THE NIH
UNDERGRADUATE
SCHOLARSHIP PROGRAM:
ISSUES AND OPTIONS FOR
RECRUITING AND
OUTREACH

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I. INTRODUCTION

In 1996, the National Institutes of Health (NIH) began offering scholarships to encourage outstanding undergraduate students from disadvantaged backgrounds to pursue careers in biomedical research, and to attract them to the intramural research program at NIH. The Undergraduate Scholarship Program (UGSP) is administered by the Office of Loan Repayment and Scholarship (OLRS) within the Office of the Director of NIH. In recent years, as the UGSP has matured, OLRS has increasingly turned its attention to program improvement and program evaluation.

This report is part of an ongoing effort by Mathematica Policy Research, Inc. (MPR) to provide OLRS with information and analysis to support their evaluation needs. The goal of the report is to identify issues and options for improving UGSP recruiting and outreach, based on preliminary observations from the first of a two-phase study. In Phase II, more detailed data on program operations and participant experiences will be available.

A. THE UNDERGRADUATE SCHOLARSHIP PROGRAM

The UGSP provides yearly renewable scholarships to pay for tuition and related educational and reasonable living expenses up to $20,000 per academic year. In return for each year of scholarship support, recipients serve as paid employees in NIH research laboratories for 10 weeks during the summer and for one year after graduation. To encourage positive peer interactions and support, scholars are housed together during their summer service payback terms. The UGSP also includes mentoring activities and communication-skills training, in addition to practical experience in a state-of-the-art research setting, all of which are designed to nurture an undergraduate’s career development.
The UGSP is a small program that focuses its resources on finding and selecting outstanding students. Each year the program accepts 10 to 20 students from about 200 to 250 applicants (an acceptance rate of about 4 to 10 percent). Applicants must have earned an overall 3.5 grade point average (GPA), or be within the top 5 percent of their class. They must also be from disadvantaged backgrounds. To qualify as disadvantaged, applicants must either document “exceptional financial need” using federal government standards or provide a personal statement explaining how their environment inhibited, but did not prevent them from, obtaining the skills, knowledge, and abilities required to enroll in and complete an undergraduate program.

In FY2001, the UGSP operated within a $1.5 million budget with five full-time equivalent staff, six scholarship selection committee members, and 92 scientists approved to be mentors to UGSP scholars.

B. ORGANIZATION OF THIS REPORT

This report is designed to provide guidance on key issues affecting the operation of the UGSP. Chapter II presents the questions that guided our research efforts—with an emphasis on ways in which OLRS can improve recruiting and outreach to ensure a highly qualified cohort of scholars each year. Chapter III outlines the findings of our analysis of OLRS applicant data and of a nationally representative dataset of college students. Chapter IV provides the results of our investigation into the strategies and approaches taken by OLRS and other organizations and programs that have faced similar challenges. Chapter V gives an overview of the approach options that OLRS faces.
II. OPERATIONAL CHALLENGES FACING THE UGSP

To set a goal for this report, MPR met separately with the directors of OLRS and the UGSP and identified a list of pressing concerns for program improvement. We then used the list to develop a research agenda.

A. CHALLENGES IDENTIFIED BY OLRS

In discussions with OLRS, we identified key challenges facing the program.

- Although the same resources are being used for recruiting, OLRS staff report that the quality of responses from the applicants during their interviews is declining. The interview process is important for identifying attributes such as poise, maturity, enthusiasm, and motivation for pursuing research (rather than clinical medical practice, for example), that are difficult to detect through written application materials.

- UGSP staff feel that the program does not recruit enough Native American and U.S.-born African American male students. An important goal of the UGSP is to promote ethnic and cultural diversity at NIH. Identifying qualified applicants from these groups has been challenging.

- The summer service payback is not integrated with other aspects of the program.

- Many UGSP scholars see their service payback as a burden and deterrent to participation or continuation in the program.

- The current recruitment strategy, which centers on attending conferences and visiting colleges and universities across the nation, is time-consuming and expensive.

- High school seniors often have problems making the transition to college. It is difficult to identify the seniors who will succeed and stay on track.

All of these challenges are related and have a common theme: How can the UGSP most cost-effectively recruit a highly qualified, highly diverse group of students who will achieve the program’s goals? The challenges to the service payback system are directly related because the prospective scholars must see the program as a benefit to them rather than a burden.

Hoping to maintain a large recruiting pool, OLRS has not eliminated high school seniors altogether, despite the challenges in identifying those applicants most likely to complete the
program. OLRS has addressed this issue through policy changes to maximize the potential for success. For example, the program continues to solicit applicants who are just completing high school, but offers only conditional awards to these students. Conditional awardees are admitted to the program and required to spend the summer after their first year of college at NIH, but are not funded until they have met the UGSP admission requirements while in college. Overall improvements to outreach and recruiting will make the UGSP less reliant on high school seniors as a source of new scholars.

A major goal of the UGSP is to maximize the number of qualified, eligible members of under-represented minority groups who apply to the program. In accordance with the legislation that established the UGSP, these groups—mainly African Americans, Hispanics, and Native Americans—do not receive any preference or differential treatment in the process that determines eligibility or award status. In that disadvantaged background is the primary eligibility screening criterion, the program attracts more under-represented minorities than it would otherwise, but NIH must do more if it is to achieve its long-run objective of increasing the diversity of its intramural research program. “Doing more” includes two tasks: (1) locating members of under-represented minorities who might be eligible for UGSP, and (2) convincing such students to apply to the program. This report addresses how to accomplish these two tasks and thereby how to meet the challenges listed.

B. QUESTIONS FOR RESEARCH

Empirical evidence was needed to address the challenges we identified. In particular, we sought answers to the following questions:

- How large is the applicant pool and where can the best applicants be found?
- What recruitment and outreach strategies have been most effective for OLRS or similar programs?
• Where have successful UGSP scholars come from? How were they recruited?
• What factors might encourage or discourage eligible students from applying to the program?

Determining the size and location of the applicant pool was the most challenging of these questions. To find the answer, we first identified those students who belong in the applicant pool and then mapped the areas where these potential scholars are concentrated, in order to effectively target recruiting efforts. To address the other questions, we interviewed staff from OLRS, staff from other scholarship programs with similar goals or target populations, and former UGSP scholars. We also conducted a review of published descriptions or evaluations of programs similar to the UGSP.

III. THE UGSP APPLICANT POOL

When one drills for oil, an important cost-saving step is prospecting for and mapping the location of reserves and deposits. Targeting recruiting and outreach efforts requires a similar approach: mapping the applicant pool of potential UGSP scholars using existing data on U.S. college students. In this section, we present data to characterize and measure the size of the potential UGSP applicant pool.

A. DEFINING APPLICANT POOLS

To examine the likely applicant pool for the UGSP, we used survey data from a nationally representative group of college students who were sophomores in 1994. This group is part of the National Educational Longitudinal Study of 1988, Third Follow-up (NELS:88/94), sponsored by the U.S. Department of Education’s National Center for Education Statistics (NCES). The NELS sample consisted of over 20,000 eighth graders interviewed in 1988 and re-interviewed
every two years over a six-year period. The third follow-up includes information on the students’ post-secondary school experiences.

We selected three samples for use in the mapping exercise. The first sample consists of potentially eligible applicants to the UGSP. The UGSP eligibility criteria could not be reproduced exactly in the NELS:88/94 dataset, so we selected high-achieving, disadvantaged science students according to the following definitions.¹

- **High-achieving.** The student scored in the top 25 percent nationally on the math or science portion of any of the tests given as part of the NELS during the baseline and the first two follow-ups.

