Beyond Ticking Boxes: Holistic Assessment of Travel Award Programs is Essential for Inclusivity

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Many professional societies utilize travel awards programs to foster inclusion and facilitate the professional development of underrepresented minority (URM) scientists. All member societies that participate in the Alliance to Catalyze Change for Equity in STEM Success (ACCESS) do so to some degree. Members of this meta-organization recently came together to share their different approaches (1). The practices of the Biophysical Society (BPS), one of the ACCESS member societies, may be of particular interest to *The Biophysicist* readership. Our society spends \$85,252 each year on travel awards. In addition, two paid staff members are dedicated to the administration of the program, and members of four committees donate their time to judge applications. Although some other societies with larger membership rolls may spend more on travel awards each year, this is a substantial commitment for a society with about 7500 members.

The Biophysical Society travel award program is actually an amalgam of multiple programs sponsored by different committees within the society, each targeting a certain group of members. The Committee on Inclusion and Diversity (CID) supports applications from URM students and postdoctoral fellows, while the Committee for Professional Opportunities for Women (CPOW) funds applications from female postdoctoral fellows and mid-career scientists. The Education Committee supports applications from all students and postdoctoral fellows, while the Membership Committee specifically funds applications from scientists working outside of the United States. In addition, the Membership Committee offers Bridging Funds Travel Grants to all regular members of the society, including independent and principal investigators. This patchwork of awards covers society members of all career levels and from underrepresented groups, and many society members are eligible to receive an award from more than one program. Prior to 2019, candidates applied directly to each program, resulting in many duplicate applications that all had to be evaluated using volunteer labor. Each committee had a limited number of awards to distribute, and it was unclear whether the number was well-matched to the needs of the targeted group. With respect to URM scientists, the group that ACCESS has a shared investment in supporting, the CID presented 18 awards each year. However, URM scientists could (and most certainly did) apply for other awards. Since demographics of applicants were not collected by all of the committees administering awards, it was unclear just how many URM scientists were applying for and receiving awards beyond those offered by the CID. Moreover, it was not clear whether the CID Travel Award was attractive to URM scientists, given its specific labeling. As pointed out by Segarra *et al* (1), there are multiple motivations beyond the monetary value of the travel award that drive people to apply. Travel awards have value as a mark of distinction (2, 3). However, as has been probed by Koritha Mitchell (4), the majority, in their quest to maintain their position in the social order, may devalue travel awards that are explicitly targeted to URM, as well as any other accomplishments of folks they have marginalized. Unfortunately, singling out URM scientists in the award process may actually exacerbate the feelings of isolation they experience and reduce the perceived value of the award.

To address these concerns, the BPS moved to a single, centralized application for all travel awards. The new format streamlined the process for applicants and reduced the workload for volunteer judges by eliminating the need to assess duplicate applications. Under this new system, all applicants were asked demographic questions to determine their eligibility for the different travel award programs. Surprisingly, compared to the number of URM individuals who

self-identified by applying for the CID award in 2018, the number of URM travel award applicants in 2019 nearly doubled. Meanwhile, the success rate for these applicants remained comparable, and, apparently, more URM scientists received awards under the centralized application system than did under a system with a certain number of awards set aside for this group (1). The change to a centralized application system for BPS travel awards was accompanied by a change from a system of several named awards to all recipients receiving an award by the same name – the BPS Travel Award. It seems likely that such an award is perceived as having more value than an award that highlights the recipient's minoritized status.

This result shows that as a society, the BPS can indeed make strides to better support URM biophysicists. Moving forward, it is crucial to highlight why that is important. As many BPS members can attest, there are not many dedicated biophysics programs in universities, which can leave biophysicists at all career levels feeling isolated. According to the National Center for Education Statistics (5), there were 4360 degree-granting postsecondary institutions in the U.S. Based on self-reported data collected by the BPS, 141 U.S. based colleges and universities have a biophysics program of some sort. While these data may not include every program, these numbers still suggest that less than 5% of higher education institutions have an identifiable biophysics program. About half of these programs have only a graduate program, so most undergraduates will have little, if any, exposure to the field before they make a decision to pursue graduate study. Furthermore, those who do learn about the field in time to choose to specialize in biophysics prior to beginning their doctoral studies do not have many choices. Trained biophysicists are, it seems, a rare breed. This can have an outsized effect on URM individuals who choose to enter the field.

