

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

## **The AGEP Program has led to Dramatic Increases in the Annual Number of PhDs Awarded to URM from 2000/01 to 2008/09**

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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 (URMs)<sup>1</sup> receiving PhDs in science, technology, engineering, and mathematics (STEM). (See *program description at bottom of page.*<sup>2</sup>) Analyses of PhD recipient data from 68 AGEP institutions from 19 Alliances indicate that the AGEP Program has dramatically increased the annual number of URM PhD recipients in STEM fields.

An analysis of URM PhD recipient data from 2000/01 to 2008/09 for 68 AGEP institutions from 19 Alliances indicates that the average annual number of URM PhD recipients in graduate programs in STEM increased from 609 (Early AGEP (2000/01 to 2002/03)) to 772 (Current AGEP (2006/07 to 2008/09)), an increase of 163 or 26.8%. During this same period, the average annual number of URM PhD recipients in graduate school programs in Natural Sciences & Engineering (NS&E) increased from 377 to 563, an increase of 186 or 49.3% (*Table 1 and Figure 1*).

## MORE ABOUT THE AGEP DATA

### **A. About the Average Annual Number and Percent of URM PhD Recipients in STEM at 68 AGEP Institutions in 2006/07, 2007/08 and 2008/09**

For 2006/07, 2007/08 and 2008/09, the average annual number of URM PhD recipients in STEM fields at 68 AGEP institutions was 772. By broad STEM fields, the average annual number and percent of URM PhD recipients at 68 AGEP institutions in 2006/07, 2007/08 and 2008/09 were:

- 563 or 72.9% in NS&E.
- 79 or 10.2% in Psychology.

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<sup>1</sup>URM students are African-Americans, Alaskan Natives, Native Americans, Hispanic Americans, and Native Pacific Islanders.

<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.

- 62 or 8.0% in Other Social Sciences.
- 28 or 3.6% in Sociology.
- 15 or 1.9% in Political Science.
- 14 or 1.8% in Interdisciplinary Sciences.
- 11 or 1.4% in Economics (*Table 1*).

Of the average annual number of 563 URM PhD recipients in NS&E at 68 AGEP institutions in 2006/07, 2007/08 and 2008/09, the average annual number and percent of URM PhD recipients were:

- 244 or 43.3% in Biological, Agricultural Sciences.
- 141 or 25.0% in Engineering.
- 84 or 14.9% in Chemistry.
- 27 or 4.8% in Other Physical Sciences.
- 25 or 4.4% in Mathematics.
- 17 or 3.0% in Computer Sciences.
- 16 or 2.8% in Earth, Atmospheric, and Ocean Sciences.
- 9 or 1.6% in Computer Engineering (*Table 1*).

#### **B. About Changes in the Average Annual Number of URM PhDs Awarded In STEM at 68 AGEP Institutions from 2000/01 to 2008/09**

An analysis of URM PhD recipient data from 2000/01 to 2008/09 for 68 AGEP institutions from 19 Alliances indicates that the average annual number of URM PhD recipients in graduate programs in STEM increased from 609 (Early AGEP (2000/01 to 2002/03)) to 772 (Current AGEP (2006/07 to 2008/09)), an increase of 163 or 26.8%. During this same period, the average annual number of URM PhD recipients in graduate school programs in NS&E increased from 377 to 563, an increase of 186 or 49.3% (*Table 1 and Figure 1*).

The average annual number of URM PhD recipients at 68 AGEP institutions increased in 11 fields between 2000/01 and 2008/09 from:

- 153 to 244 in Biological, Agricultural Sciences (an increase of 91).
- 95 to 141 in Engineering (an increase of 46).
- 70 to 84 in Chemistry (an increase of 14).
- 6 to 17 in Computer Sciences (an increase of 11).
- 4 to 14 in Interdisciplinary Sciences (an increase of 10).

- 7 to 16 in Earth, Atmospheric, and Ocean Sciences (an increase of 9).
- 20 to 27 in Other Physical Sciences (an increase of 7).
- 18 to 25 in Mathematics (an increase of 7).
- 73 to 79 in Psychology (an increase of 6).
- 7 to 11 in Economics (an increase of 4).
- 8 to 9 in Computer Engineering (an increase of 1).

