emcrforum

Australian Academy of Science

INCREASING DIVERSITY IN PRIZES AND AWARDS

EXECUTIVE SUMMARY

Prizes and awards for science, technology, engineering and mathematics (STEM) aim to recognise the contributions or achievements of scientists in their field. Prizes and awards play a significant role in informing promotions, probation reviews, recruitment and career progression in Australia, and are considered to be a key component of a scientist's career, reflecting their research profile and providing evidence of success.

Award schemes in Australia typically display low diversity in their recipients compared to the broader Australian STEM population. This contributes to slower career progression of people from under-represented groups in STEM and limits role models to encourage the next generation of STEM professionals.

Organisations that run prize and award schemes should consider the following barriers and solutions to improve diversity among their applicants and recipients.

BARRIER	SOLUTIONS
Reaching a diverse audience	Understand the diversity in the potential applicant pool
	Promote the value of the award to organisations as well as individuals
	Provide organisations with feedback about the diversity of the collective applicants they put forward
	Use diverse role models and champions to identify and encourage potential applicants, including through informal networks
Timing and time commitment	Avoid aligning application periods with other busy periods
	Streamline application processes
	Provide FAQ and contact details of someone to assist applicants
Advertising and messaging	Use diverse visual representations in advertisements and promotions
	Avoid elitist and exclusive language
Application processes	Remove or decrease requirement for referee reports in the application stage
	Simplify and incorporate questions about career interruptions into the standard application form
	Demystify nominations by having previous award winners describe how they were nominated
Assessment criteria	Avoid narrow selection criteria
	Ensure the selection panel is diverse

INTRODUCTION

There is a large body of evidence that shows people from diverse backgrounds face a number of systemic barriers throughout their careers which can have a negative impact on their career progression in STEM. This results in limited progression of women and people from minority groups, subsequently limiting diversity in senior leadership positions. This limited diversity is also reflected in prize and award recipients from across the STEM sector. **The persistent exclusion of women and minority groups in research cultures has led to an image of successful scientists with which people from diverse backgrounds do not identify**. Prizes and awards are key criteria in assessing career milestones and track record, as are grants and funding initiatives. Here, we focus specifically on prizes and awards in Australia and the ongoing under-representation of women and minority groups amongst the recipients, as this contributes to a slower progression to leadership positions of these groups and reduces their opportunity to act as role models for the next generation.
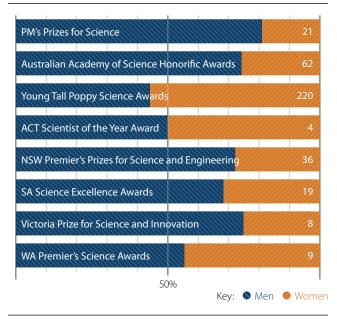
The Early- and Mid-Career Researcher (EMCR) Forum is the national voice of Australia's emerging scientists, representing researchers who are up to 15 years post-PhD (or other research higher degree), irrespective of their professional appointment. It is hosted by the Australian Academy of Science.

Through a series of facilitated workshops at the Science Pathways 2018 conference with early- and mid-career researchers, the EMCR Forum investigated attitudes to awards and prize schemes to understand how to improve diversity and ultimately improve the diversity of the STEM sector as a whole. The workshops identified a number of barriers for potential applicants in prize and award schemes that are related to low diversity amongst award recipients. Participants also discussed and developed solutions to overcome these barriers. The findings are presented in this report and a summary version is available for download from science.org.au/emcr-resources.

BACKGROUND

STEM prizes and awards in Australia are often restricted to a particular discipline or career stage (or both) and nominations are usually either via a self-application process or through peer nomination. Increasingly, organisations are identifying the lack of diversity in their award recipients as an issue to be addressed, and some have made improvements in achieving diversity amongst recipients over recent years. Unfortunately, there is limited information regarding the overall diversity of recipients or applicants for most award schemes. Gender is collected in some award schemes or can be derived, for recipients at least, from announcements regarding winners. Men dominate most

STEM prizes and awards schemes examined, even when the awarding period is limited to recent years (Figure 1). A comparison of EMCR awards to career-level award recipients reveals that women are more successful in the early stages of career than at senior levels (Figure 2). Women also tend to submit fewer grant applications and are funded at a significantly lower rate in the UK, US and Australia

Figure 2. Percentage of recipients of high-profile career and EMCR-specific awards who are men and women.