- **Science student.** The student reported taking at least one biology or chemistry course in college or reported majoring in a field related to biology, chemistry, or medicine.

- **Disadvantaged.** The student came from a family whose income was below $20,000 in 1988 (when the student was in the eighth grade), the student was Native American, or the student’s parent reported in 1988 that the student has a visual, hearing, speech, learning, or emotional disability.

The students in this sample represent about 100,000 students nationally (see Table 1) from a cohort of about 3 million.² Assuming that the above sample selection criteria approximate the UGSP eligibility criteria and that the youth who began the eighth grade in 1988 are a representative cohort, there would be, roughly speaking, 100,000 potentially eligible applicants to the UGSP in every cohort of students.

¹ To learn about the location and other characteristics of colleges attended by these students, we merged the NELS: 88/94 data with data from the Integrated Post-Secondary Education System (IPEDS) also produced by NCES.

² The number of students in the college cohort is less than 3 million because many youth do not attend four-year colleges, although the noncollege-bound youth are partially replaced by foreign students.
### TABLE 1

CHARACTERISTICS OF POTENTIAL UGSP APPLICANTS
(Percentages)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Likely Eligible Applicants</th>
<th>Likely Promising Applicants</th>
<th>Likely Promising Applicants from Under-Represented Minority Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>14</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>Hispanic</td>
<td>8</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>8</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>White</td>
<td>68</td>
<td>81</td>
<td>0</td>
</tr>
<tr>
<td>Native American</td>
<td>3</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>47</td>
<td>51</td>
<td>31</td>
</tr>
<tr>
<td>Female</td>
<td>53</td>
<td>49</td>
<td>69</td>
</tr>
<tr>
<td><strong>Sector of College or University Attended</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public 4-year</td>
<td>60</td>
<td>60</td>
<td>68</td>
</tr>
<tr>
<td>Private 4-year</td>
<td>20</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td><strong>Type of College or University Attended</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historically Black (HBCU)</td>
<td>5</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Hispanic-Serving (HIS)</td>
<td>5</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Ivy League</td>
<td>&lt;1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>State 2- and 4-Year School</td>
<td>73</td>
<td>69</td>
<td>76</td>
</tr>
<tr>
<td><strong>Size of College or University Attended</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt;5,000 Undergraduates)</td>
<td>25</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>Medium (5,000-10,000 Undergraduates)</td>
<td>22</td>
<td>16</td>
<td>29</td>
</tr>
<tr>
<td>Large (10,000-20,000 Undergraduates)</td>
<td>32</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>Very Large (&gt;20,000 Undergraduates)</td>
<td>21</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td><strong>Unweighted Sample Size</strong></td>
<td>584</td>
<td>159</td>
<td>21</td>
</tr>
<tr>
<td><strong>Weighted Sample Size</strong></td>
<td>108,444</td>
<td>29,945</td>
<td>3,658</td>
</tr>
</tbody>
</table>

**SOURCE:** MPR calculations using data from the National Educational Longitudinal Study of 1988, third follow-up.

**NOTE:** Data are weighted to reflect unequal sampling probabilities and nonresponse.

aSee text for explanation of sample definitions.

bTypes of colleges and universities are not mutually exclusive.
Under-represented minorities continue to be under-represented in the pool of potentially eligible applicants to UGSP, despite the use of disadvantaged background as a selection criterion. By defining our sample on the basis of being from a disadvantaged background, we increased the proportion of nonwhite students slightly from what it would have been among all college-age youth. However, because the sample was also defined on the basis of both high achievement and taking courses or majoring in the sciences, the race/ethnic composition of the sample was still mostly white (see Table 1).

The second sample consists of more academically promising eligible applicants. These are the students from the first sample who also scored in the top 10 percent nationally on both the math and science portions of the tests administered in conjunction with the second follow-up NELS interview, when most students were in the 12th grade. The students in this sample represent about 30,000 students nationally, meaning that the size of the likely applicant pool will, roughly speaking, be less than the 100,000 estimated under the looser test score criterion. Again, under-represented minorities continued to be under-represented in this group (Table 1). In both the first and the second sample, the distribution of males and female students was roughly even, and the majority of the students were enrolled in public colleges or universities.

The third sample consisted only of those students in the second sample who were from under-represented minority groups. This sample represents about 3,700 students nationally. The

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3 We used the top 10 percent in 12th grade to identify “promising” eligible applicants because it is a more stringent standard than the top 25 percent in 8th, 10th, or 12th grades. The cutoff is arbitrary, but strikes a balance between the looser definition and a stricter one that would exclude many youth whose scores might reasonably be expected to put them in the top five percent of a given class or translate into a grade point average over 3.5 in many American colleges.
characteristics of students in this population were difficult to predict, due to the small sample size, although the sample appeared to have more females than males.

The pool of potential UGSP applicants can be found primarily in public schools. A majority of the likely applicants we identified, particularly those from under-represented minority groups, attended public schools, particularly state schools. A small proportion, about five percent each, attended Historically Black Colleges and Universities (HBCUs) or Hispanic-Serving Institutions (HSIs), and even fewer, less than one percent, attended Ivy League schools.

The applicant pool is not concentrated in schools of any particular size, although minority candidates can typically be found at the larger enrolled. We measured the size of the schools attended by the number of undergraduates enrolled. The likely eligible applicants attended a mix of school sizes, from small (fewer than 5,000 students) to very large (over 20,000 students). The more promising applicants were slightly more likely to be found in smaller schools, with 31 percent of them attending schools with fewer than 5,000 students compared to 25 percent of the larger pool of likely eligible applicants. Among the promising applicants from under-represented minority groups, however, only 10 percent attended small schools.

The geographic distribution of potential UGSP scholars is mostly similar to the geographic distribution of the population generally, with large states having the largest number of potential applicants. Nevertheless, some smaller states had disproportionate numbers of likely eligible applicants, promising applicants, and promising minority applicants. In Figure 1, which shows these numbers of applicants for each state in the continental U.S., the states with the highest number of potential scholars include not only California, New York, and Illinois, but also Missouri, Alabama, and Louisiana. Alaska, Hawaii, and the District of Columbia, which do not appear in Figure 1, were represented by fewer than 250 students in each sample, except for the likely eligible applicants, among which students in Hawaiian colleges represented 319
FIGURE 1
SIZE OF APPLICANT POOL BY STATE OF COLLEGE OR UNIVERSITY ATTENDED

A. Likely Eligible Applicants

B. Promising Applicants

C. Promising Applicants from Under-represented Minorities

Number of Applicants
0 - 249
250 - 499
500 - 999
1,000 - 1,999
2,000 - 11,999
applicants. The NELS dataset included students who attended college in the Virgin Island, Guam, and Puerto Rico, but none of these students was in our sample of potential applicants.

B. REFINING THE APPLICANT POOL DEFINITIONS TO INCLUDE AWARD CRITERIA

UGSP outreach can be made more cost-effective if it can identify and target those who are eligible to be considered according to the minimum standard and qualified for a UGSP scholarship award based on a careful selection process. To qualify, applicants must not only meet the eligibility criteria, they must also rank highly on five specific selection criteria applied to their written applications: (1) academic credentials, (2) interest in biomedical research, (3) communication skills, (4) leadership, and (5) research potential. Of the 200 or so applicants who are typically determined eligible, the top 20 to 25 who rank highly in these areas are invited to NIH for an interview to be considered for the final round of selections. Finalists must also demonstrate poise, maturity, enthusiasm, and sincerity—attributes that are difficult to judge without meeting the applicant in person.

