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Fifty Years of Strategies for Equal Access to Graduate Fellowships

The US Supreme Court's recent ruling in *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College* and *Students for Fair Admissions, Inc. v. University of North Carolina et al.* effectively eliminates race and ethnicity as factors in college admissions. Universities are now faced with the challenge of complying with the ruling without undermining ongoing efforts to expand opportunities for underserved students, including students of color, and to ensure campus diversity.

Three decades ago, a different Supreme Court decision brought about the end of the National Science Foundation's (NSF) Minority Graduate Fellowship Program (MGFP), which had been intended to increase the representation of racial and ethnic minority students pursuing advanced degrees in science, technology, engineering, and mathematics (STEM). For 20 years, the MGFP ran as a parallel program to the agency's longstanding Graduate Research Fellowship Program (GRFP). But in 1995, in *Adarand Constructors, Inc. v. Peña*, the Supreme Court signaled that stricter scrutiny would apply to congressionally authorized, race-based programs supporting affirmative action. After a lawsuit, NSF ended the program altogether. In 1998—the last year of the MGFP competition—students from the racial and ethnic populations eligible for the program received approximately 20% of NSF's support for graduate fellowships. After the program was eliminated, it took nearly 15 years for the GRFP to achieve an equivalent level of representation.

Since 1952, the GRFP has supported over 60,000 graduate students and has been an important force in shaping both careers and the culture of the scientific enterprise. As researchers of political and policy history, we believe the outcomes achieved by NSF to improve representation in the fellowship program after the *Adarand* decision may offer useful lessons as administrators at colleges and universities seek to broaden access and participation in the future.

A first wave of inclusive policies

The GRFP is nearly as old as NSF itself; it was the first STEM workforce program established by the agency. Then, as now, supporting graduate students was seen as key to fostering science and engineering talent to meet the demands of a modern economy. However, by the early 1970s, the movement to improve equal access to education in the United States had shifted the national focus from simply increasing the number of people pursuing advanced scientific education to the more complex task of addressing the inclusivity of this expansion. A report on higher education from a 1973 special task force to the US secretary of health, education, and welfare recognized the major role of federal incentives and funding "in the opening of post-secondary education to minority students," and recommended the development of national fellowship programs at the graduate level for students from underrepresented racial or ethnic populations.

The NSF annual report from 1973 echoed these sentiments in a set of science education objectives prioritizing the improvement of education for careers in science with greater participation of minorities and women, and to meet the needs of a broader range of students. (The terms *minority* and *minorities* reflect the historical context and were used by NSF beginning in the 1970s to designate members of racial and ethnic groups, including those who identify as Black and African American, Hispanic and Latino, American Indian, Alaska Native, Native Hawaiian, and other Native Pacific Islander, that are historically underrepresented in STEM fields.)

In 1974, NSF launched several new programs, with an initial strategy of providing targeted, set-aside programs for minority-serving institutions and minority faculty and students. When the MGFP launched in 1978, about 10% of the fellowship awards for the GRFP were allocated to the program each year. To be eligible, applicants had to be US citizens or nationals and members of a racial or ethnic population underrepresented in STEM. A 1995 review by the National Research Council reported that although the fellowship award rate was highest for applicants from private research-intensive (R1) institutions, major research universities and predominantly minority institutions were equally represented among the top 10 producers of applicants, with about one-fifth of applicants coming from public and private historically Black colleges and universities (HBCUs).

Support for these and other targeted programs at NSF was sustained through the 1980s. The National Science Foundation Authorization and Science and Technology Equal Opportunities Act of 1980 authorized NSF "to promote the full use of human resources in science and technology through a comprehensive and continuing program to increase substantially the contribution and advancement of women and minorities in scientific, professional, and technical careers, and for other purposes."

In 1988, NSF recommended creating targeted programs for women in the MGFP and GRFP to encourage women to pursue advanced degrees in fields in which they were underrepresented. The Women in Engineering (WENG) program was created in 1990, and the Women in Computer and Information Science (WICS) program followed in 1994.