During this same nine year period, there were decreases in the average annual number of URM PhDs awarded in graduate programs in AGEP institutions in Sociology, Political Science and Other Social Sciences (*Table 1 and Figure 1*).

Almost 20% (18.4% or 30 of the 163) of the increases in the average annual number of STEM PhDs awarded to URMs at AGEP institutions between 2000/01 and 2008/09 was due to increases at the nine University of California (UC) campuses. In NS&E, UC campuses accounted for 26.3% (49 of 186) of the increases in the average annual number of PhDs awarded to URMs at AGEP institutions between 2000/01 and 2008/09 (*Table 3*).

### **C. Comparison of Percent Change in the Average Annual Number of URM PhD Recipients and All Other U.S. Citizens and Permanent Residents at 68 AGEP Institutions from 2000/01 to 2008/09**

From 2000/01 to 2008/09, the percent change in the average annual number of PhD recipients at the 68 AGEP institutions was higher for URM than for all other U.S. citizens and permanent residents in NS&E (49.3% vs 35.8%) and in all STEM fields (26.8% vs 24.5%). The percent change in the average annual number of PhD recipients was higher for URMs than for all other U.S. citizens and permanent residents<sup>3</sup> in Interdisciplinary Sciences (250.0% vs 11.8%), Computer Sciences (183.3% vs 92.6%), Earth, Atmospheric, and Ocean Sciences (128.6% vs 22.1%), Biological, Agricultural Sciences (59.5% vs 42.3%), Economics (57.1% vs 1.0%), Engineering (48.4% vs 40.5%), Mathematics (38.9% vs 33.7%), Other Physical Sciences (35.0% vs 25.7%), Chemistry (20.0% vs 10.3%), and Psychology (8.2% vs -1.0%) (*Figure 2 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 2008/09, the percent change in the average annual number of PhD recipients was higher for URMs than all other U.S. citizens and permanent residents in graduate school programs in NS&E (60.5% vs 32.6%) and in all STEM fields (21.6% vs 18.7%) and much higher in the Engineering (88.9% vs 50.2%) (*Table 5*).

#### **D. AGEP Institutions With the Largest Numbers of STEM URM PhD Recipients in 2008/09**

In 2008/09, the 16 AGEP institutions with the largest numbers of STEM URM PhD Recipients were:

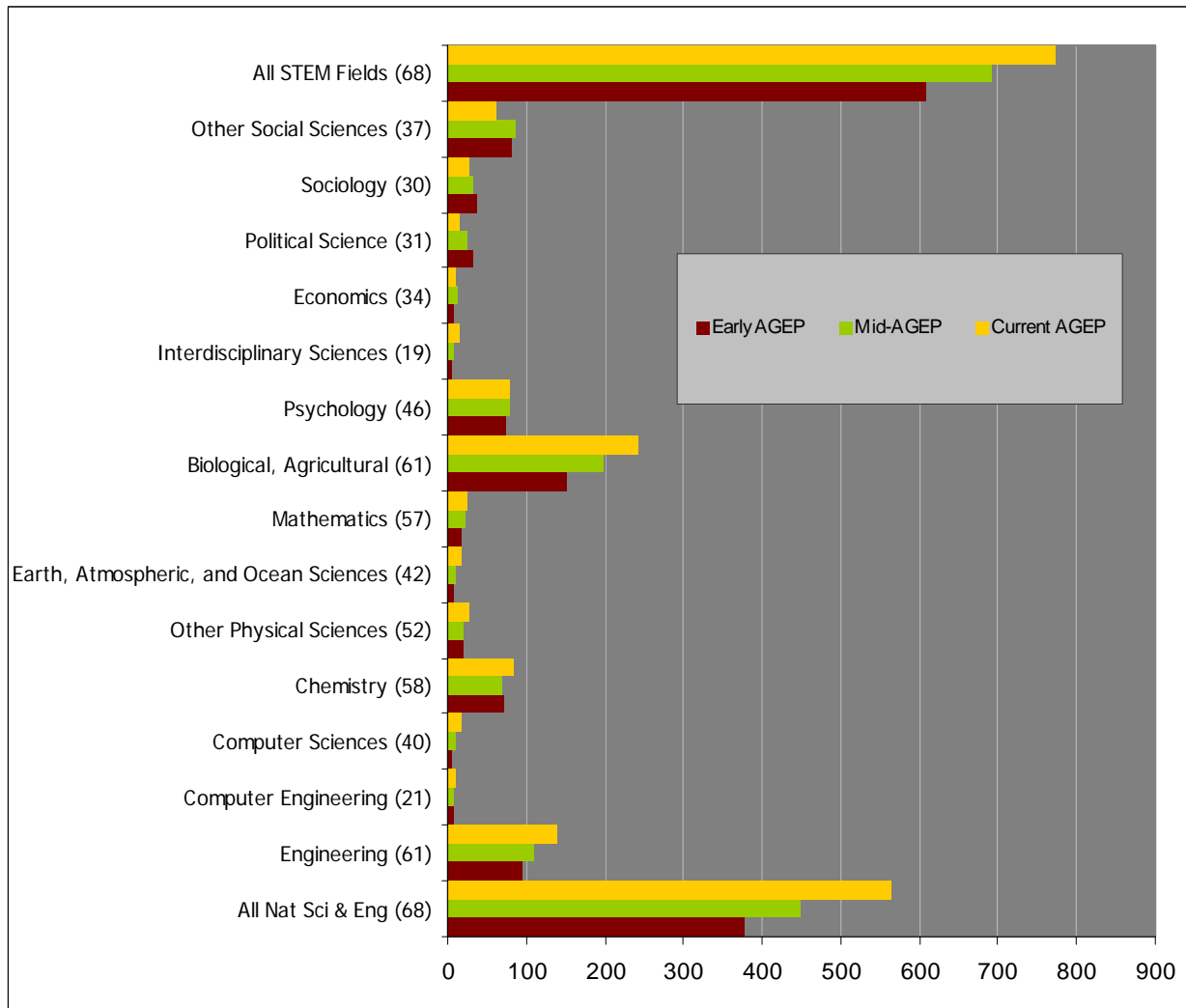
- UC: Berkeley, 71
- Howard University, 52
- UC: Los Angeles, 45
- University of Florida, 39
- University of Michigan, 33
- UC: Davis, 26
- University of Puerto Rico: Rio Piedras & Mayaguez, 24
- City University of New York: Graduate School and University Center, 23
- Georgia Institute of Technology, 23
- Rice University, 22
- University of North Carolina: Chapel Hill, 21
- Massachusetts Institute of Technology, 20
- UC: Irvine, 20
- Rutgers University, 19
- UC: San Diego, 19
- University of Utah, 19

In 2008/09, the 16 AGEP institutions with the largest numbers of NS&E URM PhD Recipients were:

- UC: Berkeley, 46
- UC: Los Angeles, 36
- Howard University, 28
- University of Florida, 28
- University of Puerto Rico: Rio Piedras & Mayaguez, 24
- Georgia Institute of Technology, 21
- UC: Davis, 21
- Rice University, 19
- University of Utah, 19
- Massachusetts Institute of Technology, 18
- Arizona State University, 17

- University of Michigan, 17
- Rutgers University, 14
- UC: Irvine, 14
- University of Colorado: Boulder, 14
- University of North Carolina: Chapel Hill, 14

**Figure 1: Changes in Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) by Broad STEM Categories at 68 AGEP Institutions from Early AGEP (2000/01-2002/03), Mid-AGEP Years (2003/04-2005/06), and Current AGEP (2006/07-2008/09)**