If we can determine which factors best predict award status, we may be able to refine the mapping exercise to focus only on those applicants who are likely to perform well at the interview stage and whom deserve a scholarship award. We used percentile rankings on test scores administered in the eighth, tenth, and twelfth grades to identify those most likely to be eligible. Examining the selection of UGSP finalists may provide clues for other sample criteria that might predict award status and see if such criteria can be measured in the NELS or any other dataset for mapping the location of potential high-quality applicants.

First, we used UGSP application data to estimate the relative importance of the five selection criteria listed above. UGSP finalists were those who were determined eligible, and who also qualified for closer consideration based on numerical ratings of their written
application. Most but not all of the finalists are scholarship students. Table 2 shows how well a regression model based on the year 2000 UGSP finalists was able to predict the award status of the 2001 UGSP finalists. We estimated a logistic regression of award status as the outcome with ratings on the five criteria as explanatory variables. The table shows that 24 finalists (80 percent) were correctly classified as awardees or non-awardees. Estimates from the statistical model placed greater weight on academics and interest and less weight on leadership and communication, with a negative weight placed on “potential.” It is important to note, however, that we could not reject the hypothesis that the five factors have an equal influence in predicting award status. In other words, the sample size is too small to make general statements about the relative importance of these factors.

We also predicted award status using the numeric ranking, which is the same as placing equal weight on the five factors. That method correctly predicted the award status of 73 percent of the finalists. The regression-based and ranking-based methods were a slight improvement over randomly predicting which finalists would receive an award. Randomly choosing would produce correct predictions for 58 percent of the finalists on average.

According to these attempts to predict award status, the UGSP selection process is doing its job. There is no mechanical way to determine a priori which applicants are most promising. The process of inviting finalists to NIH for an in-person interview makes it possible, in most cases, to measure characteristics that would be difficult to screen for using only the written application materials. This suggests that UGSP should rely on recruiting and outreach efforts that are very

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4 We also included dummy indicator variables for whether the student was entering the second, third, or fourth year of college. First-year students were omitted because most of the high school awardees were given conditional awards.
### TABLE 2
PREDICTED AWARD STATUS OF 2001 UGSP FINALISTS

<table>
<thead>
<tr>
<th>Method for Predicting Awardees</th>
<th>Awardees</th>
<th></th>
<th>Non-Awardees</th>
<th></th>
<th>Total Applicants</th>
<th>Percent Correctly Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
<td>Correct</td>
<td>Incorrect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest probability from regression model based on 2000 applicants</td>
<td>6</td>
<td>3</td>
<td>18</td>
<td>3</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>Top-ranked finalists</td>
<td>5</td>
<td>4</td>
<td>17</td>
<td>4</td>
<td>30</td>
<td>73</td>
</tr>
<tr>
<td>Randomly chosen finalists</td>
<td>2.7</td>
<td>6.3</td>
<td>14.7</td>
<td>6.3</td>
<td>30</td>
<td>58</td>
</tr>
</tbody>
</table>

**Source:** MPR calculations based on data from the NIH Office of Loan Repayment and Scholarship.

**Note:** Applicants who were entering their first year of college were excluded from this analysis.

Regression model includes scores on academic, interest, communication, leadership, potential and dummy indicators for year in college.

broad-based with respect to applicant quality, and should let the selection process identify the best applicants rather than try to focus recruiting and outreach on a smaller member of high-quality applicants.

Another potentially fruitful avenue to identify successful applicants is tracing the paths by which qualified scholars find their way into the program, as outlined in Chapter IV.
IV. APPROACHES TO OUTREACH AND RECRUITING

To examine the various approaches to outreach and recruiting, we documented strategies used by OLRS, the experiences of other programs—from the perspectives of program operators as well as evaluators—and the experiences of former scholars.

A. STRATEGIES USED BY OLRS

To understand how recruiting and outreach efforts by OLRS can produce a better applicant pool, we first examined the two general strategies in place—face-to-face and indirect recruiting. These strategies were developed and implemented by the UGSP director, who is primarily responsible for recruitment of applicants, and the director of OLRS, who plays a more managerial role, and also participates in some recruiting trips. An OLRS program analyst attends recruiting functions if neither of the directors is available.

1. Face-to-Face Recruitment Strategies

The two primary opportunities for face-to-face discussion occur at (1) professional meetings and conferences and (2) institutions of higher education. According to the program director, the face-to-face strategies are most effective because they generate the greatest interest, but they can be expensive and are very time-intensive. The UGSP director spends a large portion of his year traveling to conferences and post-secondary institutions to recruit potential scholars.

OLRS staff attend a variety of professional meetings and conferences. This often includes setting up a booth where interested students can meet and speak individually with the UGSP or OLRS directors, and conducting a conference session on UGSP. Current and former scholars frequently accompany OLRS staff on these recruiting trips, particularly if they match the demographic characteristics of the target audience. OLRS staff regularly attend conferences that focus on minority and disadvantaged students, including:
• **Society for the Advancement of Chicanos and Native Americans in Science (SACNAS).** OLRS has recruited Hispanic and Native American students from this conference in the past.

• **Annual Biomedical Research Symposium for Minority Students.** This meeting generally attracts a large number of African American students, and to a lesser degree Hispanic and Native American students.

• **Undergraduate Research Symposium.** About 80 percent of the undergraduates at this conference are minority students.

• **Biomedical Science Career Project.** This meeting is also targeted toward minority students and about 80 percent of its attendees are minorities.

• **Summer Research Opportunity Program.** About 70 percent of the attendees at this conference, which draws summer students in research labs at the Big Ten schools, are minorities.

OLRS staff also attend meetings of the Association of American Medical Colleges and the American Medical Student Association, although these organizations are less focused on disadvantaged and minority students.

The other major face-to-face recruiting efforts take place during visits to individual colleges and universities. OLRS conducts information sessions at colleges and universities in every region of the country, including Puerto Rico. Schools visited include Ivy League institutions, HBCUs, and HSIs.

2. **Indirect Recruitment Strategies**

Program staff also rely on indirect strategies that involve little or no personal contact with potential applicants. This includes an annual mailing of application materials to colleges and universities across the United States. OLRS also advertises in journals such as *Black Issues in Higher Education* and *Hispanic Weekly* and maintains a toll-free informational number and detailed Web site for applicants. These indirect strategies are less time-intensive for the program...
staff and therefore less costly per person contacted, but are probably less effective per person reached than individual contact with students.

3. Original Focus of UGSP Recruitment

In general, these recruitment strategies follow the recommendations of a group of “stakeholders” who were convened in 1995 by NIH to establish the UGSP (National Institutes of Health 1995). For example, the group recommended disseminating materials to guidance counselors, financial aid officers, and undergraduate math and science departments. In addition, the stakeholders noted the importance of working with engineering and minority associations to help identify potential applicants. These strategies have been implemented in the recruitment process.

Broad mailings to college juniors and seniors majoring in math and science and working with churches and libraries to identify strong applicants are two dissemination strategies outlined in the report, but not currently used by OLRS.