Award schemes analysed and dates were: Prime Minister's Prizes for Science and Australia Prize (1990–2018), Australian Academy of Science Honorific Awards (1957–2019); Australian Institute of Policy and Science, Young Tall Poppy Science Awards (1999–2018), Australian Capital Territory Scientist of the Year (2015–18), New South Wales Premier's Prizes for Science and Engineering (2008–18), South Australia Science Excellence Awards (2014–18), Victoria Prize for Science and Engineering (1998–2018), and Western Australia Scientist/Early-Career Scientists of the Year (2002–18). Note: Prizes and awards for PhD students, women-only, and non-tertiary teaching awards were excluded.
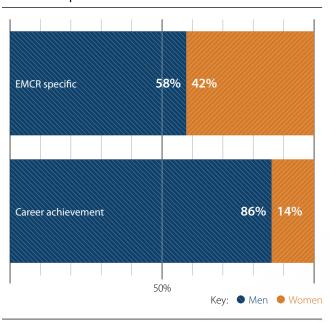
Figure 1. Gender breakdown of award recipients in a selection of prominent STEM sector prizes and awards.

Numbers indicate the number of awards conferred in each scheme in 2015–18.

(Boyle et al. 2015) while men tend to be favoured in funding applications in relation to 'quality of the researcher' and track records (Van der Lee et al. 2015).

Currently we can draw no conclusions about representation of scientists from under-represented groups among prize and award recipients as such data is rarely collected across awarding organisations. We strongly encourage all awarding organisations to collect a broad variety of demographic information from their applicants. **Only by understanding the demographic background of applicants and comparing it to the potential applicant population can organisations make meaningful progress towards improving the diversity in their prize and award recipients**.

Identifying when diversity is restricted during an award scheme process allows for actions to proactively improve diversity in award applicants and recipients (Figure 3). If the applicant pool lacks diversity, this is either likely due to a lack of existing diversity in the potential applicant population or failure in reach, advertising and messaging of the award scheme. Alternatively, if the applicants are diverse but the award recipients are not, then there is a likely failure in the selection process such as selection criteria, metrics of success and review processes. Nominations from women and other under-represented groups should at least reflect the proportion within the relevant eligible population. It has been suggested that women and minority groups should comprise at least 30% of the applicant pool in order to address low diversity in awardees (Metcalf 2018).

Addressing the diversity in the potential applicant pool takes considerable time and investment and is a long-term commitment. However, increasing diversity amongst award recipients will contribute to more visible role models and, over time, improve diversity in the potential applicant pool. In much shorter time frames, barriers can be addressed that can prevent applicants from applying for prizes and awards and improve processes to ensure that all applicants are fairly assessed.
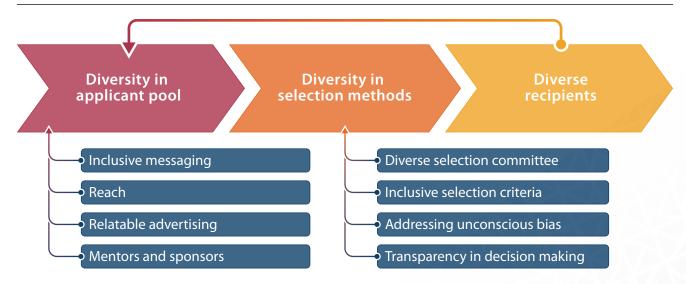
TARGETED AWARD SCHEMES

Some award schemes include awards that are targeted specifically to certain demographic characteristics typically under-represented in other awards, for example women-only awards. Anecdotal evidence suggests that in schemes which host both types of awards, the targeted award, such as women only, receives higher numbers of strong applications, but the parallel open award schemes receive lower numbers of applications from the targeted group. This highlights that these types of schemes can create a perception by either the applicant themselves or people nominating them that women and minority scientists are not as competitive within open award schemes.