Emerging evidence indicates that increased diversity has benefits to the progress of STEM disciplines. Recent findings indicate that scientists from underrepresented (UR) groups, both in terms of gender and race, are more likely than members of well-represented (WR) groups to make new connections between scientific concepts (6). This kind of innovation is the underpinning of the field of biophysics – we need scientists who can identify and exploit the links between what we know about the physics of inanimate objects and what we want to understand about the processes of life. And yet, the same data set that demonstrates that “diversity breeds innovation” also reveals that scientists from UR groups are more likely than their counterparts from WR groups to see their novel contributions discounted. This kind of erasure may discourage URM scientists from persisting in biophysics, and we have no way of knowing the cost of the associated loss of talent.

However, even if there were no evidence suggesting that welcoming and supporting URM scientists into the biophysics community might lead to an increase in innovation, the fact of the matter is that URM deserve to have opportunities to pursue their interests. But supporting the participation of these scientists means addressing the barriers that they often encounter. Marginalized status often correlates with a lack of resources – many URM scientists do not have the funds available to support their attendance at conferences (7-9). That results in missed opportunities to network with others. Given the scarcity of institutions that have a critical mass of biophysicists, URM biophysicists' networking needs may not be met by their home institutions because they do not have a chance to meet others pursuing scientific questions that lie at the interfaces between “traditional” departments. Conferences offer

opportunities to meet and interact with established members of the community, as well as to access professional development opportunities and indicators of excellence, such as travel awards. As a result, conference attendance represents a critical building block to career success in any field, and an important way to counteract the lack of resources that can undermine URM scientists.

If societies wish to use travel award programs to provide the kinds of support URM scientists truly need, then it follows that the architects of these programs must formulate clear goals, collect data to assess whether they are being achieved, and make changes as necessary. Certainly, a first step is to determine how many URM scientists a program is reaching. The results of the recent changes to the BPS travel award program demonstrate that small adjustments can have large effects. However, if societies want to move beyond simply increasing the numbers and attempt to have an impact on the level of success for URM scientists, careful assessment of travel awards programs is critical. A reasonable overarching goal for all society programs that target URM scientists would be to support their persistence in science in general, and to make it more likely that these scientists choose to stay in the society's field. Given the known attrition rates of URM trainees from STEM fields, particularly at career transition points (10, 11), a more specific goal may be to use travel award programs to help URM scientists navigate these transitions more successfully. And, if societies want URM scientists to thrive, all programs targeting URM scientists should aim to increase their sense of belonging within the society and the scientific community.

How can societies know if their travel awards program is having the desired impact? The best way to know what is working in a program (and what is not) is to assess the program using a mixture of different kinds of indicators. An indicator is a marker of progress toward achieving program goals. Societies should consider indicators that are defined with respect to the inputs, the process, the outputs, and the outcomes of their programs. Analysis of all of these kinds of indicators will help societies to know if their efforts are having the desired impact and may help reveal specific needs for additional support beyond monetary awards that will amplify the positive effects of travel awards. ACCESS societies have come together to create a survey of travel award recipients to support societies in this effort. We have used the travel award assessment survey administered by the American Society for Cell Biology (supported by the National Institutes of Health grants T36-GM008622 and R25GM116707) as a starting point and have developed it further to create an instrument that includes questions that touch on the process and outputs of a travel award program, as well as the outcomes for travel award recipients. We have developed this survey to help societies move beyond the stage of ticking off boxes for numbers of participants in specific demographic groups. Rather, the ACCESS Travel Award Survey probes a broad range of indicators for the goals identified above: increasing the diversity of scientists reached by the travel award program, supporting the persistence of URM scientists in STEM in general (and in our field specifically), supporting URM scientists at critical career transition points, and ensuring that URM scientists feel that they have a place in our scientific societies.

Input indicators probe what the society is investing in the program; they are not captured by a survey of award recipients. Therefore, in addition to using the ACCESS Travel Award Survey, we recommend that societies take time to consider the inputs into their award program. Inputs

that should be considered include the money spent by a society, and the time invested by staff members and volunteers. There is a limit to how many programs any society can run, so another important input to consider is focus. By choosing to focus on travel awards, other diversity initiatives may fall by the wayside. Societies should evaluate how all of their programming works together to accomplish their broader goals. It may be that a well-designed travel award program is the missing piece that will complete a unified plan for increasing diversity. Alternatively, it may be that a society can achieve their goals with less effort or expense. Put another way, program evaluation may reveal that efforts need to be refocused to maximize the impact on the society's goals. Evaluating program inputs is also fundamental for maintaining commitment to the undertaking. Stakeholders, such as donors and corporate underwriters, may be rightfully concerned about the return on their investment. In addition, many travel award programs depend on volunteer effort to recruit applicants, vet awards, and plan and run associated events. Societies should consider where that effort is coming from, since URM scientists often carry an excess burden when it comes to diversity initiatives, and that burden is often not acknowledged (12). All academics need to be recognized for their volunteer work in service to the profession, especially those from UR groups.