B. EXPERIENCES OF OTHER PROGRAMS

To provide some perspective on UGSP practices, we identified other scholarship and fellowship programs with components similar to those of the UGSP. These programs, listed in Appendix A, share at least one of the following characteristics with the UGSP (the UGSP characteristic is listed in italics):

- **Sponsor type:** federal agency
- **Field:** biomedical research field
- **Target applicants:** disadvantaged minority undergraduate and high school students
- **Program scale and support:** a small number of awards providing full tuition for one school-year
- **Service obligation:** required summer component and service payback obligation
• **Program community:** foster a sense of community through interaction among scholars during summer laboratory.

As highlighted in Appendix A, the UGSP is a unique program. Many programs have some components in common with the UGSP, but no program exactly matches all of its features.

1. **Perspective of Program Operators**

   We spoke directly with the program directors of four of these scholarship programs to learn more about their recruitment strategies, applicant pools, and summer internship and service payback components. These were (1) UNCF-Merck’s Undergraduate Science Research Scholarship Award, (2) the University of Maryland, Baltimore County’s Meyerhoff Scholarship Program, (3) the Ford Foundation’s Predoctoral Fellowships for Minorities, and (4) the Howard Hughes Medical Institute’s Predoctoral Fellowships in Biological Sciences. Detailed case study descriptions of these programs are presented in Appendix B.

   The interviews produced several findings. First, these four programs rely on many of the same strategies as the UGSP—including sending staff to national conferences in their target field, conducting recruiting trips to post-secondary institutions, and relying on mailings to academic institutions to attract the best-qualified applicants. All four also stressed the importance of developing relationships with high school and college faculty and staff, and of using these contacts to encourage students to apply for their scholarship program. The program directors noted that as a result of these relationships they had specific schools from which they always received high-quality applicants.

   Second, program directors described recruitment problems similar to those faced by UGSP program staff. For example, programs have trouble recruiting both African American males and American Indian/Alaskan Native applicants.
Third, these four programs attracted the strongest applicants by highlighting the range of benefits available in addition to financial support. Because applicants to these programs generally have multiple financial aid options, other program components such as formal mentoring, summer internships, and program prestige contribute heavily to students’ decisions to apply for and accept scholarships or fellowships.

2. Evaluation Literature on Related Scholarship Programs

Most of the programs we have identified have not been subject to any formal evaluation. The exceptions are the Meyerhoff Scholarship Program (Maton et al. 2000) and the Spencer Dissertation Fellowship Program (Gamse et al. 2000).

a. Meyerhoff Scholarship Program

Although the evaluation of the Meyerhoff Scholarship Program focused on program outcomes, the researchers conducted a process evaluation, including a survey and interviews, which revealed several factors that were critical to students’ success. While the financial support was the most highly rated element of the program, scholars also noted other important aspects. The “program community”—fostered by interaction among the scholars, the formalized study groups, and the Summer Bridge Program—was one of the biggest assets.

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5 The outcome evaluation compared current Meyerhoff scholars both with students who had been offered the scholarship and declined it to attend a different institution and with students who had characteristics similar to current Meyerhoff scholars but who attended UMBC prior to the scholarship’s existence. The study found that Meyerhoff scholars were more likely to graduate in their science, engineering, and mathematics majors than were the “declined scholars” and the historical samples. In addition, the scholars had higher GPAs in these courses and were more likely to attend related graduate schools than were either of the comparison groups.
b. Spencer Foundation Dissertation Fellowship

A study of the Spencer Foundation Dissertation Fellowship found that the program’s recruitment efforts were successful in selecting talented and diverse scholars that have since contributed meaningfully to the educational research community. For example, despite their short careers (at the time, most Fellows had been out of graduate school fewer than eight years), 29 percent of those in ladder-rank positions in the academy had been awarded tenure. In addition, these fellows had been responsible for over 1,100 publications and been awarded grants totaling $6 million.

As with the Meyerhoff program, researchers found that Spencer Fellows characterized their program as much more than just financial support. For example, many Fellows cited the professional networks and contacts they established through the program, as well as opportunities for collaboration on future research and insight into federal- and foundation-supported research.

C. EXPERIENCES OF SUCCESSFUL SCHOLARS

Because it is difficult to identify the attributes that predict who among potential applicants will be successful UGSP scholars, we interviewed four former UGSP scholars directly to learn what brought them into the program. We wanted the perspective of the “most successful” scholars the program has produced in order to identify, retrospectively, which recruiting practices had the best yield. Because no objective criteria are available to define “most successful” and because NIH cites enrollment in an MD/PhD program as one of the strongest outcomes for UGSP scholars, we selected three students who were enrolled in MD/PhD
programs and consented to a telephone interview.\textsuperscript{6} OLRS staff noted that enrollment in a PhD program was also a positive outcome, so we randomly selected a PhD student to interview as well.

All four of the scholars we interviewed had a strong interest in medicine and science prior to enrolling in their undergraduate institution. Two attended Ivy League institutions for their undergraduate work; the third, an HBCU in the South; and the fourth, a college focusing on science and engineering located on the West Coast. The scholars were split between one and two years of UGSP participation.

1. Recruitment

We asked scholars how they were recruited into the program to learn which strategies were most effective. Three of the four scholars learned about the UGSP through faculty or staff members at their post-secondary institution. One of these three learned about the program through a professor, who provided the student with the Web site address so he could learn more about the program and download the application. The professor gently pushed him to apply, but the student did not feel he was a strong candidate, so he did not directly speak with anyone at OLRS before applying.

The second former scholar learned about the program through a minority counselor in the science program at his post-secondary institution. The counselor approached this former scholar and two or three other upperclassmen to encourage them to apply for the program.

The third scholar, who learned about UGSP through campus faculty and staff members, was encouraged to apply by a faculty member in the medical school.

\textsuperscript{6} There are five MD/PhD students altogether; three students agreed to participate in the study, one student refused, and one did not respond to the director’s request for consent.
The fourth scholar attended a session for undergraduate students at the Student National Medical Conference, which she learned about from a bulletin in the department office. At the conference, she saw a 15-minute presentation on the UGSP and spoke with the director of OLRS and a former scholar.

2. Mentoring and Summer Laboratory Experience

We also asked scholars about their mentoring and laboratory experiences to learn whether they played a role in the decision to apply. Overall responses to these components were very positive. As one scholar noted, “I wouldn’t have been interested in the service payback if there weren’t the mentoring.” In addition, all four were much more interested in the summer laboratory experience than the service payback (see below) during the application process. More than one scholar noted that their experience during the summer laboratory helped prepare them for the challenges that they faced as graduate students. One scholar commented that the summer laboratory helped establish a sense of “camaraderie” with fellow scholars, and several mentioned that it was helpful to interact with other individuals from similar backgrounds, especially because there are few minority scientists at NIH.

3. Service Payback Obligation

As with the other components of the UGSP, we asked if the service obligation played a role in the decision to apply. Perceptions of the service payback option were mixed among these four scholars and their peers. For one scholar, the opportunity to work at NIH was one of the main benefits of the scholarship program. He noted that any opportunity to have a position at NIH conducting research is a major asset. The other three scholars saw both positive and negative aspects of the service payback. In general, all three of these noted that “it was nice to have a
guaranteed position at NIH,” but when they were applying, they were worried that this commitment would limit other career choices.

All four noted that the payback influenced (or would have influenced) their decision to seek a scholarship renewal. One scholar decided not to seek a second year of funding in part because it would have required a second year of service payback. A second scholar, who did not renew his scholarship, stated that a second year of service payback was a consideration in his decision not to reapply. The scholar who was most positive about the service payback component also noted that he would not have accepted a third year of funding because three years of service obligation would be too long. The fourth scholar who received funding during his senior year noted that, had he been applying for a second year of funding, service payback would have been a factor (and he would not have wanted to commit to more than two years of payback).

