

AGEP *Alliances for Graduate Education and the Professoriate*

Info Brief II

Increases in the Annual Number and Percent of Underrepresented Minority Graduate Student Enrollment in STEM at AGEP Institutions

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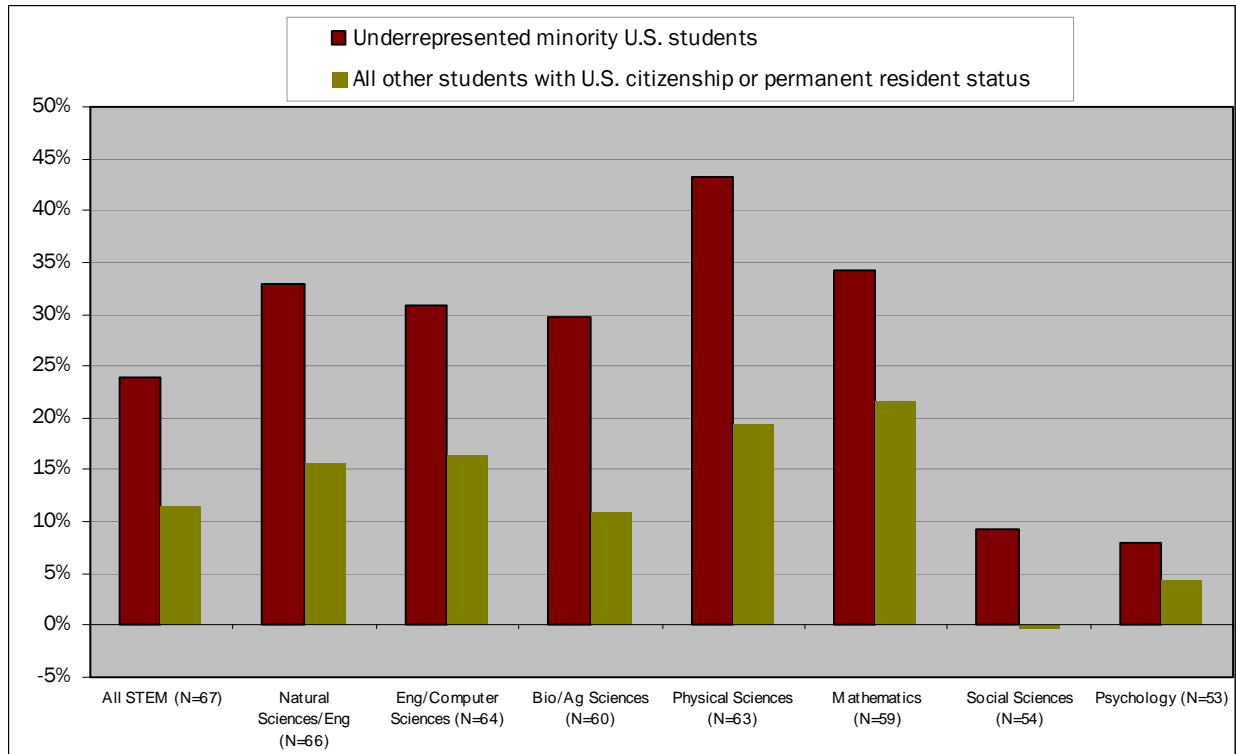
SUMMARY

One of the goals of the National Science Foundation (NSF) Alliances for Graduate Education and the Professoriate (AGEP) Program, which began in 1998, is to increase the number of underrepresented minority (URM) students pursuing advanced degrees in science, technology, engineering, and mathematics (STEM) (See program description at bottom of page)¹. Analyses of graduate student enrollee data from AGEP institutions indicate that the AGEP Program is achieving this goal.