NSF began to pivot away from such targeted programs after the Supreme Court's ruling in the 1995 *Adarand* case, which held that race-based classifications "must serve a compelling government interest, and must be narrowly tailored to further that interest." A period of public advocacy acknowledging the importance of targeted programs for engaging students from underrepresented groups in STEM followed in the wake of the ruling. But the final straw was a 1997 lawsuit by an ineligible MGFP applicant challenging the constitutionality of the program, which was settled out of court. With growing social and political opposition to affirmative action, the MGFP and most other targeted NSF programs were discontinued by 1998.

Building inclusion after *Adarand*

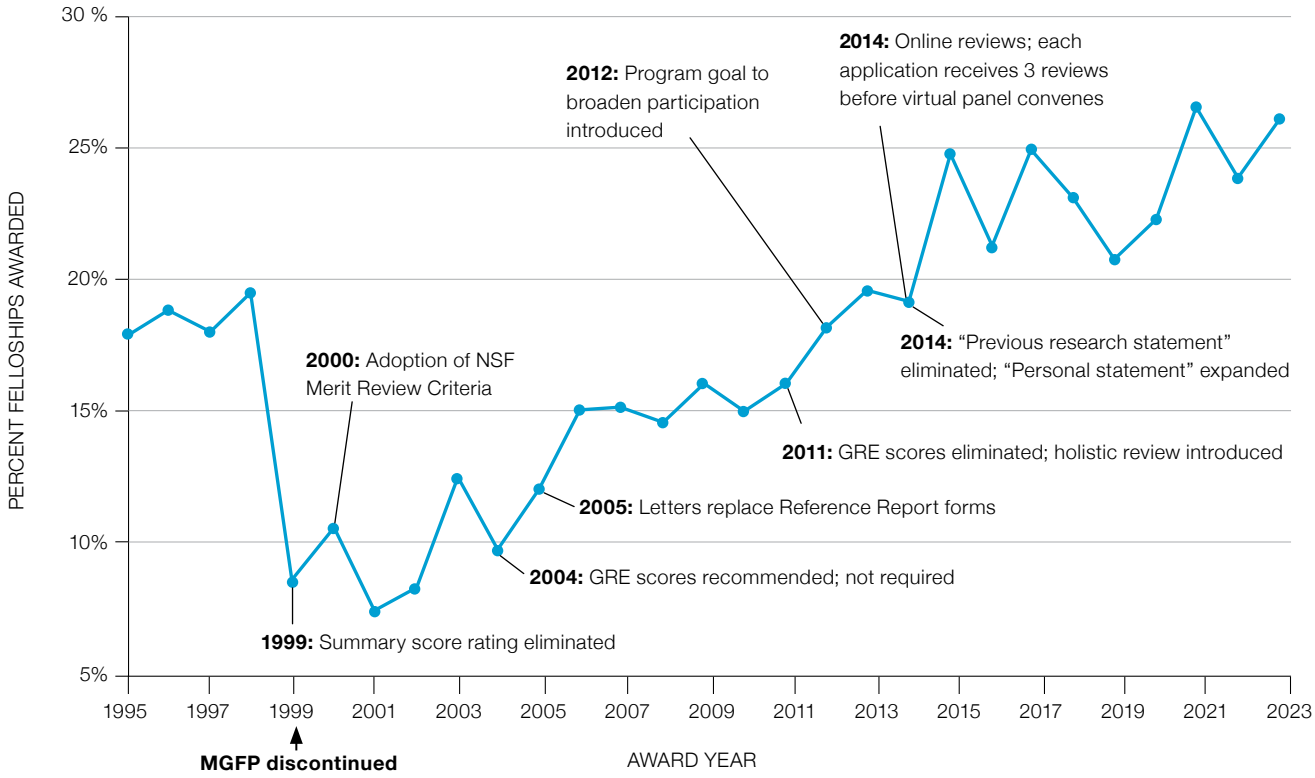
After the dissolution of the MGFP, NSF conducted a single GRFP competition in 1999, stating that it was replacing "emphasis on selection with emphasis on recruitment and development, toward increased participation of women and underrepresented minorities in advanced careers in the sciences, mathematics and engineering." However, that year only 76 of the 900 fellowships (8.4%) were awarded to people from racial and ethnic groups underrepresented in STEM—less than half the number awarded by the two combined programs in the previous year.

