framing on strategies that can support the most marginalized members of our community. By normalizing statements that may be perceived as having a negative tone, such as the statement above, we hope to prioritize and address the experiences of harm and marginalization over the language used to describe those experiences.

Although we were ultimately satisfied with the framing and focus of our work, we found that disagreements around tone posed significant challenges, both for the task at hand and for future accountability. This conflict could have compromised the actual focus of our work. Although ours was an inherently forward-looking process, our actionable recommendations were intended to fix real problems of historical legacy and ongoing impact; giving space to that reality is crucial to guiding our path forward.

### **Advice for committee members**

Center inequities and injustices over perception and prestige. Everyone must learn to value content more than tone, just as we do in scientific research. If we want to make real progress we need to recognize that things that seem negative to some reflect the lived reality of others, and we have to

prioritize that lived reality over our own interpretations. Shifting the focus of a sentence to highlight a specific injustice and inequity provides examples to support your arguments, and does not detract from any aspirations or goals; in fact, it can strengthen your motivations and clarify your intentions around achieving them. This is a way to be forward-looking in a way that does not ignore harm that has already been done.

### **Advice for institutions**

Institutions can show brave leadership by bearing witness, being accountable, and offering meaningful apology for the ways that harmful histories persist within each institution (Clancy et al., 2020; Freyd, 2018). To advance DEI goals, taking a neutral stance serves to reinforce the existing status quo rather than paving the way for meaningful change. On the other hand, taking a courageous stance might alienate established members of the community who fear changes to the status quo. The main questions for institutions are: who are you centering, and who are you serving? If the goal is to be inclusive for the long-term, perhaps the focus should be on students, who are the future of science and institutions. Look for opportunities to proactively support members of the community who have been negatively impacted by manifestations of those harmful histories, for example by centering and responding to students of color by taking decisive and meaningful action in support of their requests (e.g., hiring Black faculty).

### **Finances and values**

Since the delivery of the Task Force Report, financial issues have led to uncertainty about what resources will be made available and/or fundraised to meet DEI goals and hire personnel focused on creating and maintaining DEI-focused relationships, and whether those resources will come from new sources or will come at the expense of funds that are already allocated. As co-chairs, we regularly faced this “zero-sum” framing, where the pursuit of DEI is assumed to jeopardize or undermine the pursuit of excellence in scientific research and/or other institutional priorities.

It is helpful to remember that white people are overrepresented in geoscience, a fact that is implied when we talk about underrepresentation but is rarely addressed separately. This means that the scientific community is currently sacrificing diversity at the expense of excellence; the bar is lower for white people than it is for members of other racial and ethnic groups, given the many historic and current barriers that minorities must overcome to reach the same place. In the current context, we emphasize that excellence can then only be pursued with a simultaneous commitment to DEI. Taken this way, DEI ideals are foundational to the institutional goals of conducting top-notch research, and teaching and mentoring students to be the next generation of great scientists and leaders. The focus on and investment in DEI are inseparable from excellent science and a more well-rounded and inclusive teaching and research environment.

Whether DEI is viewed as a zero-sum game or a critical part of the pursuit of excellence reflects an institution's value system. One can directly assess an institution's value system by looking at whether lived and budgetary realities align with stated values. For example, some people may feel that creating a budget would place limitations on how imaginative committee members will be so as to not go over the budget. However, without a budget, it is possible that little will ever happen, compromising both the morale of those who are engaged in advocating for change and any potential impact that committee recommendations would have. It is important to acknowledge both of these possibilities and weigh them when starting the work of a Task Force. Individuals can actualize their values through their own budgetary discretion and/or within various leadership capacities within an institution. In addition, institutional structures are implicated in determining how and whether funding will be made available to meet high-priority DEI goals.

#### ***Advice for committee members***

Provide recommendations that cover a range of costs, including no cost options. Strategies for progress can be identified and acted upon by everyone, regardless of their access to institutional resources.

#### ***Advice for institutions***

Before starting a committee or Task Force on DEI, make institutional resources available to support the work during and after the process so recommendations can be implemented immediately and/or specific frameworks can get started to move a project forward.

#### ***The power and politics of data***

Data are central to our work, goals, and missions as scientists. Data are a powerful tool to describe community demographics, track progress toward our diversity goals, and document change.

Although demographic data are meant to provide an objective metric for broadening participation, the politics around this kind of data collection are contentious. First, there are issues in using and defining different ethnicities and races in a scientific workplace that includes international and non-US citizen workers. In addition, the delineation between races, ethnicities, and groups remains problematic for those who do not fall into one singular group, those that delineate races and ethnicities in a non-US-centric way, or who reject the US classification system for other reasons.

