STEM Education

Goal Leaders:
Jo Handelsman, Associate Director for Science,
White House Office of Science and Technology Policy
Joan Ferrini-Mundy, Assistant Director,
National Science Foundation

FY2015 Quarter 4

Overview

Goal Statement

Improve science, technology, engineering, and mathematics (STEM) education by implementing The Federal STEM Education 5-Year Strategic Plan announced in May 2013, specifically:

- Improve STEM instruction
- Increase and sustain youth and public engagement in STEM
- Enhance STEM experience of undergraduate students
- Better serve groups historically under-represented in STEM fields
- Design graduate education for tomorrow's STEM workforce
- Build new models for leveraging assets and expertise
- Build and use evidence-based approaches

Urgency

- Advances in STEM have long been central to our nation's economy, security, and ability to preserve the health of its people and the environment; enhancing U.S. students' engagement and success in STEM disciplines is essential to the U.S. maintaining its preeminent position in the world.
- We have considerable progress to make given that our K-12 system ranks "middle of the pack" in international comparisons.
- Meeting the growing demand for STEM expertise and competency is important to the economy and our democracy.
- Increasing opportunities in STEM for more Americans is critical to building a just and inclusive society.

Vision

- The Federal STEM Education 5-Year Strategic Plan sets out ambitious national goals to drive federal investment in five priority STEM education areas toward which significant progress will require improved coherence and coordination across Federal agencies with STEM assets and expertise and STEM education resources.

Progress Update: FY15 Quarter 4 Highlights

- Representatives of the of FC-STEM five Interagency Working Groups (IWGs), the Office of Management and Budget (OMB) , the Office of Science and Technology Policy (OSTP) and the Performance Improvement Council (PIC) convened to discuss progress on the STEM Education Cross Agency Priority (CAP) goal on September 30, 2015. The group :
  - Discussed key milestones accomplished.
  - Strategies to make the most impact in FY 2016 and FY 2017 based on the review of ideas drawn from IWG Workplans, OSTP policy priorities, and the *Federal STEM Education 5-Year Strategic Plan*.
  - Evaluated the potential impact and level of difficulty of the potential ideas, prioritized projects, and collaborated over a rapid project planning activity.
- In September, 2015 the National Science Foundation (NSF) launched the Second Annual Community College Innovation Challenge (CCIC) to address the Federal STEM Education 5-Year Strategic Plan goal "Enhance STEM Experience of Undergraduate Students." The CICC is informed and shaped by discussions of the Undergraduate IWG. The submission window for entries to the CICC is October 15, 2015 through February 15, 2016.
- To encourage sharing of best practices across agencies, the Undergraduate Education IWG has begun regularly sharing dissemination tools to reach broader audiences, including tools such as NASA's Express Newsletter and the Department of Education's (ED) Community College Communities of Practice. For example, NASA Express, through social media such as Twitter, has the potential to be shared with approximately 13.17 million people.
- On August 17-18, 2015 the NSF and the Department of Agriculture (USDA) convened the Tribal Colleges and Universities Program (TCUP) Research Symposium. The activity is sponsored by NSF's Tribal Colleges and Universities Program and the 1994 Land Grant Program of the National Institute for Food and Agriculture (USDA). Over 40 students and faculty from TCUP institutions present their research findings at NSF.

Progress Update: FY15 Quarter 4 Highlights

- Activities that will support implementation of the Federal STEM Education 5-Year Strategic Plan Goal, "Enhance STEM Experience of Undergraduate Students" initiated this quarter included:
  - The NSF funded a National Research Council study to develop a conceptual framework for an indicator system to document the current state of Undergraduate STEM education and track improvements over time. These indicators will focus on the first two years of undergraduate education, document the status and quality of undergraduate STEM education, and be used to track improvements at the national level.
  - Interpersonal and intrapersonal competencies are associated with college completion. Measuring and assessing these competencies will be improved by a National Academies of Science, Engineering, and Medicine project to assess and establish priorities for the use of such measurements.
- To examine trends and set benchmarks for improving access to STEM degrees and decertifications, the Undergraduate STEM Education IWG analyzed data on the number of degrees and certificates awarded from 2008-2013, with data disaggregated by gender, race, and degree type.

