

# **AGEP** Alliances for Graduate Education and the Professoriate **Info Brief IV**

## **Changes in the Annual Number of Underrepresented Minorities New Enrollees in STEM Graduate Programs at AGEP Institutions**

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March 2008

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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 minorities (URM)<sup>1</sup> pursuing advanced degrees in science, technology, engineering, and mathematics (STEM). (See *program description at bottom of page.*<sup>2</sup>) Analyses of new enrollee data from 68 AGEP institutions from 21 Alliances indicate that the AGEP Program is achieving the goal of increasing the annual number of URM pursuing advanced STEM degrees.

### **Number and Percent of URM New Enrollees in STEM Graduate Programs at AGEP Institutions in 2006/07**

In 2006/07, 2,710 URM new enrollees entered STEM graduate programs at 68 AGEP institutions. Of the 2,710 URM new enrollees entering STEM graduate programs at AGEP institutions in 2006/07:

- 1,892 or 69.8% were in Natural Science & Engineering (NS&E).
- 363 or 13.4% were in Other Social Sciences.
- 235 or 8.7% were in Psychology.
- 75 or 2.8% were in Sociology.
- 63 or 2.3% were in Political Science.
- 46 or 1.7% were in Economics.
- 36 or 1.3% were in Interdisciplinary Sciences (*Table 1*).

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<sup>1</sup>URM students are African Americans, Hispanic Americans, and Native Americans who are U.S. citizens or permanent residents.

<sup>2</sup>**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.

Of the 1,892 URM graduate student new enrollees entering NS&E graduate programs at 68 AGEP institutions in 2006/07:

- 740 or 39.1% were in Engineering.
- 589 or 31.1% were in Biological, Agricultural Sciences.
- 146 or 7.7% were in Computer Sciences.
- 134 or 7.1% were in Chemistry.
- 130 or 6.9% were in Other Physical Sciences.
- 94 or 5.0% were in Mathematics.
- 46 or 2.4% were in Earth, Atmospheric, and Ocean Sciences.
- 45 or 2.4% were in Computer Engineering (*Table 1*).

#### **About Changes in the Annual Number of URM New Enrollees entering STEM Graduate Programs at AGEP Institutions from 2000/01 to 2006/07**

An analysis of URM new enrollee data from 2000/01 to 2006/07 for 68 AGEP institutions from 21 Alliances indicates that the annual number of URM new enrollees in graduate programs in STEM increased from 2,427 to 2,710. Thus, in the past six years the annual number of URM new enrollees entering graduate programs in STEM at the 68 AGEP institutions increased by 11.7% or 283. During this same period, the annual number of URM new enrollees in graduate school programs in NS&E increased from 1,645 to 1,892. Thus, in the past six years the annual number of URM new enrollees entering graduate school programs in NS&E increased by 15.0% or 247 (*Table 1*).

The annual number of URM new enrollees in graduate school programs at 68 AGEP institutions increased in ten fields between 2000/01 and 2006/07 from:

- 449 to 589 in the Biological/Agricultural Sciences (an increase of 140).
- 662 to 740 in Engineering (an increase of 78).
- 194 to 235 in Psychology (an increase of 41).
- 123 to 146 in Computer Sciences (an increase of 23).
- 29 to 46 in Economics (an increase of 17).
- 126 to 134 in Chemistry (an increase of 8).
- 68 to 75 in Sociology (an increase of 7).

- 90 to 94 in Mathematics (an increase of 4). However, the increase in mathematics from 2000/01 to 2005/06 was from 90 to 118 (an increase of 28).
- 34 to 36 in Interdisciplinary Sciences (an increase of 2).
- 45 to 46 in Earth, Atmospheric, and Ocean Sciences (an increase of 1).

While there was an increase in the annual number of URM new enrollees in Other Social Sciences in AGEP institutions from 2000/01 to 2005/06 from 372 to 435 (an increase of 73), there was a decline from 372 to 363 (a decrease of 22) from 2000/01 to 2006/07. During this same six year period, there were decreases in the annual number of URM new enrollees entering graduate programs in AGEP institutions in Political Sciences; Other Physical Sciences (including Astronomy and Physics); and Computer Engineering (*Table 1 and Figure 2*).