Second, the issue of self-determination can lead to fluctuations of trends in data that do not actually exist. In the institution's demographic data from 2005–2020, the same individual may have a different race or ethnicity depending on when and/or how the data were collected. This includes changing the primary race or ethnicity they identify as or changing from choosing just one race or ethnicity to multiple. This can affect the way that we interpret institutional change and progress. From 2005 to 2011, demographic diversity fluctuated and

showed both increases and decreases in the number of URM faculty, even though there was no inflow or outflow of URM faculty; these changes were driven only by changes in data collection or individual identification (Figure 3).

Third, though data is often seen as truth, a lack of data can also be illuminating. The absence of demographic data can be a political issue. On one hand, the lack of demographic data, especially at a predominately white institution, may reflect disinterest by the majority group (in the geoscience community's case, white men) in tracking demographic change within a relatively homogeneous group. At the same time, this lack of data can be leveraged to suggest that there may be people from underrepresented groups who were not counted in the past, diluting the need for broadening participation on the basis that the past may have been more inclusive than we assume—we just do not have the data to show it.

Through the work of the Task Force, we learned that the ways we collect, interpret, and show data influence how it is received and interpreted.

#### ***Advice for committee members***

Demographic data are powerful because they provide a quantitative way to track progress toward our goals. At the same time, be mindful that these data also necessarily erase the complexity of a human being into a set of identities that often do not fit nicely into the boxes we use to quantify them. Ensure that concerns about data are presented alongside the data, and be mindful of considering other ways of knowing about marginalization and injustice that these data do not capture. Recognize that demographic data are inherently political, complex, and subject to revision; not everything needs to be quantifiable to identify a problem or motivate a change. In addition to quantitative measures, qualitative techniques can also be employed to understand the institutional landscape. Open-ended interviews with employees and students of color, for example, have been used to identify recommendations for making structural change at another well-known geoscience institution (Livingston, 2018).

#### ***Advice for institutions***

Proactively collect data in a way that is safe but also helps institutions to know if they are meeting stated goals. Be transparent, inclusive, and equitable in data collection and analysis. Design data collection strategies intentionally for the community, collect and analyze data regularly to capture demographics and shifts, and safely make public as much data as possible. Demographic data should be compiled and updated by the administration and made publicly available before either starting a Task Force or trying to create large-scale change.

#### **Conclusion**

The importance of DEI in the geosciences has been an issue long before the events of 2020. The geoscience community is currently grappling with the long-standing legacy of exclusion in the field; however, this is not the first time

that groups and institutions have attempted to confront these issues, nor will it be the last. Changing and challenging systemic racism and exclusion must be approached through multilateral actions on both short and long timescales. Every institution could apply more forward-looking policies, broaden its reach and content, and create more inclusive, dynamic, and diverse science.

In reflecting on our experience as Task Force chairs, we came to a number of realizations about what did and did not work, and how our insights could be applicable to other contexts. By establishing a strict timeline (six months) and action-oriented governance structure (including a voting process for advancing recommendations) for our work, we ensured that we made steady progress toward our ultimate goal in the face of obstacles. The obstacles that were especially salient for our work were considering power dynamics, striking a balance between tone and content, addressing how financial constraints intersect with institutional values, and respecting the power and politics of data. Knowing these barriers ahead of time would have helped us to navigate them more efficiently; in this work, we have provided our reflections in terms of “advice” that can be used both by committee members asked to join such an effort, and for institutional leadership considering asking their employees to take on this kind of project. Although our effort was centered at a large geoscience institution, we have tailored our reflections to be applicable to a range of institution types, sizes, and disciplines.

Establishing a community-based effort, like a committee or Task Force, is often an early step that institutional leadership takes to address their overarching DEI goals. To make a difference, it is imperative that these groups be strategically formed in a way that promotes their success and maximizes potential impact. In our experience as the leadership of one such Task Force at a major geoscience education and research institution, we identified a number of structural, interpersonal, and philosophical strategies that helped us meet our charge and achieve our goals. We hope that sharing our experiences, strategies, and observations around these issues will help others to create a blueprint for meaningful change at their institutions. Ultimately, advancing DEI goals requires partnerships that leverage community enthusiasm and expertise alongside institutional leadership. This work addresses the former, illustrating the ways in which we built and sustained community-driven inquiry into the barriers that have historically restricted participation at Lamont-Doherty Earth Observatory to relatively homogeneous racial and ethnic groups while offering strategies to overcome them. Although our institution is not yet the workplace of our dreams, there are many examples of individuals bravely leading our community toward a more just future. Using the strategies and frameworks outlined herein, we urge you to think about ways you can create and enact change within your own institutions.

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