All four scholars perceived that their peers had mixed attitudes towards the service payback. They noted that some were excited about the payback component and while others saw it as a drawback.

None of the four scholars had yet completed their service payback obligation. The one scholar who was most positive about the payback obligation did not see any real benefit to undertaking the payback between his undergraduate and graduate work. He felt that to really get the most out of his time at NIH, he needed to complete at least some graduate work. He stated that even completing two years of his MD program would be very beneficial. He has now decided to complete all his graduate work and use his time at NIH as a postdoctoral fellowship opportunity.

A second scholar had planned to complete her service when she completed her undergraduate work, but she was unable to do so because of events beyond her control. A third scholar with two years of payback obligation felt it would require too much time between her
undergraduate and graduate work. Although she is still excited about coming to NIH, she also feels that the “longer you wait, the more it is hanging over your head.”

The comment made most frequently by the four scholars was that they felt the advantages and disadvantages of undertaking the service payback at different points in their academic career were not clearly explained by the UGSP program office. For example, they would have liked information on how their experience would differ if they had more education, and on the advantages of completing the service payback after finishing two years of the medical program, but before beginning the PhD program.

V. DISCUSSION OF FINDINGS AND OPTIONS FOR PROGRAM IMPROVEMENT

The findings from the analysis of national data, personal interviews, and the literature search help sharpen the issues facing OLRS and the options for program improvement.

A. OVERVIEW OF TRADEOFFS INHERENT IN CHOOSING ALTERNATIVE APPROACHES

The UGSP faces a tradeoff in its outreach and recruiting strategies between aiming to increase the quantity of applications versus the quality of applications. Quality, from the perspective of the UGSP, has two dimensions. One dimension is defined in terms of whether the candidate will meet the selection committee’s standards for award status. The other dimension is defined in terms of whether the candidate can contribute to the diversity of the NIH workforce, for example, by being a member of an under-represented minority group. We provided some evidence from the awardee selection process suggesting that recruiting and outreach may do little with regard to the first dimension of quality. However, the second dimension, the ability to contribute to a diverse workplace, cannot be considered during the eligibility determination and awardee selection process, so it must be incorporated into outreach and recruiting. The
implication is that, as a general rule, outreach and recruiting should focus on under-represented minority status while selection and interviewing efforts can focus on credentials.

Our preliminary investigation has implications for more specific questions as well. The first set of questions concerns outreach: how many and which colleges, universities, and meetings should UGSP staff attend? Should the UGSP staff try to find a few disadvantaged students from among a large set of pre-screened students, as in a highly selective college, or should they try to find the few “elite” students at institutions that may be less selective but that have larger concentrations of disadvantaged students from under-represented groups? Our analysis suggests that potential scholars, particularly the talented students from under-represented minority groups, are most concentrated in large public schools. Nevertheless, smaller schools and those such as HBCUs and HSIs with higher concentrations of minority students may be more cost effective to visit because less screening is required once the school is identified. The decision about how many schools and meetings to attend will have strong implications for UGSP staffing. It may be necessary to add staff to allow for visits to a larger, more geographically dispersed set of institutions.

The second set of questions concerns the outreach strategy once institutions are selected. A broad-based approach would involve presentations by USGP staff to large groups of students. A more focused approach would involve faculty and staff contacts at the institutions who would pre-screen individuals most likely to apply or who are the most appropriate candidates. We found that staff in other programs tended to take the more focused approach, although no concrete evidence exists to say which approach is preferable.

A third set of questions we can address concerns recruiting strategy. What can be done to make the UGSP more attractive to students who are highly qualified candidates and who are successfully targeted through outreach efforts but choose not to apply? It was not possible to
identify enough of these individuals to include their perspective in the current study, but we learned through others that the likely explanations have to do with the service payback obligations. The choices UGSP staff face are to improve the way the program is marketed, change the program itself, or both. Our interviews with some of the most committed scholars—those enrolled in joint MD/PhD programs—suggest that both summer and post-graduation service obligations may present a barrier to program continuation.

**B. OPTIONS FOR PROGRAM IMPROVEMENT**

The research conducted for this report is preliminary. Specific recommendations will be appropriate in Phase II of the study, after a comprehensive evaluation. Nevertheless, we offer some options to consider based on our observations as an independent party and our discussions with informants who have left the program or who operate similar programs. Some of these suggestions are easy to implement. Others may require Congressional authorization to change the program.

*Create Stronger Incentives for Undergraduate Institutions.* Other programs explicitly require faculty to nominate the applicants or even provide direct payments to the institutions whose applicants are awarded scholarships. While the incentive of a few thousand dollars may be relatively weak for well-funded academic institutions, it may create a further justification for staff or faculty to devote some time to the screening and nomination process, and may strengthen ties to specific individuals and institutions.7

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7 Public Law 103-43, which amended the Public Health Service Act to create the UGSP, does not specifically authorize the direct payment of funds to institutions. Implementing this recommendation may require a change to the legislation (Public Health Service Act; Public Law 103-43).
In addition, by continuing to cultivate relationships with post-secondary faculty and staff, OLRS can further develop this potentially rich source of strong applicants. For example, three of the former scholars we spoke with learned about the UGSP from and were encouraged to apply by professors or staff at their post-secondary institutions.

**Emphasize the Benefits of the Summer Payback Program.** Calling it simply the undergraduate scholarship program may give the impression that the UGSP is just a cash award. Our literature review showed that for the two programs that were formally evaluated, the non-pecuniary components were very important. It may be useful to label the UGSP in such a way as to signal to applicants that the program provides mentoring, quality peer interaction, an annual summer research opportunity, and a full time research position at NIH. One suggestion would be to rename it the Undergraduate Summer Fellowship Program.

In addition to renaming the program, OLRS should continue to promote other aspects of the UGSP go beyond just financial support. For example, NIH provides funding for scholars to attend academic conferences so they may present their work. Also, scholars may enroll at no cost in academic classes while on the NIH campus.

**Make the Service Obligations Voluntary.** Simply renaming the program or reconfiguring the summer internship activities may not be enough to generate interest among qualified applicants. The UGSP is intended to attract the most highly talented and accomplished science students, but these students are also eligible for many of the programs identified in Appendix A, which are both financially generous and do not have any service obligation. Making NIH employment voluntary turns an obligation into a benefit and makes UGSP more competitive with the other programs that have no mandatory payback. The risk associated with this strategy is that not enough students will freely choose to work at NIH as summer interns or apply for tenure
track positions when they complete their training to justify the program. However, if this turns out to be the case, then it reveals a problem that can be diagnosed and fixed.\textsuperscript{8}

**Accentuate the Program’s Prestige.** From our interviews, we learned that the prestige of the program is an important factor in the decision to apply or encourage others to apply. One way to highlight this element is to name the program after an inspirational figure, perhaps an accomplished NIH scientist who has overcome many of the barriers faced by UGSP scholars. In addition to giving the program character, this would lend a sense of mission and tradition to the program.

**Involve Former Scholars in Outreach and Recruiting.** The former scholars we spoke with reported having difficulties sorting out their options for completing their service obligation and continuing their training. Former scholars could provide career counseling either through OLRS staff or program mentors. This counseling could include ongoing information about NIH programs as well as advice on other research career decisions. Even if the former scholars do not pursue long-term careers at NIH, they may be useful allies in other research and teaching facilities who can speak for the program and reduce the travel burden on OLRS staff, while broadening the network and encouraging their own students and lab assistants to consider careers at NIH.