- An analysis of graduate student enrollee data from the 1997/98 to 2005/06 for 67 of the AGEP institutions from 20 Alliances indicates that the annual percent and number of URM graduate student enrollees increased by 23.9% from 8,963 to 11,105 for all STEM fields. There were increases in URM graduate enrollment in every broad STEM field. This change represents an average annual increase of 2,142 URM graduate student enrollees, after seven years of AGEP implementation. During this same period, the average annual graduate school enrollment of URM in Natural Sciences and Engineering (NS&E) increased by 33.0%, or from 5,568 to 7,405. In the Social Sciences, URM graduate student enrollment increased by 9.3%, or from 2,586 to 2,826, and the annual number of URM graduate school enrollees in Psychology increased by 8.0% from 809 to 874 (*Table 1*).
- The percent change in graduate school enrollment from 1997/98 to 2005/06 was much higher for URM than for all other students with U.S. citizenship or permanent resident status in all STEM fields (23.9% vs 11.5%). The annual percent change in graduate school enrollment for the same period in NS&E was 33.0% for URM and 15.6% for all other students with U.S. citizenship or permanent resident status and 8.0% for URM and 4.4% for all other students with U.S. citizenship or permanent resident status in Psychology. For Social Sciences the increase was 9.3% for URM, while there was a decrease of 0.3% for all other U.S. students or permanent residents (*Figure 1 and Table 4*).
- At nine campuses of the University of California (UC) the annual percent change in graduate student enrollment in STEM was higher for URM than for all other students with U.S. citizenship or permanent resident status (36.1% vs 25.8%) (*Table 5*). Increases in the Physical Sciences were particularly dramatic for URM (120.6% vs 55.3%) (*Table 2*).

¹**Program Description:** The goal of the National Science Foundation (NSF) Alliances for Graduate Education and the Professoriate (AGEP) Program is to increase the number of underrepresented minority students pursuing advanced study, obtaining doctoral degrees, and entering the professoriate in STEM disciplines (including Social Sciences). Alliances participating in this program are expected to engage in comprehensive institutional cultural changes that will lead to sustained increases in the conferral of STEM doctoral degrees, significantly exceeding historic levels of performance. Specific objectives of AGEP are: (1) to develop and implement innovative models for recruiting, mentoring, and advancing minority students in STEM doctoral programs and (2) to develop effective strategies for identifying and supporting underrepresented minorities who want to pursue academic careers.

Figure 1: Percent Changes in Graduate School Enrollments for URM* and All Other Students with U.S. Citizenship or Permanent Resident Status in Broad STEM Categories between Pre-AGEP (1997/98-1999/00) and Mid-AGEP (2003/04-2005/06) Years. (N = 67 Institutions)**



*URM include African Americans, Hispanic Americans, and Native Americans.

**See Table 4 for numbers and percentages.

Analysis of STEM Graduate School Enrollment Data in AGEP Institutions

To examine changes in URM graduate student enrollment in broad STEM categories from 1997/98 to 2005/06, data from 67 AGEP institutions representing 20 Alliances were analyzed. The 67 institutions submitted data on URM graduate student enrollees and all other students with U.S. citizenship or permanent resident status for at least one broad category of STEM fields. To reduce the volatility of annual graduate student enrollee data, the data were grouped into three categories: the Pre-AGEP Years (1997/98 to 1999/00); the Early AGEP Years (2000/01 to 2002/03); and the Mid-AGEP years (2003/05 to 2005/06).

Data analyzed for the 67 institutions from 1997/98 to 2005/06 indicate that the average annual number of URM graduate student enrollees:

- In all STEM fields increased by 23.9%, from 8,963 to 11,105. This change represents an increase of 2,142 URM graduate student enrollees per year in all STEM fields.
- In the NS&E increased by 33.0%, from 5,568 to 7,405. This change represents an increase of 1,837 URM graduate student enrollees per year in NS&E.
- In the Social Sciences increased by 9.3%, from 2,586 to 2,826. This change represents an increase of 240 URM graduate student enrollees per year in the Social Sciences.
- In Psychology increased by 8.0%, from 809 to 874. This represents an increase of 65 URM graduate student enrollees per year in Psychology. (*Table 1*)

Of the average annual number and percent of URM graduate student enrollees in STEM fields (11,105) for 2003/04 to 2005/06:

- 7,405 or 66.7% were in NS&E.
- 2,826 or 25.4% were in the Social Sciences.
- 874 or 7.9% were in Psychology.

Of the average annual number of URM graduate student enrollees in NS&E (7,405) for 2003/04 to 2005/06:

- 3,392 or 45.8% were Engineering/Computer Sciences.
- 2,137 or 28.8% were in the Biological/Agricultural Sciences.
- 1,465 or 19.8% were in the Physical Sciences.
- 411 or 5.6% were in Mathematics (*Table 1*).