The outcomes achieved by NSF to improve representation in the fellowship program after the *Adarand* decision may offer useful lessons.

Congressional testimony by then NSF director Rita Colwell details a stark contrast between the final MGFP competition and the first year of the single GRFP competition. In 1998, the success rate for applicants in separate competitions was 19.2% for the MGFP and 15.8% for the GRFP. In comparison, in 1999 the success rate of applicants belonging to groups underrepresented in STEM had fallen to 13.6%, contrasting with 18.8% for all applicants. Notably, that lower success rate in 1999 was exacerbated by a 19.8% drop in applications submitted by persons from populations underrepresented in STEM. This steep drop did not affect other applicants; overall, there was only a 1.1% drop in applications between 1998 and 1999.

This precipitous decrease in awards to people from racial and ethnic groups underrepresented in STEM prompted NSF to evaluate its review and selection criteria and to take steps to remove barriers to participation in the GRFP. Figure 1 shows the timing of major changes in the application and review policies following the end of the MGFP, in relation to the percentage of total fellowships (both the MGFP and GRFP) awarded to people from racial and ethnic groups that are underrepresented in STEM.

Figure 1: **SHARE OF TOTAL FELLOWSHIP AWARDS TO APPLICANTS FROM POPULATIONS MINORITIZED AND UNDERREPRESENTED IN STEM**



Data for 1995 through 1998 calculated from data presented in a 1999 hearing of the House Appropriations Subcommittee on Veterans Affairs, Housing and Urban Development, and Independent Agencies. Percentages for 1999 through 2018 calculated from Gisèle Muller-Parker, Susan E. Brennan, and Erick C. Jones, "Why Fellowships? A Funding Model Worth Defending," Council of Graduate Schools (2020). Data from 2019 through 2023 calculated from NSF's GRFP. Policy start-dates obtained from the GRFP solicitations issued each year.

In the first wave of policy adjustments, the GRFP reduced the program's longstanding emphasis on quantitative measures of scientific ability. Traditionally, the GRFP calculated a summary score for all applicants based on a weighted average of GRE scores, undergraduate science grade point average, and reference report ratings. Reviewers then received a list of applicants in order of descending summary score percentile. Soon after the closure of the MGFP, the GRFP eliminated the summary score rating. Within the next year, NSF's two qualitative merit review criteria for assessing intellectual impact and broader impacts were adopted for evaluation of GRFP applications. GRE scores were made optional in 2004, and a year later reference report forms with numeric scales were replaced with reference letters, providing reviewers with a more individualized understanding of the potential of the applicants. Between 2004 and 2006, the percentage of awards to applicants from populations underrepresented in STEM increased from 10% to 15%.

The second wave of policies further prioritized inclusive forms of review. Since 2011, all GRFP applications have been evaluated, as described in the program solicitation, "using a holistic, comprehensive approach, giving balanced consideration to all components of the application, including the educational and research record, leadership, outreach, service activities, and future plans, as well as individual competencies, experiences, and other attributes." GRE scores were eliminated from the application altogether in 2011, and a year later, GRFP made broadening participation an explicit program goal. Between 2011 and 2013, awards to applicants from underrepresented populations increased from 16% to 19%.

A third strategy has involved elevating lived experience over research experience within the application. Emphasis on previous research experience—a part of the application since 1952—privileged applicants from R1 universities that offer abundant access to research opportunities. Recognizing

that some applicants do not have opportunities to participate in research experiences at their undergraduate institutions or because of work or family obligations, the GRFP discontinued the two-page "Previous Research" essay in 2014 and added a third page to the "Personal Statement," renaming it as the "Personal Statement, Relevant Background, and Future Goals Statement." This allows applicants flexibility in the types of evidence they provide about their backgrounds, scientific ability, and future potential. To support this new emphasis, reviewers were given training in implicit bias, as well as longer review periods and access to an online review site, which replaced the practice of conducting application review exclusively on-site over a few days.