There is also evidence to suggest that where there are targeted awards, these groups are less likely to be awarded scholarly awards or prizes that are open to all scientists (Bell et al. 2003; Cadwalader & Bryant-Freidrich 2014). The merit and prestige of targeted awards is also sometimes questioned as they are deemed to be drawn from a smaller pool and are incorrectly perceived to be less competitive, given that they are often oversubscribed. Targeted awards and prize schemes can mask the existing limited diversity in broader award schemes by inflating the numbers of diverse award recipients (Lincoln et al. 2012).

Targeted award schemes may be valuable in certain circumstances, such as when part of their purpose is to bring visibility to the targeted group and their work. They do not, however, provide a holistic solution to improving diversity in award schemes and should not be put in place solely in an attempt to meet this purpose. Rather, it is important for all award schemes to take steps such as those outlined here to improve diversity in recipients across all their prizes and awards. Targeted awards should be considered only where appropriate to meet a specific need and with consideration of the potential negative impacts.

Figure 3. Factors contributing to diversity

BARRIERS TO APPLYING FOR PRIZES & AWARDS, AND HOW TO ADDRESS THEM

The barriers to applying for prize and award schemes identified through the workshop sessions and from the literature can be broadly grouped into **reach, timing and time constraints, advertising and messaging, application processes, and assessment criteria**. The following sections provide information about each barrier and how it impacts the potential diversity of recipients. Suggested solutions to overcome each barrier are also presented, with a particular focus on methods to help increase diversity in the applicant pool or recipients of prizes and awards.

Reaching a diverse audience

In many cases, there is a lack of knowledge about the prize or award among the target audience. For example, at one workshop hosted as part of this consultation, more than half the attendees were unaware of the Australian Academy of Science's honorific awards, despite being part of the target applicant pool for many of the awards. Wide communication of prizes and awards to and within target organisations may not be effective, causing a lack of awareness by both organisations and potential applicants. Marketing of prizes and awards may be too broad or may not be pitched appropriately to reach or catch the attention of the target audience.

Informal networks play an important role in career progression as information about promotion possibilities, funding schemes, contribution to research projects and opportunities such as job openings or prize and award applications are frequently exchanged. However, these networks often have limited diversity (Bell et al. 2003). The exclusion of women and minority groups from informal networks affects the reach of communications about prizes and awards, particularly within groups that need to be targeted in order to improve diversity.

Solutions

Awarding organisations need to have a good understanding of their potential pool of applicants, where they work and how to reach them. This should not only be based on what worked for previous awardees. Directly emailing research offices, senior people at relevant organisations and professional societies can increase the reach and increase the number and diversity of applicants.

One solution to improving the reach and awareness of prize and award schemes is to **promote the value of the award to organisations as well as individuals**. If awarding organisations can communicate the value of having awardees on staff to employing organisations, employing organisations become partners in deepening the reach and awareness of the award scheme. Using mechanisms such as university research offices, comprehensive responses to calls for applications can be undertaken with organisations drawing on senior scientists to 'shoulder tap' or provide names of potential applicants as well as using their internal records to identify eligible applicants.

This approach also allows comprehensive mechanisms to improve diversity through transparency in the application process: awarding organisations can explicitly ask employing organisations to consider diversity when encouraging applicants and supporting applications. Awarding organisations can collate data on the applicant pool to assess i) the diversity of the applicants, and ii) a breakdown on the diversity of applicants by nominating organisation. This information can identify if applicants from particular organisations are skewed or less diverse (taking into account the pool of potential applicants). Awarding organisations can then provide de-identified feedback on diversity of applicants to the nominating organisations to support them to take steps to improve applicant diversity in future rounds.

People in senior leadership positions should act as **role models, champions and enablers to drive cultural, social and workplace change**. This includes ensuring women and people from other under-represented groups are included in informal networks that support career progression. These leaders should recognise their role in making change and can do this by talking to their colleagues who are from under-represented groups, encouraging and supporting them to apply for prizes and awards. Organisations have a role in creating a culture where senior scientists and mentors are encouraged and incentivised to take on these roles. Encouragement from peers is also important as this sends a signal to applicants that colleagues recognise their contribution and that their scientific activities are worthy of an award.