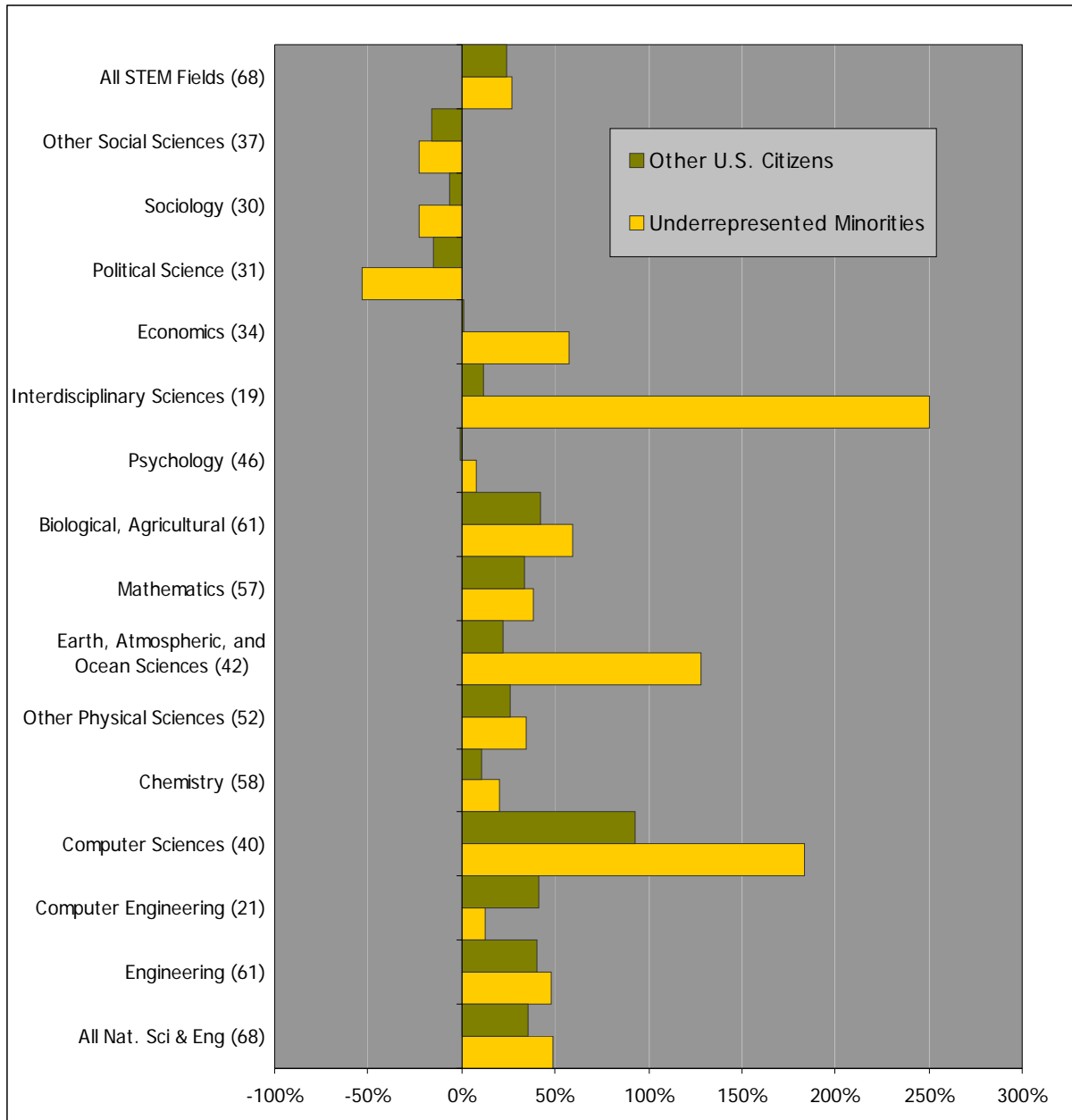


Numbers for this Figure are in Table 1.

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

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

**Figure 2: Percent Change in Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) and All Other U.S. Citizen\*\* and Permanent Residents in STEM Graduate School Programs at 68 AGEP Institutions from Early AGEP Years (2000/01-2002/03) to Current AGEP (2006/07-2008/09)**



Numbers for this figure are in Table 4.

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

\*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.