A symbolic step to maintain long-term relationships with scholars who are no longer receiving funding is to refrain from calling them “former” scholars, but instead name them

\textsuperscript{8} Public Law 103-43 explicitly states that “an individual is obligated to serve as an employee of the National Institutes of Health . . . 12 months for each academic year for which the scholarship . . . is provided.” Thus, making the service obligation voluntary would require a change in this legislation (Public Health Service Act; Public Law 103-43).
UGSP Scholars for life. This would be similar in spirit to the Spencer Dissertation Fellowship Program, which maintains a mailing list of individuals who are referred to as Spencer Fellows. With this convention, the Spencer Foundation can report on the subsequent accomplishments of its Spencer Fellows throughout their careers. As the UGSP continues to mature, more and more of its scholars will have graduated and found employment in strategic positions in academia, increasing the value of this community of scholars.

Conduct Local Recruiting and Outreach. While NIH probably seeks geographic as well as other types of diversity in its workforce, it may be worth taking advantage of the main campus’ proximity to a potentially rich source of African American science students in the counties of Maryland immediately surrounding Washington, DC, as identified by the Meyerhoff program. NIH’s proximity to Prince George’s County schools, for example, provides an opportunity for low-cost outreach with a high yield, given the success of the Meyerhoff program in attracting talented African American students and the ease which students living in the Washington, DC area could access the NIH campus. When recruiting in these locations, it may be useful for recruiters to target parents of students.

Focus Efforts on Colleges and Universities that Potential Scholars are Most Likely to Attend. Are there qualified youth whom the program is not finding? If so, where can they be found? This report took the first step toward addressing this question. We showed that the potential applicant pool may be as large as 30,000 or 100,000 students in each college cohort. We also showed, however, that building representation of under-represented minorities could be challenging, since they represent a relatively small fraction of this potentially eligible applicant pool, despite the pool’s being made up of only people from disadvantaged backgrounds. Nevertheless, data from a nationally representative sample of students suggests that the likely applicant pool is concentrated in public colleges and universities, not necessarily those with
higher prestige (Ivy League, for example) or a higher concentration of under-represented minorities (HBCUs and HSIs, for example). While more under-represented applicants may be discovered at larger universities, OLRS should consider that it may be more difficult to screen large student bodies to identify those potential scholars for information sessions and targeted outreach events. Geographically, the potential scholars are concentrated mainly in areas where the population more generally is concentrated—large population states—with the exception of a few smaller states such as Missouri, Alabama, Louisiana, and New Mexico.
REFERENCES


Public Health Service Act, Title Iv, Part G, Section 487d, As Amended, Public Law 103-43; 42 U.S.C 288-4.
APPENDIX A

CHARACTERISTICS OF EXISTING SCHOLARSHIP PROGRAMS
<table>
<thead>
<tr>
<th>Program</th>
<th>Sponsor and Type</th>
<th>Field of Study</th>
<th>Target Applicant Education Level</th>
<th>Target Applicant Background</th>
<th>Level of Support and Scale</th>
<th>Service Obligations</th>
<th>Program Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIH Undergraduate Scholarship Program</td>
<td>HHS, NIH — federal</td>
<td>Biomedical</td>
<td>Undergraduate students</td>
<td>Disadvantaged students</td>
<td>$20,000 per academic year up to 4 years. 15 scholarships in 2001</td>
<td>10-week summer lab; 1 year employment at NIH per scholarship</td>
<td>Mentoring, summer laboratory</td>
</tr>
<tr>
<td>Undergraduate Science Research Scholarship Award</td>
<td>UNCF-MERCK—private foundation</td>
<td>Biomedical science education and research</td>
<td>College juniors</td>
<td>African American students</td>
<td>Scholarship of up to $25,000 and 2 summer stipends totaling $10,000. About 15 awards in current cycle.</td>
<td>Summer internship</td>
<td>Mentoring, summer internship</td>
</tr>
<tr>
<td>Meyerhoff Scholarship Program</td>
<td>University of Maryland, Baltimore County—University</td>
<td>Sciences, mathematics, computer science, and engineering</td>
<td>High school seniors</td>
<td>Minorities, particularly African Americans</td>
<td>12-month stipend beginning at $16,000</td>
<td>Summer Bridge Program—internship on the UMBC campus or at another educational institution, company, or government agency</td>
<td>Mentoring, summer internship</td>
</tr>
<tr>
<td>Ford Foundation Predoctoral Fellowship for Minorities</td>
<td>Ford Foundation and National Research Council—private company and foundation</td>
<td>Biology, Chemistry, Life Sciences, Social Sciences and Mathematics (PhD or ScD)</td>
<td>College seniors, college graduates, or graduate students in their first year</td>
<td>Minority students (Alaska Natives, African Americans, Hispanics, Native Americans, Asian/Pacific Islanders)</td>
<td>Awards of up to $16,000. About 60 awards in 2002.</td>
<td>None</td>
<td>Conference of Ford Fellows, Informal mentoring</td>
</tr>
<tr>
<td>Hughes Predoctoral Fellowships in Biological Sciences</td>
<td>Howard Hughes Medical Institute and National Research Council—private company and foundation</td>
<td>Biomedical research</td>
<td>College seniors, college graduates, or graduate students in their first year</td>
<td>Women and minorities are encouraged to apply</td>
<td>$21,000 each year for 5 years. 80 awards planned for 2002.</td>
<td>None</td>
<td>Mentoring</td>
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<tr>
<td>National Health Service Corps</td>
<td>HHS, HRSA — federal</td>
<td>Medical profession</td>
<td>Graduate students</td>
<td>Disadvantaged students</td>
<td>Award includes tuition and monthly stipend</td>
<td>One year obligated service in area of</td>
<td>None</td>
</tr>
<tr>
<td>Program</td>
<td>Sponsor and Type</td>
<td>Field of Study Supported</td>
<td>Target Applicant Educational Level</td>
<td>Target Applicant Background</td>
<td>Level of Support and Scale</td>
<td>Service Obligations</td>
<td>Program Community</td>
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<tr>
<td>Scholarship Program</td>
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<td>average of $1,028 per month. 284 first-time awardees and 32 continuations in FY 2000.</td>
<td>high need for each year of scholarship.</td>
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</tr>
<tr>
<td>GEM PhD Science Fellowship Program</td>
<td>National Consortium for Graduate Degrees for Minorities in Engineering and Science—nonprofit organization</td>
<td>The natural sciences including chemistry, physics, earth sciences, mathematics, biological sciences, and computer science</td>
<td>Undergraduate junior and senior students and students who have completed their undergraduate degree</td>
<td>Minority students</td>
<td>Tuition for first year of graduate work</td>
<td>Summer internship</td>
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<tr>
<td>Scholarships for Health Professions Students from Disadvantaged Students</td>
<td>HHS, HRSA—federal grant awarded at the institutional level</td>
<td>Health professions</td>
<td>Undergraduate (and select graduate) education in the health professions</td>
<td>Disadvantaged students</td>
<td>Average institutional grant $107,809. 306 grants awarded in 2000-2001</td>
<td>None</td>
<td>None</td>
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<td>Graduate Science Research Dissertation Fellowship</td>
<td>UNCF-Merck—private foundation</td>
<td>Biomedical science education and research</td>
<td>Graduate students enrolled in a PhD program</td>
<td>African Americans</td>
<td>Fellowship stipend of up to $30,000 and a department stipend of up to $10,000. 12 awards in current cycle.</td>
<td>None</td>
<td>Mentoring</td>
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<td>Health Professions Pregraduate Scholarship Program for Indians</td>
<td>HHS, Indian Health Service—federal</td>
<td>Medicine and Dentistry</td>
<td>Undergraduates enrolled in pre-medicine and pre-dentistry</td>
<td>American Indian and Alaskan natives only</td>
<td>Average award $18,913 to $27,217 per year up to 4 years. 45 new and 61 continuing awards in 2000.</td>
<td>None</td>
<td>None</td>
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<tr>
<td>Research Training Fellowships for Medical Students</td>
<td>Howard Hughes Medical Institute—private foundation</td>
<td>Biomedical research</td>
<td>Students currently enrolled in schools of medicine</td>
<td>Women and minorities are encouraged to apply</td>
<td>Award of up to $21,000. 60 awards planned for 2002.</td>
<td>None</td>
<td>Mentoring</td>
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<td>Scholarship for Service</td>
<td>NSF funds distributed to six institutions of higher education – federal</td>
<td>Computer security and information assurance</td>
<td>Undergraduates and graduates</td>
<td>Disadvantaged and minority students</td>
<td>Tuition for junior and senior years of undergraduate work or 2 years of graduate school</td>
<td>One year of service in a federal agency for each year of scholarship</td>
<td>Summer internship</td>
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<td>Strauss Scholarship</td>
<td>Donald A Strauss Foundation—private foundation</td>
<td>Public service</td>
<td>Undergraduate juniors</td>
<td>Must attend one of 14 California post-secondary institutions</td>
<td>Awards of $10,000. 15 awards in 2001.</td>
<td>Recipients must complete a public service project during their senior year</td>
<td>None</td>
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<tr>
<td>Program</td>
<td>Sponsor and Type</td>
<td>Field of Study Supported</td>
<td>Target Applicant Educational Level</td>
<td>Target Applicant Background</td>
<td>Level of Support and Scale</td>
<td>Service Obligations</td>
<td>Program Community</td>
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<tr>
<td>United States Armed Forces Health Professions Scholarships</td>
<td>U.S. Department of Defense—federal</td>
<td>Medicine</td>
<td>Students enrolled in school of medicine</td>
<td>None</td>
<td>Full coverage of medical school tuition. About 200 awards.</td>
<td>45 days per year during scholarship period and one year service for each year of scholarship</td>
<td>None</td>
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<tr>
<td>National Security Education Program</td>
<td>DOD—Federal and Institute of International Education—private, nonprofit organization</td>
<td>International relations and national security</td>
<td>Undergraduate students</td>
<td>None</td>
<td>Up to $10,000 per semester and $20,000 per year. 135 in 2000-2001</td>
<td>Service with a federal agency related to “international affairs” for at least length of scholarship</td>
<td>None</td>
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<td>Truman Scholarship</td>
<td>The Truman Foundation—federal</td>
<td>Public service</td>
<td>Undergraduate juniors</td>
<td>None</td>
<td>75-80 of $30,000 each in 2002</td>
<td>Scholarship must be used for graduate study in a field of public service</td>
<td>Scholar events, including a conference</td>
</tr>
<tr>
<td>Spencer Dissertation Fellowship</td>
<td>The Spencer Foundation—private foundation</td>
<td>Social science research related to education</td>
<td>Candidates for doctoral degrees</td>
<td>None</td>
<td>25 scholarships of $35,000</td>
<td>None</td>
<td>Scholar events</td>
</tr>
<tr>
<td>Gates Millennium Scholarship</td>
<td>Bill and Melinda Gates Foundation and UNCF—private foundation</td>
<td>Undergraduate education in all fields and graduate education in mathematics, science, engineering, education, and library science</td>
<td>Undergraduate and graduate students</td>
<td>African American, American Indian/Alaska Native, Asian Pacific Islander, and Hispanic students</td>
<td>4,000 initial awards in 2001. 1,000 awards each following year.</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Postdoctoral Research Fellowships for Physicians</td>
<td>Howard Hughes Medical Institute—private foundation</td>
<td>No longer competed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benjamin Banneker Scholarship</td>
<td>University of Maryland—university</td>
<td>No longer competed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Program characteristics that are similar to those of the UGSP are highlighted in gray.