A little over 25% (25.1% or 71 of the 283) of the increases in the annual number of URM new enrollees entering all AGEP STEM graduate school programs between 2000/01 and 2006/07 was due to increases at the nine University of California (UC) campuses. The increases in the annual number of new enrollees at the nine UC campuses accounted for two-thirds of the increases in the Biological/ Agricultural Sciences 67.1% (or 94 of the 140) (*Table 3*).

#### **Comparison of Percent Change in the Annual Number of New Enrollees in STEM Graduate Programs for URM and All Other U.S. Citizens and Permanent Residents at AGEP Institutions from 2000/01 to 2006/07**

From 2000/01 to 2006/07, the percent change in the annual number of new enrollees in graduate school programs at the 68 AGEP institutions was higher for URM than for all other U.S. citizens and permanent residents<sup>3</sup> in NS&E (15.0% vs 5.2%) and in all STEM fields (11.7% vs 6.3%). The percent change in the annual number of new enrollees in graduate school programs was higher for URM than for all other U.S. citizens and permanent residents in Economics (58.6% vs 15.1%), Biological/Agricultural Sciences (31.2% vs 7.5%), Psychology (21.1% vs 7.4%), Computer Sciences (18.7% vs -9.0%), and Engineering (11.8% vs 2.2%) (*Figure 1 and Table 4*).

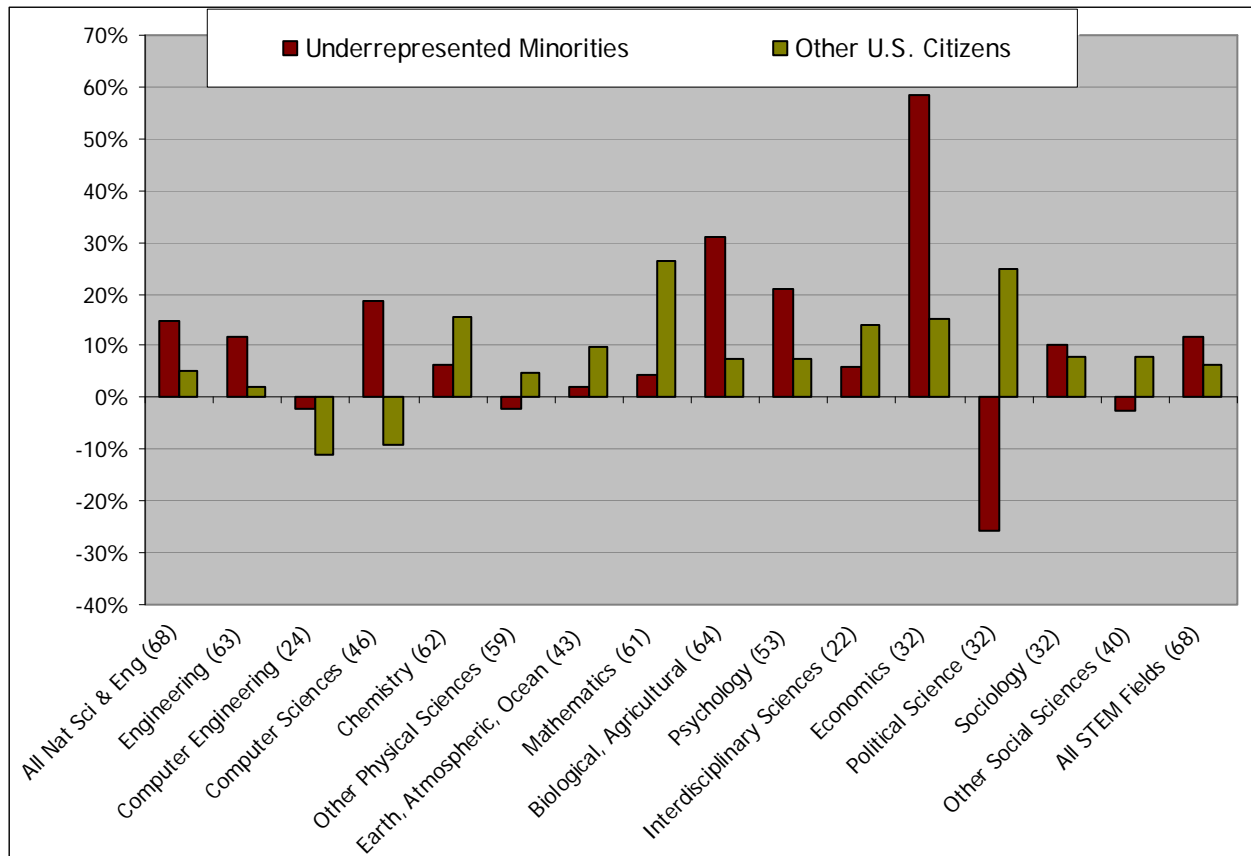
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<sup>3</sup>All other U.S. citizens or permanent residents does not include African Americans, Hispanic Americans, and Native Americans.