**Table 1 – Number and Percent Changes in the Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) in STEM from 2000/01 to 2008/09 at 68 AGEP Institutions, including Nine Campuses of the University of California (UC)**

<b>PhD Recipient URM</b>	<b>Average Annual Number for Early AGEP Years 2000/01 to 2002/03</b>	<b>Average Annual Number for Mid-AGEP Years 2003/04 to 2005/06</b>	<b>Average Annual Number for Current AGEP Years 2006/07 to 2008/09</b>	<b>Changes in the Average Annual Number for Early to Current AGEP Years</b>	<b>Percent Changes in the Average Annual Number of PhDs Awarded to URM for Early to Current AGEP Years</b>
<b>All Natural Sciences &amp; Engineering (68)</b>	377	448	563	186	49.3%
<b>Engineering (61)</b>	95	110	141	46	48.4%
<b>Computer Engineering (21)</b>	8	7	9	1	12.5%
<b>Computer Sciences (40)</b>	6	10	17	11	183.3%
<b>Chemistry (58)</b>	70	69	84	14	20.0%
<b>Other Physical Sciences (52)</b>	20	20	27	7	35.0%
<b>Earth, Atmospheric, and Ocean Sciences (42)</b>	7	11	16	9	128.6%
<b>Mathematics (57)</b>	18	23	25	7	38.9%
<b>Biological, Agricultural (61)</b>	153	198	244	91	59.5%
<b>Psychology (46)</b>	73	78	79	6	8.2%
<b>Interdisciplinary Sciences (19)</b>	4	8	14	10	250.0%
<b>Economics (34)</b>	7	12	11	4	57.1%
<b>Political Science (31)</b>	32	25	15	-17	-53.1%
<b>Sociology (30)</b>	36	33	28	-8	-22.2%
<b>Other Social Sciences (37)</b>	80	87	62	-18	-22.5%
<b>All STEM Fields (68)</b>	609	691	772	163	26.8%

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

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

**Table 2 – Number and Percent Changes in the Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) in STEM from 2000/01 to 2008/09 at Nine Campuses of the University of California (UC)**

<b>PhD Recipient URMs at UC only</b>	<b>Average Annual Number for Early AGEP Years 2000/01 to 2002/03</b>	<b>Average Annual Number for Mid-AGEP Years 2003/04 to 2005/06</b>	<b>Average Annual Number for Current AGEP Years 2006/07 to 2008/09</b>	<b>Changes in the Average Annual Number for Early to Current AGEP Years at UC</b>	<b>Percent Changes in the Average Annual Number of PhDs Awarded to URMs for Early to Current AGEP Years at UC</b>
<b>All Natural Sciences &amp; Engineering (9)</b>	81	81	130	49	60.5%
<b>Engineering (9)</b>	18	14	34	16	88.9%
<b>Computer Engineering</b>					
<b>Computer Sciences</b>					
<b>Chemistry (9)</b>	12	14	22	10	83.3%
<b>Other Physical Sciences (8)</b>	5	6	8	3	60.0%
<b>Earth, Atmospheric, and Ocean Sciences</b>					
<b>Mathematics (9)</b>	3	5	4	1	33.3%
<b>Biological, Agricultural (9)</b>	43	42	62	19	44.2%
<b>Psychology (8)</b>	15	16	14	-1	-6.7%
<b>Interdisciplinary Sciences</b>					
<b>Economics</b>					
<b>Political Science</b>					
<b>Sociology</b>					
<b>Other Social Sciences (9)</b>	43	41	25	-18	-41.9%
<b>All STEM Fields (9)</b>	139	138	169	30	21.6%

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

Note: UC data for Computer Engineering and Computer Sciences are included in Engineering. Data for Earth, Atmospheric, and Ocean Sciences are included in Other Physical Sciences.