A little over one-quarter (26.2% or 482 of 1,837) of the average annual increases in the number of URM graduate student enrollees in NS&E between 1997/98 and 2005/06 was due to increases at the nine campuses of the University of California (UC). This was also the case in all STEM fields 25.6% (549 of 2,142). URM graduate student enrollees at the UC campuses account for almost

one-half (46.2% or 205 of 443) of the increases in the Physical Sciences and a little over one-third (36.4% or 179 of 491) of the increases in the Biological/Agricultural Sciences (*Tables 1 & 3*).

As indicated in Table 4 and Figure 1, the percent change in graduate student enrollment from 1997/98 to 2005/06 was much higher from URM than for all other students with U.S. citizenship or permanent resident status in STEM (23.9% vs 11.5%) and in NS&E (33.0% vs 15.6%).

Specifically, in NS&E from 1997/98 to 2005/06, the average annual percent change in URM graduate enrollment was much higher than all other students with U.S. citizenship or permanent resident status in the:

- Physical Sciences (43.3% vs 19.4%).
- Biological/Agricultural Sciences (29.8% vs 10.9%).
- Engineering/Computer Sciences (30.8% vs 16.4%).
- Mathematics (34.3% vs 21.7%).

For the same time period, the average annual percent change in graduate student enrollments was much higher for URM than for all other students with U.S. citizenship or permanent resident status in the Social Sciences (9.3% vs -0.3%) and in Psychology (8.0% vs 4.4%).

As indicated in Table 5, the average annual percent change in graduate student enrollment at UC from 1997/98 to 2005/06 was higher for URM than all other students with U.S. citizenship or permanent resident status in STEM (36.1% vs 25.8%). The average annual percent change in graduate school enrollment from 1997/98 to 2005/06 of URM was higher than for all other students with U.S. citizenship or permanent resident status at UC campuses in NS&E (52.6% vs 31.2%). The percent of increase for URM was much higher for the Physical Sciences (120.6% vs 55.3%) and Biological/Agricultural Sciences (38.0% vs 16.4%). Percent increases were about the same in Engineering and Computer Sciences (39.3% vs 35.8%) and the percent of increase in Mathematics was lower for URM (17.4% vs 31.6%). The average annual percent change from 1997/98 to 2005/06 in graduate school enrollment was higher for URM than for other U.S. students or permanent residents at UC campuses in the Social Sciences (10.7% vs 5.0%) and lower in Psychology (13.6% vs. 28.5%).

Table 1 -- Changes in the Average Annual Number and Percent of All URM Graduate Student Enrollees in Broad STEM Categories from 1997/98 to 2005/06 (N= 67 Institutions, Including Nine Campuses of the University of California)

STEM Categories (Number of Institutions with Usable Data)	Pre-AGEP Years 1997/98 to 1999/00	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Pre/Mid- Years Change (Mid- AGEP- Pre-AGEP)	Pre/Mid- Years Percent Change (Mid- AGEP-Pre- AGEP)/ Pre-AGEP
All Natural Sciences & Engineering (66)	5,568	6,232	7,405	1,837	33.0%
Engineering/Computer Sciences (64)	2,594	2,849	3,392	798	30.8%
Biological/Agricultural (60)	1,646	1,822	2,137	491	29.8%
Physical Sciences (63)	1,022	1,220	1,465	443	43.3%
Mathematics (59)	306	341	411	105	34.3%
Social Sciences (54)	2,586	2,640	2,826	240	9.3%
Psychology (53)	809	882	874	65	8.0%
All STEM Fields (67)	8,963	9,754	11,105	2,142	23.9%

Table 2 -- Changes in the Average Annual Number and Percent of All URM Graduate Student Enrollees in Broad STEM Categories from 1997/98 to 2005/06 at the Nine Campuses of the University of California