At the nine UC campuses from 2000/01 to 2006/07, the percent change in the annual number of new enrollees was higher for URM than all other U.S. citizens and permanent residents in graduate school programs in NS&E (34.1% vs 9.9%) and in all STEM fields (17.1% vs 3.1%) and much higher in the Biological/Agricultural Sciences (61.4% vs 11.8%) (Table 5).

**Figure 1: Percent Change in Annual Number of URM and All Other U.S. Citizen and Permanent Resident New Enrollees in STEM Graduate School Programs in AGEP Institutions from Early AGEP Years (2000/01-2002/03) to 2006/07**

(The numbers in parentheses represent the number of institutions reporting data in the field.)



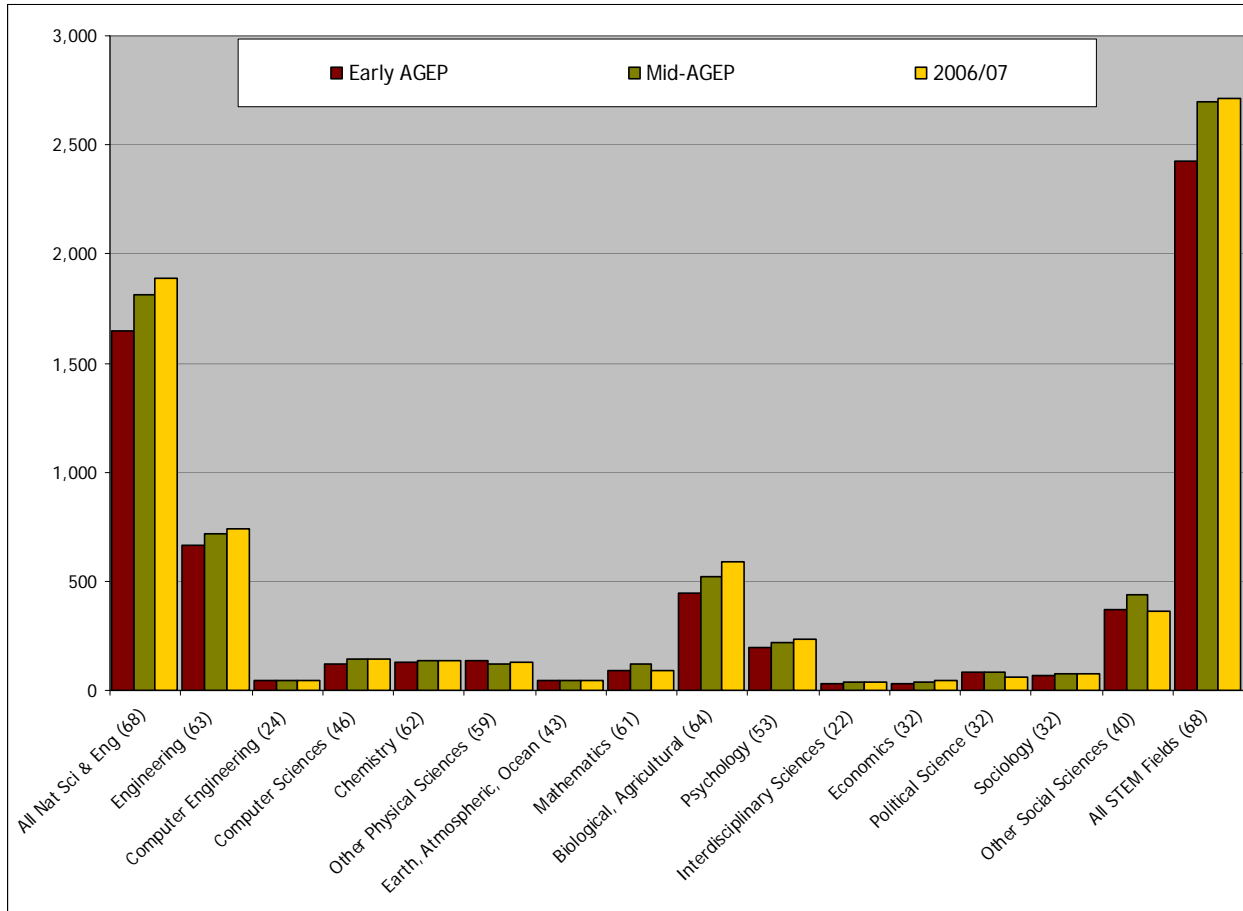
(Numbers for this Figure are in Table 4.)