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

**Table 3 – Percent Changes in the Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) at AGEP Institutions due to Nine Campuses of the University of California from 2000/01 to 2008/09\*\***

PhD Recipients	Changes in the Average Annual Number for Early to Current AGEP Years at UC***	Changes in the Average Annual Number for Early to Current AGEP Years at all 68 AGEP Institutions	Percent Increase in the Average Annual Number of PhDs Awarded to URM for Early to Current AGEP Years due to UC
<b>All Natural Sciences &amp; Engineering</b>	49	186	26.3%
<b>Engineering</b>	16	46	34.8%
<b>Computer Engineering</b>		1	
<b>Computer Sciences</b>		11	
<b>Chemistry</b>	10	14	71.4%
<b>Other Physical Sciences</b>	3	7	42.9%
<b>Earth, Atmospheric, and Ocean Sciences</b>		9	
<b>Mathematics</b>	1	7	14.3%
<b>Biological, Agricultural</b>	19	91	20.9%
<b>Psychology</b>	-1	6	****
<b>Interdisciplinary Sciences</b>		10	
<b>Economics</b>		4	
<b>Political Science</b>		-17	
<b>Sociology</b>		-8	
<b>Other Social Sciences</b>	-18	-18	100.0%
<b>All STEM Fields</b>	30	163	18.4%

*Note: UC data for Computer Engineering and Computer Sciences are included in Engineering. Data for Earth, Atmospheric and Ocean Sciences are included in Other Physical Sciences.*

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

\*\*See Table 2 for more details about the changes in the average annual number of PhD recipient URM at UC.

\*\*\*See Table 1 for more details about the changes in the average annual number of PhD recipient URM at the 68 AGEP institutions.

\*\*\*\*Only positive percent increase is reported.

**Table 4 – Number and Percent Changes in the Average Annual Number of PhDs Awarded to All Other U.S. Citizens and Permanent Residents in STEM at 68 AGEP Institutions and the Percent Changes in the Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) in STEM from 2000/01 to 2008/09**

PhD Recipients All Other U.S. Citizens and Permanent Residents (not including URMs)	Average Annual Number for Early AGEP Years 2000/01 to 2002/03	Average Annual Number for Mid- AGEP Years 2003/04 to 2005/06	Average Annual Number for Current AGEP Years 2006/07 to 2008/09	Changes in the Average Annual Number for Early to Current AGEP Years	Percent Changes in the Average Annual Number of PhDs Award to All Other U.S. Citizens & Permanent Residents for Early to Current AGEP Years	Percent Changes in the Average Annual Number of PhDs Awarded to URMs for Early to Current AGEP Years
<b>All Natural Sciences &amp; Engineering (68)</b>	4,042	4,675	5,490	1,448	35.8%	49.3%
<b>Engineering (61)</b>	1,058	1,210	1,487	429	40.5%	48.4%
<b>Computer Engineering (21)</b>	48	65	68	20	41.7%	12.5%
<b>Computer Sciences (40)</b>	95	155	183	88	92.6%	183.3%
<b>Chemistry (58)</b>	582	598	642	60	10.3%	20.0%
<b>Other Physical Sciences (52)</b>	338	342	425	87	25.7%	35.0%
<b>Earth, Atmospheric, and Ocean Sciences (42)</b>	154	146	188	34	22.1%	128.6%
<b>Mathematics (57)</b>	208	257	278	70	33.7%	38.9%
<b>Biological, Agricultural (61)</b>	1,559	1,902	2,219	660	42.3%	59.5%
<b>Psychology (46)</b>	486	445	481	-5	-1.0%	8.2%
<b>Interdisciplinary Sciences (19)</b>	34	35	38	4	11.8%	250.0%
<b>Economics (34)</b>	98	86	99	1	1.0%	57.1%
<b>Political Science (31)</b>	128	116	109	-19	-14.8%	-53.1%
<b>Sociology (30)</b>	113	110	106	-7	-6.2%	-22.2%
<b>Other Social Sciences (37)</b>	542	578	455	-87	-16.1%	-22.5%
<b>All STEM Fields (68)</b>	5,443	6,045	6,778	1,335	24.5%	26.8%

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

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

**Table 5 – Number and Percent Changes in the Average Annual Number of PhDs Awarded to All Other U.S. Citizens and Permanent Residents in STEM and the Percent Changes in the Average Annual Number of PhDs Awarded to Underrepresented Minorities\* (URMs) in STEM at Nine Campuses of the University of California from 2000/01 to 2008/09**