Timing and time commitment

Applications for prizes and awards were viewed as time-consuming by workshop participants and were thought to have potentially limited value, mainly because people considered themselves unlikely to be successful. Scientists, therefore, described weighing up the time commitment required to apply for awards with the potential gain if they were successful and against the other competing draws on their time. The amount of time spent in applying for prizes and awards can particularly disadvantage people from under-represented groups. These scientists often have additional pressures and responsibilities as they are frequently expected to act as role models and mentors, be visible, and participate in a range of outreach activities at a higher rate than those who are not from under-represented groups. This is also true for scientists working part time, who are typically time poor and over-committed, and may not have the opportunity to include award applications in their priorities.

Ideal times to open and receive applications for awards and prizes

JAN ✕	FEB ✕	MAR ✕	APR ✓
MAY ✓	JUN ✓	JUL ✓	AUG ✓
SEP ✓	OCT ✓	NOV ✓	DEC ✕

Solutions

Submission dates for prize and award applications should not coincide with the submission of major grant or funding applications, as grant applications will usually be given a higher priority. In Australia, major grant rounds usually fall in the period of December to March. This period also coincides with the summer break in Australia and school holidays, which may disadvantage those with carer responsibilities. Discipline-specific awards should also take into consideration time constraints related to the particular discipline. The period between opening and closing of applications should be as generous as possible.

Showcasing mentors and champions in the advertising campaign will also demystify the application process and highlight that the application process is a beneficial process for all involved, not just the applicant. Previous awardees can provide an impact statement to highlight the benefits of applying for the award and the achievements that the award has led to as a result. These benefits do not need to be related directly to research outputs but can also include increased visibility and profile in their discipline or in the general public. For example, the award may have led to an increase in the number of opportunities such as participation on boards, panels or collaborative partnerships. Organisations should encourage senior scientists and past award recipients to actively seek out junior scientists in a mentoring role. Mentors are able to offer independent advice to potential applicants about their suitability and provide encouragement during the application process.

The application or nomination form itself should be streamlined and length of application kept to a minimum to reduce the administrative burden and time required of applicants and/or nominators. Automated methods of collecting information about applicants exist, for example Expert Connect, and could be utilised to streamline applications. Award websites should include clearly accessible and labelled sections on frequently asked questions (FAQs), tips, common misconceptions, and guidelines for the application. An accessible contact person with a name and direct contact details was also identified as a key enabling point which encouraged applicants. The inclusion of a named contact person provided potential applicants with the confidence to proceed as they had someone to contact with any questions. Realistic estimates

of the time commitment required to complete applications or nominations should be provided.

Advertising and messaging

There are a number of ways in which advertising methods and messaging can act as a barrier to achieving diversity in prize and award schemes. Frequently, prizes and awards are named after pioneers within the discipline or in science more broadly and the names and images of these pioneers are often older, white men which are then used in advertising. This can discourage applicants from more diverse backgrounds who may perceive a lack of 'fit' with the scheme. Using photos or names of previous award winners in advertising for schemes that have historically lacked diversity can have a similar impact.

Elitist and exclusive language in describing awards may also act to discourage applicants. In schemes that require self-applications, potential applicants can feel that they are not competitive and therefore do not apply. There are also cultural and social barriers to self-perceptions of being competitive in such schemes and awards and these are influenced by a potential applicant's gender, ethnicity and language.

Solutions

Where diversity exists amongst previous award winners it should be showcased in advertising of the scheme. This can encourage applications from a diversity of people as it can increase the number of people who identify with the award winners. Where this is not possible, advertising can focus on showcasing the diversity of potential applicants by using images or including specific wording which encourages applicants from historically under-represented areas or backgrounds.

Workshop attendees found ambiguous wording such as 'outstanding' and 'distinguished' disengaging. They should be replaced with phrases such as 'demonstrated research excellence' that will increase clarity and potentially increase diversity of applicants. Gendered language should be avoided as this may suggest that the award is targeted at a particular group.

Application processes

Some factors that form part of the prize or award application process were also identified as significant barriers, including requiring nominations, requiring referee reports and the treatment of career interruptions.