\*Underrepresented Minorities (URM) include African Americans, Hispanic Americans, and Native Americans.

Other U.S. Citizens includes permanent residents and does not include African Americans, Hispanic Americans, and Native Americans.

**Figure 2: Changes in the Annual Number of URM New Enrollees in STEM Graduate Programs in AGEP Institutions for Early AGEP Years (2000/01-2002/03), Mid-AGEP Years (2003/04 – 2005/06), and 2006/07**

(The numbers in parentheses represent the number of institutions reporting data in the field.)



(Numbers for this figure are in Table 1.)

Underrepresented Minorities (URM) include African Americans, Hispanic Americans, and Native Americans.

**Table 1 – Number and Percent Change in the Annual Number of URM New Enrollees in STEM Graduate School Programs from 2000/01 to 2006/07 at AGEP Institutions, including the Nine Campuses of the University of California\***

(The numbers in parentheses represent the number of institutions reporting data in the field.)

New Enrollees Underrepresented Minorities (all)	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Year 2006/07	Early AGEP to 2006/07 Change	Early AGEP to 2006/07 Percent Change
<b>All Natural Sciences &amp; Engineering (68)</b>	1,645	1,811	1,892	247	15.0%
Engineering (63)	662	716	740	78	11.8%
Computer Engineering (24)	46	45	45	-1	-2.2%
Computer Sciences (46)	123	144	146	23	18.7%
Chemistry (62)	126	136	134	8	6.3%
Other Physical Sciences (59)	133	123	130	-3	-2.3%
Earth, Atmospheric, Ocean (43)	45	46	46	1	2.2%
Mathematics (61)	90	118	94	4	4.4%
Biological, Agricultural (64)	449	518	589	140	31.2%
Psychology (53)	194	216	235	41	21.1%
Interdisciplinary Sciences (22)	34	38	36	2	5.9%
Economics (32)	29	40	46	17	58.6%
Political Science (32)	85	84	63	-22	-25.9%
Sociology (32)	68	76	75	7	10.3%
Other Social Sciences (40)	372	435	363	-9	-2.4%
<b>All STEM Fields (68)</b>	2,427	2,700	2,710	283	11.7%

\* The UC system reported they entered their data for Chemistry students twice, once under Chemistry and once under Other Physical Sciences. For that reason, data for UC Chemistry students are not included in Natural Sciences & Engineering and STEM totals, nor are the UC Chemistry data used in the computation of the percent of change due to UC.

**Table 2 – Number and Percent Change in the Annual Number of URM New Enrollees in STEM Graduate Programs from 2000/01 to 2006/07 at the Nine Campuses of the University of California\***

(The numbers in parentheses represent the number of institutions reporting data in the field.)