SOURCES: Program information on official websites, interviews with program operators, evaluation reports.
I. UNCF-MERCK UNDERGRADUATE SCIENCE RESEARCH SCHOLARSHIP AWARD

UNCF-Merck’s Undergraduate Science Research Scholarship Award is designed to increase the number of African American students in the pipeline of biomedical science education and research. Applicants must be African American students in their junior year of college, majoring in life or physical sciences, with an interest in biomedical research and a cumulative GPA of 3.3. UNCF-Merck funds about 15 scholarships, which consist of a $25,000 award and stipends totaling at least $10,000 to support two required 10-12 week summer internships at a Merck Research facility.

A. RECRUITMENT

UNCF-Merck relies on several strategies to recruit high-quality applicants for its scholarship. As with the UGSP, representatives of the UNCF-Merck Program attend a variety of conferences, including those sponsored by the Minority Access to Research Careers, the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, and the American Society for Cell Biology. The director of the program also visits some post-secondary institutions to meet individually with students. (He would like to visit more colleges and universities but said he does not have the time or the funding to do so.)

UNCF-Merck also uses two different mailings lists. The first is a list of professors and administrators at post-secondary institutions that the program director purchases from a mailing list agency. The second is a list, cultivated by the program director, of approximately 900 contacts at nearly 100 institutions across the country that have provided strong candidates in the past.
The purchased mailing list generates the largest number of applications, but the program director does not necessarily consider it the most effective recruitment method. Students are much more likely to apply for the program if they have met directly with the program director than if they receive a mailing.

UNCF-Merck also relies on colleges and universities to encourage strong applicants to apply. The program office provides a department grant to the awardee’s academic department that is equal to the difference between the $25,000 scholarship and the institution’s annual tuition (up to $10,000). Post-secondary institutions and academic departments themselves then have an incentive to encourage highly qualified applicants to apply. The impact of this incentive varies among different institutions, however, because those institutions with high tuition rates or a significant amount of extramural funds are less likely to see the department grant as an incentive.

In addition, UNCF-Merck requires that scholarship applicants submit application materials to their institution, rather than directly to NIH. The institution then submits one packet of materials for all applicants to UNCF-Merck. This allows the institution to have more control over the application process and to further encourage strong students to apply.

B. APPLICANT POOL

UNCF-Merck receives between 100 and 150 applications each year for 15 awards. About one-third of the awardees come from HBCUs and the rest come from other major colleges and universities. A challenge cited by the program director is that the density of qualified African American students is so low, especially at major universities. He is forced to “cast a broad net to catch just a few fish.” He reported having an even more difficult time attracting qualified male applicants. There are fewer African American males than females in post-secondary education and the pool among males is even smaller when the application requirements are considered.
UNCF-Merck, however, does not directly target males in recruitment efforts or give them a preference in the ranking.

C. OTHER COMPONENTS

The program director notes that the strongest applicants to the program have opportunities for funding from many different sources. What separates the UNCF-Merck award from other scholarship programs is the mentoring and internship opportunities. He admits, however, that in some cases applicants decide not to accept the award because of the internship requirement.