Significantly, the dissolution of the MGFP did not affect award rates to women, but it is possible that the policy actions taken afterwards by the GRFP improved award rates to all women. Award rates to women rose from 49% in 1999 to over 55% in 2017. After NSF ended the two targeted programs supporting women in engineering and women in computer science in 2009, the rate of GRFP awards to women fell by 5% but recovered by 2013 and rose again after 2015.

More than a decade of policy adjustments has made a visible impact on the GRFP. In 2021, 26.5% of awards were to people from racial and ethnic groups that are underrepresented in STEM. In comparison with national data, this population constituted 25% of master's students and 19% of doctoral students in 2021.

Although successful in increasing the diversity of GRFP awardees, these measures have not accomplished the goal of broadening access to applicants from the full range of academic institutions. Public awardee data reveals a low number of awards to applicants from HBCUs, tribal colleges and universities (TCUs), and predominantly undergraduate institutions. Every GRFP Committee of Visitors report has noted the skewed distribution of fellowship awards to students at large institutions that have resources for undergraduate research experiences and provide support to applicants in the preparation of the application material.

It's important also to recognize the way that expanding the number of awards in the GRFP competition may affect inclusivity. NSF has doubled the number of new three-year fellowships twice, from 500 in the 1970s and 1980s, to 1,000 in 1988, and to 2,000 fellowships in 2010. NSF awarded 2,555 fellowships in 2023. The 2022 CHIPS and Science Act states that NSF should increase the number of new fellowships to no fewer than 3,000 fellowships annually. Thus the increasing share of awards to diverse students represents a significant rise in the total number of fellowship awardees from underrepresented populations.

Critical next steps for the GRFP will be reaching more students from a wider array of backgrounds and building relationships with new communities. This effort may benefit from developing partnerships with HBCUs, TCUs, and other minority serving institutions to encourage and support applicants; expanding online and in-person access to GRFP prep materials and resources to students; and holding information sessions and application workshops at national conferences designed for students from populations minoritized and underrepresented in STEM. The importance of this work is receiving new national focus. The CHIPS and Science Act amended Section 10 of the NSF Act of 1950 to add the requirement that the NSF director "ensure program outreach to recruit fellowship applicants from fields of study that are in areas of critical national need from all regions of the country, and from historically underrepresented populations in STEM."

A second important focus area for the GRFP involves the future of demographic data transparency. Such data—disaggregated by race and ethnicity, by gender within race and ethnicity, by geographical region, and by institutional affiliation—are integral to the practice of identifying and removing potential barriers to application, and to shaping outreach efforts. Guidance from the US Departments of Justice and Education following the *Students for Fair Admissions* decision emphasizes the broader ways demographic data can support equity efforts beyond admissions decisions, including understanding student programming needs to support degree attainment.

The history of the GRFP and MGFP tells a story of the persistent endeavor to remove barriers to equal access to graduate education, with gains paced by bureaucratic and institutional change. The GRFP's policy changes after *Adarand*—to prioritize qualitative over quantitative evaluation criteria, with a focus on broader life experiences and future goals—provide a blueprint for higher education institutions to consider after the recent affirmative action decision.

Still, significant barriers to equity in higher education remain, and universities must mobilize quickly to avoid losing ground. As Shirley Malcom reflected in 1996 in the shadow of the *Adarand* decision, "Some institutions, sensing the mood in the country, may choose to 'preemptively close' their special programs.… Other institutions, understanding history, looking toward the future, and possessing a commitment to realizing science's uncommon values of openness, quality, and inclusion, will work toward building the kind of community that supports and affirms participation from the entire pool of talent."

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