<b>PhD Recipients All Other U.S. Citizens and Permanent Residents (not including URM's) at UC only</b>	<b>Average Annual Number for Early AGEP Years 2000/01 to 2002/03</b>	<b>Average Annual Number for Mid- AGEP Years 2003/04 to 2005/06</b>	<b>Average Annual Number for Current AGEP Years 2006/07 to 2008/09</b>	<b>Changes in the Average Annual Number for Early to Cur- rent AGEP Years</b>	<b>Percent Changes in the Average Annual Number of PhDs Awarded to All Other U.S. Citizens &amp; Permanent Residents for Early to Current AGEP Years</b>	<b>Percent Changes in the Average Annual Number of PhDs Awarded to URMs for Early to Current AGEP Years</b>
<b>All Natural Sciences &amp; Engineering (9)</b>	1,112	1,150	1,474	362	32.6%	60.5%
<b>Engineering (9)</b>	255	282	383	128	50.2%	88.9%
<b>Computer Engineering</b>						
<b>Computer Sciences</b>						
<b>Chemistry (9)</b>	156	164	194	38	24.4%	83.3%
<b>Other Physical Sciences (8)</b>	133	128	159	26	19.5%	60.0%
<b>Earth, Atmospheric, and Ocean Sciences</b>						
<b>Mathematics (9)</b>	54	67	81	27	50.0%	33.3%
<b>Biological, Agricultural (9)</b>	514	509	657	143	27.8%	44.2%
<b>Psychology (8)</b>	88	95	100	12	13.6%	-6.7%
<b>Interdisciplinary Sciences</b>						
<b>Economics</b>						
<b>Political Science</b>						
<b>Sociology</b>						
<b>Other Social Sciences (9)</b>	263	282	163	-100	-38.0%	-41.9%
<b>All STEM Fields (9)</b>	1,463	1,527	1,737	274	18.7%	21.6%

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

Note: UC data for Computer Engineering and Computer Sciences are included in Engineering. Data for Earth, Atmospheric, and Ocean Sciences are included in Other Physical Sciences.

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

### **E. About Data Collection and Analysis of the Average Annual Number of STEM PhDs Awarded to URMs at AGEP Institutions (2000/01 to 2008/09)**

To examine changes in the annual number of STEM PhDs awarded to URMs from 2000/01 to 2008/09, data were collected from 68 AGEP institutions representing 19 Alliances. Between June 2009 and January 2010, the 68 institutions submitted data on URMs and other U.S. citizens and permanent residents for at least one category of STEM fields.

To reduce the volatility of the annual data, the data were grouped into three categories, and the average annual number was calculated for each of the three categories.

- Early AGEP Years (2000/01 to 2002/03);
- Mid-AGEP Years (2003/04 to 2005/06); and
- Current AGEP Years (2006/07 to 2008/09).

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

The category NS&E includes Biological & Agricultural Science; Chemistry; Computer Engineering; Computer Sciences; Earth & Atmospheric Sciences; Engineering; Mathematics; and Other Physical Sciences.

## **F. Strategies to Increase Enrollment and Retention of URM Graduate Students**

To increase the annual number of URM graduate students entering and completing STEM PhD STEM programs, AGEP institutions implemented a variety of strategies, where appropriate including:

- Establishing undergraduate research programs with minority serving institutions.
- Recruiting prospective students at meetings where undergraduate students are presenting posters and oral presentations, including the annual meetings of SACNAS (a society of scientists dedicated to fostering the success of Hispanic/Chicano and Native American scientists), the Annual Biomedical Research Conference for Minority Students (ABRCMS), and the AAAS/NSF Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) Research Conference.
- Reviewing and monitoring institutional and departmental practices, including practices related to graduate student admissions/selection, financial aid, advising, and advancing to candidacy.
- Providing financial aid packages that reduce debt burden of graduate students.
- Offering professional development programs for faculty, with an emphasis on strategies for recruiting and retaining URM and effective graduate student mentoring.
- Offering supplementary academic support workshops or tutoring for graduate students in writing, statistics, and other subjects.
- Providing activities that foster the social and early intellectual integration of graduate students into the institution and department, including graduate student bridge programs and strategies for family/work balance.
- Providing graduate student travel awards and other incentives to increase research productivity (poster or oral presentations at professional meetings, publications, etc).
- Monitoring graduate student progression with attention to early achievement of PhD milestones.