New Enrollees Underrepresented Minorities UC only	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Year 2006/07	Early AGEP To 2006/07 Change	Early AGEP to 2006/07 Percent Change
<b>All Natural Sciences &amp; Engineering (9)</b>	299	352	401	102	34.1%
Engineering (9)	82	100	88	6	7.3%
Computer Engineering					
Computer Sciences					
Chemistry (9)	29	35	32	3	10.3%
Other Physical Sciences (9)	49	57	49	0	0.0%
Earth, Atmospheric, Ocean					
Mathematics (9)	15	16	17	2	13.3%
Biological, Agricultural (9)	153	179	247	94	61.4%
Psychology (9)	15	19	17	2	13.3%
Interdisciplinary Sciences					
Economics					
Political Science					
Sociology					
Other Social Sciences (8)	102	114	69	-33	-32.4%
<b>All STEM Fields (9)</b>	416	485	487	71	17.1%

\* Some data cells do not contain information because UC did not report data in all categories. Also, the UC system reported they entered their data for Chemistry students twice, once under Chemistry and once under Other Physical Sciences. For that reason, data for UC Chemistry students are not included in Natural Sciences & Engineering and STEM totals, nor are the UC Chemistry data used in the computation of the percent of change due to UC.

**Table 3 -- Percent Change in the Annual Number of URM New Enrollees in STEM Graduate Programs Due to the Nine Campuses of the University of California\* from 2000/01 to 2006/07**

URM Graduate Student New Enrollees in Broad STEM Categories	Number Early AGEP to 2006/07-Change at UC	Percent Early AGEP to 2006/07-Change at UC	Number Early AGEP to 2006/07 Change at All AGEP Institutions	Percent Early AGEP to 2006/07 Change at All AGEP Institutions	Percent Early AGEP to 2006/07 Change Due to UC
<b>All Natural Sciences &amp; Engineering</b>	102	34.1%	247	15.0%	41.3%
Engineering	6	7.3%	78	11.8%	7.7%
Computer Engineering			-1	-2.2%	
Computer Sciences			23	18.7%	
Chemistry	3	10.3%	8	6.3%	37.5%
Other Physical Sciences	0	0.0%	-3	-2.3%	0.0%
Earth, Atmospheric, Ocean			1	2.2%	
Mathematics	2	13.3%	4	4.4%	50.0%
Biological, Agricultural	94	61.4%	140	31.2%	67.1%
Psychology	2	13.3%	41	21.2%	4.9%
Interdisciplinary Sciences			2	5.9%	
Economics			17	58.6%	
Political Science			-22	-25.9%	
Sociology			7	10.3%	
Other Social Sciences	-33	-32.4%	-9	-2.4%	366.7%
<b>All STEM Fields</b>	71	17.1%	283	11.7%	25.1%

\* Some data cells do not contain information because UC did not report data in all categories. Also, the UC system reported they entered their data for Chemistry students twice, once under Chemistry and once under Other Physical Sciences. For that reason, data for UC Chemistry students are not included in Natural Sciences & Engineering and STEM totals, nor are the UC Chemistry data used in the computation of the percent of change due to UC.

**Table 4 – Number and Percent Change in the Annual Number of All Other U.S. Citizen and Permanent Resident New Enrollees in STEM Graduate Programs at AGEP Institutions and Percent Change in the Annual Number of URM New Enrollees in STEM Graduate Programs from 2000/01 to 2006/07\***

(The numbers in parentheses represent the number of institutions reporting data in the field.)

New Enrollees Other US (All)	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Year 2006/07	Early AGEP to 2006/07 Change	Early AGEP to 2006/07 Percent Change All Other U.S. Students	Early AGEP to 2006/07 Percent Change URM
<b>All Natural Sciences &amp; Engineering (68)</b>	12,861	13,833	13,527	666	5.2%	15.0%
Engineering (63)	4,923	5,356	5,032	109	2.2%	11.8%
Computer Engineering (24)	326	295	290	-36	-11.0%	-2.2%
Computer Sciences (46)	874	952	795	-79	-9.0%	18.7%
Chemistry (62)	840	949	969	129	15.4%	6.3%
Other Physical Sciences (59)	947	1,076	991	44	4.6%	-2.3%
Earth, Atmospheric, Ocean (43)	514	545	565	51	9.9%	2.2%
Mathematics (61)	697	860	882	185	26.5%	4.4%
Biological, Agricultural (64)	3,986	4,074	4,286	300	7.5%	31.2%
Psychology (53)	960	1,072	1,031	71	7.4%	21.1%
Interdisciplinary Sciences (22)	201	206	229	28	13.9%	5.9%
Economics (32)	225	263	259	34	15.1%	58.6%
Political Science (32)	338	426	422	84	24.9%	-25.9%
Sociology (32)	282	297	304	22	7.8%	10.3%
Other Social Sciences (40)	2,086	2,517	2,247	161	7.7%	-2.4%
<b>All STEM Fields (68)</b>	16,953	18,614	18,019	1,066	6.3%	11.7%

\* Some data cells do not contain information because UC did not report data in all categories. Also, the UC system reported they entered their data for Chemistry students twice, once under Chemistry and once under Other Physical Sciences. For that reason, data for UC Chemistry students are not included in Natural Sciences & Engineering and STEM totals, nor are the UC Chemistry data used in the computation of the percent of change due to UC.