II. UNIVERSITY OF MARYLAND, BALTIMORE COUNTY MEYERHOFF SCHOLARSHIP PROGRAM

The Meyerhoff Scholarship Program is administered by the University of Maryland, Baltimore County (UMBC). The Meyerhoff program supports minorities, particularly African Americans, who are interested in eventually pursuing a doctoral degree in the sciences, mathematics, computer science, and engineering. Applicants must be in their senior year of high school and have strong grades and SAT scores. Scholars receive a $16,000 stipend and must participate in the Summer Bridge Program, an internship on the UMBC campus or at another educational institution, private company, or federal agency.

A. RECRUITMENT

The Meyerhoff Program staff rely on a variety of strategies to recruit applicants from within Maryland and across the country. Each year, a program announcement is sent to Maryland secondary school principals and counselors, asking them to nominate the strongest candidates in the senior class. The program director then sends application information directly to each student. While the program office expects to hear from most schools across the state, they have a large group of schools in Maryland that consistently provide good candidates each year. These
schools are in Prince George’s, Howard, and Montgomery counties, areas that lie close to or include the main NIH campus in Bethesda, Maryland.

The program office also works with several organizations to help identify strong applicants. Some of the groups they have worked with include the Maryland Mathematics, Engineering, Science Achievement Program; the Urban League; and Outward Bound. Meyerhoff staff began developing relationships with many of these organizations early in the program’s history and have worked to maintain them. They often invite representatives to attend Meyerhoff scholar activities, which helps keep them involved and interested in providing additional candidates.

The biggest challenges for the Meyerhoff Scholarship program are the small pool of potential scholars, the difficulty recruiting out-of-state applicants, and competition with better-known universities. The number of minority students interested in pursuing a doctoral degree in the sciences, mathematics, computer science, and engineering is very small, and fewer still have strong grades and SAT scores. The program office has to work very hard to find strong candidates. Recruiting students from outside the state is difficult because the program does not pay for advertising in any publications. Coverage in news stories in several nationally known publications, including CNN and the Washington Post, has helped raise its profile nationally. In addition, the program office began contacting high schools with strong magnet science programs in different states to encourage the schools to recruit qualified applicants.

A third challenge faced by the Meyerhoff Scholarship program, according to its staff, is that UMBC’s reputation is not as strong as that of other institutions. Within Maryland, students are much more familiar with Johns Hopkins University and the University of Maryland. In addition, the program director noted that UMBC is competing for elite students who have an opportunity to attend more selective institutions, including many Ivy League schools, and “it can be a battle fighting the bigger, more well-known schools.” The Meyerhoff Program representatives speak
individually with awardees and their parents and discuss the benefits of the program, as well as its strong history of success, to lure the strongest candidates to UMBC.

B. APPLICANT POOL

The program office selects about 500 applications from the 1,800 to 2,000 nominations for the scholarship. Of these, 200 are selected for interviews; 40 to 50 are then admitted into the program. The class is diverse—most ethnic and racial groups are represented. The program director would like to see more males apply for the program, but the pool of qualified female applicants is much larger, and, according to her, much more aggressive in applying for this type of aid. The Meyerhoff Program has been able to expand outside of Maryland: 23 states were represented in the last group of awardees.

C. OTHER COMPONENTS

According to the program director, although some applicants may see the Summer Bridge Program as a deterrent, most do not. Once scholars come to UMBC and are immersed in their work, she notes, they are generally more enthusiastic about the summer experience.

II. NATIONAL RESEARCH COUNCIL FORD FOUNDATION PREDOCTORAL FELLOWSHIPS FOR MINORITIES AND THE HOWARD HUGHES PREDOCTORAL FELLOWSHIPS IN BIOLOGICAL SCIENCES

The National Research Council (NRC) administers two programs similar to the UGSP: the Ford Foundation Predoctoral Fellowships for Minorities and the Howard Hughes Predoctoral Fellowships in Biological Sciences.

The goal of the Ford Fellowship is to increase the number of minority students in post-secondary institutions’ faculties and enhance diversity on campus. Applicants for the fellowship must be a member of one of the following groups: Alaskan Native, Black or African American,
Hispanic, Native American, or Pacific Islander. They must also be college seniors, college graduates, or doctoral students who can fully use the three-year fellowship. NRC awards 60 scholarships, which include a $16,000 stipend for work towards a PhD or ScD in biology, chemistry, mathematics, and the life and social sciences as well as funding to attend three Conferences of the Ford Fellows.

The Hughes Predoctoral Fellowship in the Biological Sciences is designed to support excellence in biomedical research by helping outstanding prospective researchers obtain graduate education. The program is not limited to minorities, but Howard Hughes and NRC encourage applications from women and minority groups traditionally under-represented in the sciences. As with the Ford Fellowship, applicants must be college seniors, college graduates, or doctoral students who can fully use the three-year fellowship. The annual stipend is $21,000, with an additional allowance of $2,500 for health-care expenses, books, and supplies.

A. RECRUITMENT

Program directors from the both the Hughes and Ford Fellowships attend meetings and conferences to recruit fellows. In 2001, the Hughes Fellowship director is attending 15 conferences and the director of the Ford Fellowship is attending 25 to 30 meetings—including those sponsored by Minority Access to Research Careers and the Annual Biomedical Conference for Minorities. While these conferences afford the opportunity to meet potential applicants, the biggest advantage is that they allow program staff to build relations with university faculty, who are a great resource in helping to identify potential applicants. In fact, the Ford Program has found that “the most effective [recruitment method] is going to conferences, getting to know faculty, and having the faculty promote the programs on their campus.”

In addition, the program offices work directly with post-secondary institutions. In the fall, the program offices mail out information to department chairs and graduate school and medical
school deans. These contacts come from a mailing list that the program office purchases from a mailing house. In the past, the program office maintained this list, but that became too difficult and time-consuming.

The program directors conduct campus visits to schools across the country, and the Ford Foundation Fellowships director makes an annual recruiting trip to institutions in Puerto Rico. Both project directors stated that current and former scholars are very helpful in helping to identify prospective applicants.

One of the difficulties that the program office has faced is that the number of applications has been declining over the past several years. The director believes that the number of applications is often tied to the economy—if the best-qualified applicants can find better opportunities in more professional degree programs, such as the JD or MD, they are less likely to be interested in PhD and MD/PhD programs.

B. APPLICANT POOL

Both programs are very competitive—each receives over 1,000 applications for between 60 and 80 fellowships. In the past, the Ford Foundation has struggled to attract Native American and Alaskan Native applicants.

C. OTHER COMPONENTS

The program directors believe that, in addition to the funding, one of the biggest selling points of these programs is the prestige of the scholarships and the sponsoring organizations, the Ford Foundation and the Howard Hughes Medical Institute. One program director has heard several applicants comment that “they didn’t care about the money, they just wanted to put it on their resume.” Both programs are well-established. For example, the Ford Foundation Predoctoral Fellowships for Minorities were first funded in 1986, and the Postdoctoral
Fellowships for Minorities were first funded in 1980. Prior to that, the Ford Foundation had a history of support for minorities in graduate education. In addition to their prestige, the Hughes and Ford Fellowships support fellows' travel to conferences to encourage interaction among scholars and give them an opportunity to present their research. The Ford Foundation also has 30 regional liaisons across the country who serve as informal mentors to both the predoctoral and postdoctoral students. This helps to build a strong network of support for the programs across the country.