STEM Categories (Number of Institutions with Usable Data)	Pre-AGEP Years 1997/98 to 1999/00	Early AGEP Years 2000/01 to 2002/03	Mid- AGEP Years 2003/04 to 2005/06	Pre/Mid- Years Change (Mid- AGEP -Pre-AGEP)	Pre/Mid- Years Per- cent Change (Mid-AGEP- Pre-AGEP)/ Pre-AGEP
All Natural Sciences & Engineering (9)	916	1,079	1,398	482	52.6%
Engineering/Computer Sciences (9)	229	237	319	90	39.3%
Biological/Agricultural (9)	471	515	650	179	38.0%
Physical Sciences (9)	170	276	375	205	120.6%
Mathematics (9)	46	51	54	8	17.4%
Social Sciences (9)	522	514	578	56	10.7%
Psychology (9)	81	85	92	11	13.6%
All STEM Fields (9)	1,519	1,678	2,068	549	36.1%

Table 3 – Percent Change in All URM Graduate Student Enrollees in Broad STEM Categories from 1997/98 to 2005/06 Due to the Nine Campuses of the University of California

Broad STEM Categories	Number Pre/Mid-Change at UC	Percent Pre/Mid-Change at UC	Number Pre/ Mid-Change at All AGEP Institutions	Percent Pre/ Mid-Years Change at All AGEP Institutions	Percent Change Due to UC
All Natural Sciences & Engineering	482	52.6%	1,837	33.0%	26.2%
Engineering/Computer Sciences	90	39.3%	798	30.8%	11.3%
Biological/Agricultural Sciences	179	38.0%	491	29.8%	36.5%
Physical Sciences	205	120.6%	443	43.3%	46.3%
Mathematics	8	17.4%	105	34.3%	7.6%
Social Sciences	56	10.7%	240	9.3%	23.3%
Psychology	11	13.6%	65	8.0%	16.9%
All STEM Fields	549	36.1%	2,142	23.9%	25.6%

Table 4 -- Changes in the Average Annual Number and Percent of All Other Students with U.S. Citizenship and Permanent Resident Status in Broad STEM Categories and Percent Difference of URM Graduate Student Enrollees from 1997/98 to 2005/06 (N= 67 Institutions)

STEM Categories (Number of Institutions with Usable Data)	Pre- AGEP Years 1997/98 to 1999/00	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Pre/Mid-Years Change All other students with U.S. citizenship or permanent resident status	Pre/Mid-Years Percent Change all other students with U.S. citizenship or permanent resident status	Pre/Mid-Years Percent Change URM
All Natural Sciences & Engineering (66)	49,599	49,835	57,333	7,734	15.6%	33.0%
Engineering/ Computer Sciences (64)	22,314	21,814	25,966	3,652	16.4%	30.8%
Biological/ Agricultural (60)	14,909	15,238	16,532	1,623	10.9%	29.8%
Physical Sciences (63)	9,833	10,282	11,741	1,908	19.4%	43.3%
Mathematics (59)	2,543	2,501	3,094	551	21.7%	34.3%
Social Sciences (54)	14,621	13,900	14,580	-41	-0.3%	9.3%
Psychology (53)	4,392	4,280	4,584	192	4.4%	8.0%
All STEM Fields (67)	68,612	68,015	76,497	7,885	11.5%	23.9%

Table 5 -- Changes in the Average Annual Number and Percent of All Other Students with U.S. Citizenship or Permanent Resident Status in Broad STEM Categories and Percent Change in URM Graduate Student Enrollees at the Nine Campuses of the University of California from 1997/98 to 2005/06

STEM Categories (Number of Institutions with Usable Data)	Pre-AGEP Years 1997/98 to 1999/00	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Pre/Mid- Years Change All Other U.S. students or permanent residents	Pre/Mid- Years Percent Change All Other U.S. students or permanent residents	Pre/Mid- Years Percent Change URM
All Natural Sciences & Engineering (9)	10,591	12,012	13,894	3,303	31.2%	52.6%
Engineering and Computer Sciences (9)	2,981	3,226	4,048	1,067	35.8%	39.3%
Biological/ Agricultural (9)	4,771	5,109	5,552	781	16.4%	38.0%
Physical Sciences (9)	2,349	3,123	3,649	1,300	55.3%	120.6%
Mathematics (9)	490	554	645	155	31.6%	17.4%
Social Sciences (9)	2,815	2,729	2,957	142	5.0%	10.7%
Psychology (9)	508	571	653	145	28.5%	13.6%
All STEM Fields (9)	13,914	15,312	17,504	3,590	25.8%	36.1%