The requirement for nominations—as opposed to self-applications—was identified as a major barrier for potential applicants, as was the requirement for referees' letters. Some scientists do not feel comfortable approaching senior scientists or their peers to submit a nomination on their behalf, particularly junior scientists and those from certain cultural backgrounds. Junior scientists may perceive senior scientists to be too busy to submit letters of support for these types of applications or may feel uncomfortable placing a burden on them. Factors such as social

conditioning and power imbalance can dissuade these people from approaching senior scientists to request time and input for referee letters or nominations. Our workshops also revealed that many EMCRs were unaware that it was common practice for potential applicants to actively approach senior scientists or colleagues to submit on their behalf. Rather, they thought that others would nominate them when they were seen to be ready.

The wording and description of career interruptions was also identified as a barrier for applicants as they were perceived to frame career diversity in a negative manner, such as use of 'despite career interruptions. While relative to opportunity assessments have become the norm in grant applications and members of the scientific community are becoming familiar with applying these frameworks, award application processes and wording on application forms can remain outdated. For example, some require that those with career interruptions complete additional application forms to apply for an exemption from the eligibility criteria.

Using age as an eligibility criterion, for example defining EMCRs as under 35, excludes people who commenced study later in life or experienced career interruptions, career changes, or frequent relocations for career progression. It also unnecessarily disadvantages scientists who may have taken more time to reach the same level of excellence as their peers. Even listing years post PhD as an eligibility criterion, without noting that career interruptions will be taken into account, can act as a disincentive to potential applicants.

Solutions

Engaging previous award recipients as champions for the award scheme has many benefits. Asking them to provide personal accounts of their own nomination experience to demystify the application process can be very valuable. These personal accounts can include a description of how they were nominated, if they approached senior scientists or colleagues, the material required, and time spent on the application process. Increasing accessibility of previous winners to potential applicants via social media, through video or by holding in-person sessions, can also assist in making the advertisement more personal and identifiable.

The **requirement for referees' reports was repeatedly stated by EMCRs as a significant barrier to overcome**. However, completely removing referees poses a challenge in many award schemes, particularly where fields of discipline are broad, and a selection panel could not reasonably be expected to have in-depth expertise across the possible disciplines. Rather, a solution would be to ask for referees' reports once potential award winners are short-listed. This removes the requirement for all applicants to provide referees' reports at the application stage. This will also decrease the burden on potential referees and assessors and may increase the overall numbers of application due to a simplified application process. Burden on potential referees could be further reduced by applicants providing only the names and contact details for potential referees who are subsequently contacted by the assessment committee only as required, similar to job recruitment processes.

To encourage those who have experienced career interruptions to apply for prizes and awards, the application process should ensure that part-time workloads and career interruptions are normalised. For example, a question on career interruptions should be a standard field on the application form that should require a compulsory response for all applicants. Those without career interruptions can enter 'N/A', but those with career interruptions will feel empowered to apply. Application forms should allow for applicants to self-report outputs relative to opportunity, rather than using complicated calculations to assess career interruptions and part time status. Using 'years in field' or 'years post-PhD or other research higher degree' or similar are more inclusive than age as an eligibility criterion.

Assessment criteria

Selection criteria were identified as potential barriers in some awards, particularly where traditional metrics such as numbers of publications, citations and citation indices are used as major selection criteria. These selection criteria exclude scientists who have had diverse career paths and can disadvantage those who work in interdisciplinary research or who have had career interruptions. Furthermore, assessments of merit and the value placed on various types of activities undertaken in the STEM sector are affected by biases, both individual and systemic. For example, activities such as outreach and mentoring are dominated by women (Ecklund et al. 2012), and they are frequently undervalued and not included in assessment criteria. Women tend to win awards associated with teaching and service, compared to men who tend to win awards associated with research (Lincoln et al. 2012). Awards associated with research are usually viewed as more prestigious and have a greater weighting in terms of assessments for promotion or funding.

Solutions

Our workshop groups recommended assessment criteria beyond the research metrics should be included to ensure the award is relevant to a diverse range of applicants. Examples of non-traditional metrics include research impact, outreach activities, industry engagement, patents, policy, software, mentorship, supervision, teaching, advocacy and committee service. Broadening of assessment criteria for awards where possible can also contribute to a larger systemic change which legitimises these types of activities as scholarly activity in themselves, and as a scholarly activity that contribute to scientific excellence. A broadening of assessment criteria and metrics of excellence will also encourage those researchers engaged in interdisciplinary research.