Other U.S. citizens and permanent residents does not include African Americans, Hispanic Americans, and Native Americans.

**Table 5 – Change in the Number and Percent of All Other U.S. Citizen or Permanent Resident New Enrollees in STEM & Percent Change in the Annual Number of URM New Enrollees in STEM Programs at the Nine Campuses of the University of California from 2000/01 to 2006/07\***

(The numbers in parentheses represent the number of institutions reporting data in the field.)

New Enrollees Other US UC only	Early AGEP Years 2000/01 to 2002/03	Mid-AGEP Years 2003/04 to 2005/06	Year 2006/07	Early AGEP to 2006/07 Change	Early AGEP to 2006/07 Percent Change All Other U.S. Students	Early AGEP to 2006/07 Percent Change URM
<b>All Natural Sciences &amp; Engineering (9)</b>	3,125	3,481	3,435	310	9.9%	34.1%
Engineering (9)	1,046	1,267	1,147	101	9.7%	7.3%
Computer Engineering						
Computer Sciences						
Chemistry (9)	246	274	283	37	15.0%	10.3%
Other Physical Sci- ences (9)	495	556	503	8	1.6%	0.0%
Earth, Atmospheric, Ocean						
Mathematics (9)	166	159	200	34	20.5%	13.3%
Biological, Agricultural (9)	1,418	1,499	1,585	167	11.8%	61.4%
Psychology (9)	118	137	133	15	12.7%	13.3%
Interdisciplinary Sci- ences						
Economics						
Political Science						
Sociology						
Other Social Sciences (8)	499	614	290	-209	-41.9%	-32.4%
<b>All STEM Fields (9)</b>	<b>3,742</b>	<b>4,232</b>	<b>3,858</b>	<b>116</b>	<b>3.1%</b>	<b>17.1%</b>

\* Some data cells do not contain information because UC did not report data in all categories. Also, the UC system reported they entered their data for Chemistry students twice, once under Chemistry and once under Other Physical Sciences. For that reason, data for UC Chemistry students are not included in Natural Sciences & Engineering and STEM totals, nor are the UC Chemistry data used in the computation of the percent of change due to UC.

Other U.S. citizens and permanent residents does not include African Americans, Hispanic Americans, and Native Americans.

### **About Data Collection and Analysis of URM New Enrollees in STEM Graduate Programs at AGEP Institutions (2000/01 to 2006/07)**

To examine changes in the annual number of URM new enrollees in STEM graduate programs from 2000/01 to 2006/07, data was collected from 68 AGEP institutions representing 21 Alliances. Between July 2007 and February 2008, 68 AGEP institutions submitted data on URM and other U.S. citizens and permanent resident new enrollees in STEM graduate programs for at least one category of STEM fields. To reduce the volatility of the annual data, the data were grouped into three categories:

- Early AGEP Years (2000/01 to 2002/03);
- Mid-AGEP Years (2003/04 to 2005/06); and
- 2006/07.

Also, data were collected and analyzed by race/ethnicity, gender, and citizenship for the following fields:

- (a) Biological & Agricultural Sciences
- (b) Chemistry
- (c) Computer Engineering
- (d) Computer Sciences
- (e) Earth, Atmospheric, and Ocean Sciences (including Geosciences, Environmental Sciences)
- (f) Economics
- (g) Engineering (including Electrical Engineering; excluding Computer Engineering)
- (h) Interdisciplinary Sciences
- (i) Mathematics (including Mathematical Statistics)
- (j) Other Physical Sciences (including Astronomy, Physics)
- (k) Other Social Sciences
- (l) Political Science
- (m) Psychology (excluding Clinical Psychology)
- (n) Sociology