Process indicators are important for understanding how a travel awards program is running. Even with careful and thoughtful planning, it is impossible to predict what will happen when a program is initiated. Process indicators let us know who is actually applying to the program. As the data from the Biophysical Society travel award discussed above demonstrates, the best way to maximize diversity among applicants may not be immediately obvious. Process indicators can also help us understand what the application process is like from the applicant perspective. Finding out how applicants heard about the program can allow societies to better target advertising and outreach. If successful applicants needed multiple attempts before they received an award, that can be an indication of whether the requirements are clear and attainable. The fraction of qualified applicants that receive awards is also an important indicator of whether the scale of the program matches the need within the society. Other process indicators can help societies understand whether their travel award program is actually meeting the needs of applicants. For instance, it is important to understand what might lead an applicant to decline an award. Were they unable to cover extra costs beyond the monetary value of the award? Did they feel that meeting attendance was not worth the expense? It's easy for established members of a scientific society to see the value of meeting attendance, but in order to attract and retain URM scientists to become active society members, it is crucial that there are meeting sessions and activities that are attractive to them, and that these items are well publicized. For this reason, we recommend asking travel award participants about their knowledge of and participation in conference activities targeted toward this group. The data collected can be used to ensure that meeting planners make adjustments or expand programs in ways that are likely to further society goals.

Output indicators show what the program has achieved in the short-term with respect to the goals. These indicators include numbers that are simple to interpret, but not always simple to collect accurately. For instance, if we want to know how many URM scientists are receiving travel awards and/or participating in our scientific society, we must ask questions about recipients' demographics. These questions are inherently personal in nature, and they serve as reminders to URM respondents that they are indeed members of an excluded group in

science. Because URM's often encounter a narrative that URM scientists are less capable than members of the majority, they may be reluctant to identify themselves as URM. This emotional response can have a negative impact on the responses given for the rest of the survey – a phenomenon known as stereotype threat. While we do feel that it is important for societies to ask these difficult questions, we recommend placing questions about race, ethnicity, and gender at the end of the survey to avoid highlighting respondents' minoritized status. The outputs of a travel award can, and should, go beyond merely increasing the numbers of people from certain groups. In addition, we recommend that any survey of travel award recipients also include questions that allow recipients to report their perceived benefits from the award, beyond the monetary value.

Given the goals we have articulated, what we really should be attempting to find out is whether the receipt of travel awards has a positive impact on the experiences of URM scientists as they participate in our society's annual meeting, and whether these kinds of experiences will make a difference to their career trajectories and sustained society membership. These are difficult outcomes to measure – these kinds of effects occur over a longer time period than any conference. However, we can start to get at these indicators by asking travel award recipients about what they feel they can take away from the conference, and how they are doing in their careers. And, although it may be difficult to ask participants whether they feel welcome in our scientific society and expect to get an honest response, there are good alternative questions we can use to probe this important outcome. When we feel that we belong in a society, we participate fully and regularly. By asking travel awardees about their current and planned participation in society activities, we can collect data that may help us gauge whether URM scientists do feel that they belong in our society.

In conclusion, we are sharing the ACCESS Travel Award Survey (see Supporting Material) in its entirety with the goal of assisting any scientific society that wishes to assess whether their travel award program is helping them meet a goal of fully welcoming scientists from all backgrounds into their community and supporting them as they make a career in their discipline. Societies may choose to use some, or all of the questions in the survey, depending on their needs and the amount of time they feel comfortable asking participants to spend. Questions are labeled according to the type of indicator they are intended to probe. Process indicators will help tailor the program and ensure that it is reaching the right people. Some programs may already collect demographics data on the winners, but that type of data is not sufficient to determine if a program is successful. We therefore suggest including additional questions probing participants' goals in attending the conference, and whether they were able to meet them. Finally, we recommend that societies use this survey (or a modified version) as a means to seek answers to the bigger questions that drive us to offer programs targeting URM scientists. Until we move beyond ticking boxes, we will never know whether our programs are making any difference in the effort to achieve full participation of all who are interested in the scientific endeavor.

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