## ABOUT THE AUTHORS

**Pat Campbell, President of Campbell-Kibler Associates (C-KA), Inc.,** has been involved in educational research and evaluation with a focus on formal and informal science, technology, engineering and mathematics (STEM) education and issues of race/ethnicity, gender and disability since the mid 1970's. Her BS, from LeMoyne College is in Mathematics, her MS from Syracuse University, is in Instructional Technology, and her PhD, also from Syracuse University, is in Teacher Education. Campbell, formerly a professor of research, measurement and statistics at Georgia State University, has authored more than 100 publications including coauthoring of "Good Schools in Poor Neighborhoods: Defying Demographics, Achieving Success" and "Building Evaluation Capacity: Guide I Designing A Cross Project Evaluation and Guide II Collecting and Using Data in Cross-Project Evaluations with Beatriz Chu Clewell.

**Yolanda S. George, AAAS, Deputy Director, Education and Human Resources Programs,** has served as Director of Development, Association of Science-Technology Centers (ASTC); Director, Professional Development Program, University of California, Berkeley; and as a research biologist at Lawrence Livermore Laboratory, Livermore, California. George conducts evaluations, project reviews, and workshops for both the National Institutes of Health and National Science Foundation, as well as proposal reviews for private foundations and public agencies, including Carnegie Corporation of New York, the Ford Foundation, and the European Commission. Over the last 25 years she has raised over \$80 million for a variety of SMT education initiatives for colleges and universities, associations, and community-based groups. George has authored or co-authored over 50 papers, pamphlets, and hands-on science manuals. She received her BS and MS from Xavier University of Louisiana and Atlanta University in Georgia, respectively.

**Tom R. Kibler, Vice President for Systems at C-KA,** has been a computer professional for over 30 years. He focuses on adapting reengineering and rapid application development/deployment to education and serves as a consultant on institutional change for universities with a focus on math and science educa-

tion and on using technology to enhance evidence development and information use. Kibler was formerly Vice President of Symmetrix with primary responsibility for advanced systems architecture, technical recruiting and technical innovation for both Symmetrix and corporate clients.

**Shirley M. Malcom, Director for Education and Human Resources (EHR) Programs at AAAS,** has served as a program officer in the NSF Science Education Directorate; an assistant professor of biology, University of North Carolina, Wilmington; and a high school teacher. Malcom received her PhD in Ecology from The Pennsylvania State University; Master's in Zoology from the University of California, Los Angeles; and Bachelor's with distinction in Zoology from the University of Washington. In addition, she holds 15 honorary degrees. Malcom serves on several boards, including the Heinz Endowments, Commission of Professionals in Science & Technology, and University Corporation for Atmospheric Research. She serves as a trustee of Caltech and as a Regent of Morgan State University. In 2003, Malcom received the Public Welfare Medal of the National Academy of Science, the highest award granted by the Academy. She was a member of the National Science Board, the policymaking body of NSF, from 1994 to 1998, and of the President's Committee of Advisers on Science and Technology from 1994 to 2001.

**Jennifer L. Weisman, Research Associate at C-KA,** has worked on a variety of projects, including AGEP and FairerScience. As part of FairerScience she co-created the guide "Using Women in Science Blogs to Encourage Girls in Science." Her BA (Psychology and Women's Studies) is from Randolph-Macon College, MS (Counseling Psychology) is from Northeastern University, and PhD (Counseling and Personnel Services) is from the University of Maryland, College Park. Her dissertation research focused on the experiences of college students who have a sibling with a developmental disability. Dr. Weisman's publications include an entry in "Women in Higher Education: An encyclopedia" and the co-authored article "Different by design: An examination of student outcomes among participants in three types of living-learning programs." Her professional experience also includes work for The Civil Rights Project at Harvard University.



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