During assessment of applications, awarding organisations should ensure that selection panels are comprised of diverse members to limit bias and unconscious bias. Being transparent about selection processes by disclosing the members on the assessment panel and making the selection criteria public is also advisable.

CONCLUSION

The findings and recommendation presented here aim to enable awarding organisations to improve their practices and increase diversity among the applicants and recipients of their prizes and awards. It is not sufficient for only a few awarding bodies to make productive changes. A person's success at one level, for example receiving an award within their organisation, contributes to further successes such as receiving a national award (Bol et al. 2018). It is therefore important to acknowledge that to effectively increase diversity among prize and award recipients requires sector-wide change. Without concerted effort at all levels, a lack of diversity at one level can continue to flow into and impact other levels.

Employing organisations and individuals throughout the STEM sector also have a role to play to contribute to promoting, 'shoulder tapping', mentoring and encouraging others to apply for awards. In doing so we strongly recommend that they use this guide to examine and improve their practices to fairly and equitably support others. During discussions regarding awards, particularly if applicants are unsuccessful, it should be reiterated that persistence and resilience is required and that scientists should continue to apply for prizes and awards. Encouragement and support from mentors and peers are key factors in people choosing to apply for awards and ultimately contribute to successful progression in their career.

ACKNOWLEDGEMENTS

ABOUT THE EMCR FORUM

The Early- and Mid-Career Researcher Forum (the EMCR Forum) is the national voice of Australia's emerging scientists, representing researchers who are up to 15 years post-PhD (or other research higher degree), irrespective of their professional appointment or their discipline or research. The EMCR Forum's mission is to champion improvement in the national research environment through advocacy. Some of the main areas of focus for the EMCR Forum are sustainable and transparent career structures, gender equity, stable funding policies, career development opportunities, and raising awareness of issues facing the future of science.

The EMCR Forum is supported by the Australian Academy of Science which provides secretariat and other support for the Forum and its activities. This is a key strategic activity of the Academy and underpins its commitment to support diversity and excellence in science and empower the next generation of scientists. The EMCR Forum provides a mechanism for the Academy to engage with EMCRs around Australia and to receive advice on issues relevant to them. This informs the Academy's activities and its policy recommendations to government in view of creating a better future for scientists. The EMCR Forum provides a vital connection between Australia's most eminent scientists and tomorrow's future scientific leaders.

Connect with the EMCR Forum

Web: www.science.org.au/emcr-forum

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Twitter: @EMCRForum

REFERENCES

Bell, RE, Kastens KA, Cane, M, Muller, RB, Mutter, JC, Pfirman, S. Righting the balance: gender diversity in the geosciences. Eos, Transactions American Geophysical Union. 2003;84 (31): 292

Bol, T, de Vaan, M, van de Rijt, A. The Matthew effect in science funding. 2018;115 (19): 4887-4890

Boyle, PJ, Smith, LK, Cooper, NJ, Williams, KS, O'Connor, H. Gender balance: women are funded more fairly in social science. Nature. 2015;525 (7568): 181-183.

Cadwalader, E.L. & Bryant-Freidrich (2014) Improving Transparency and Equity in Scholarly Recognition by Scientific Societies. IN "Careers, Entrepreneurship, and Diversity: Challenges and Opportunities in the Global Chemistry Enterprise". ACS *Symposium Series*, Vol. 1169. Chapter 22, pp 245–254

Ecklund, E.H., James, S.A. & Lincoln, A.E. (2012) How academic biologists and physicists view science outreach. PLoS One. 7(5): e36240

Lincoln A.E., Pincus, S., Bandows Koster, J. & Leboy P.S. (2012) The Matilda Effect in science: Awards and Prizes in the US, 1990s and 2000s. Social Studies of Science. 42: 307-320

Metcalf H. (2018) Association of American Medical Colleges. "The Matilda Effect in STEM; what can you do to mitigate the role of bias in awards" https://www.aamc.org/members/gwims/communications/431526/metcalfarticle.html Accessed August 2018.

Van der Lee, R., Ellemers, N. Gender contributes to personal research funding success in The Netherlands. Proceedings of the National Academy of Sciences. 2015;112(40): 12349-12353.