STEM Education Goal Team and Governance Plan

Oversight and Project Management of Implementation Working Groups
Goal Leaders: Joan Ferrini-Mundy and Jo Handelsman
Deputy Goal Leaders: National Science Foundation (NSF) and Office of Science and Technology Policy (OSTP)

P-12 STEM Instruction

Co-Leads:
- Department of Education
- NSF

Engagement

Co-Leads:
- Smithsonian
- NASA

Undergraduate STEM Education

Co-Leads:
- NSF
- Department of Energy

Under-represented Groups

Co-Leads:
- NSF
- National Institutes of Health (NIH)

Graduate Education

Co-Leads:
- NSF
- National Institutes of Health (NIH)

Coordination Objectives

Lead:
- FC-STEM

Governance

- Co-STEM: Jo Handelsman (OSTP) and France Córdova (NSF) are Co-Chairs. Annual report from FC-STEM to Co-STEM
- FC-STEM: Joan Ferrini-Mundy (NSF) and Donald James (NASA) are Co-Chairs. Quarterly reports from Inter-agency Working Groups to FC-STEM

Action Plan Summary

Sub-goal	Major Strategies to Achieve Impact	Key indicators
1. Improve STEM instruction	• Support teacher preparation efforts that encourage use of evidence-based STEM learning opportunities • Increase and improve authentic STEM experiences for teachers	• Percentage of high school mathematics and science teachers who hold degrees in their teaching field or in science of mathematics education • Number of STEM bachelor's degrees earned annually • Percentage of bachelor's degrees awarded to women, black or African American, Hispanic, and American Indian or Alaska Native students (Plus further indicators in development – see slide 13)
2. Increase and sustain youth and public engagement in STEM	• Provide access to scientific and engineering assets of the federal government • Integrate STEM into school-readiness and after-school programs • Improve empirical understanding of how authentic STEM experiences influence learning or interest	
3. Enhance STEM experience of undergraduate students	• Implement evidence-based instructional practices and innovations • Improve STEM education at 2-year colleges and transfer to 4-year colleges • Support the development of university-industry partnerships to provide relevant and authentic experiences • Address high failure rates in introductory undergraduate mathematics	
4. Better serve groups historically under-represented in STEM fields	• Be more responsive to rapidly changing demographics • Focus investments on developing and testing strategies for improving preparation for higher education • Invest in efforts to create campus climates that are effective in improving success for students from under-represented groups	
5. Design graduate education for tomorrow's STEM workforce	• Recognize and provide financial support to students of high potential • Provide opportunities for fellows' preparation in areas critical to the Nation • Combine and enhance mechanisms that evaluate the impact of fellowships to inform future Federal investments	
6. Build new models for leveraging assets and expertise	• Collaborate to build implementation roadmaps in the goal areas • Reduce administrative barriers to collaboration • Develop a framework to guide coordinated CoSTEM agency budget requests	
7. Build and use evidence-based approaches	• Support syntheses of existing research on critical issues in STEM priority areas • Improve and align evaluation and research strategies across Federal agencies • Streamline processes for interagency collaboration	

Work Plan Sub-goal 1: Improve STEM Instruction

Strategic Objectives

- Support teacher preparation efforts that encourage use of evidence-based STEM learning opportunities
- Increase and improve authentic STEM experiences for teachers

Key Milestones (Lead: Department of Education / NSF)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Identify opportunities to leverage related efforts of IWG on Undergraduate Education	12/2014	Complete	IWG P-12, IWG Undergrad	
Create a repository of best practices and research related to teacher preparation and professional learning	02/2015*	Complete	IWG P-12	
Conduct an in-depth analysis of one regional "hotspot zone" to identify all relevant Federal asset activity, programs, and local non-governmental efforts to improve STEM instruction	02/2015**	Complete	IWG P-12	Initial analysis was limited in scope to three areas: Hunstsville, AL; Minneapolis, MN; and, Baltimore area, MD
Conduct focus group sessions with institutions of higher education (IHE) faculty responsible for educating pre-service teachers about using evidence-based STEM learning opportunities and federal resources. Prepare summary of sessions	06/2015	Complete	IWG-P12	
Finalize FY16 outcomes, activities and milestones	09/2015	Complete	IWG-P12	

*Due date revised. The original due date was 09/2014. NSF is working with possible Congressional report language along this line.
**Due date revised. The original due date was 11/2014. Identifying all Federal activities has been more challenging for some agencies than originally anticipated.

Work Plan Sub-goal 1: Improve STEM Instruction (continued)

Key Milestones (Lead: Department of Education / NSF)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Finalize FY16 outcomes, activities and milestones	09/2015	Complete	IWG-P12	
Compile information about Federal resources for P-12 STEM teachers in an online repository, one-pager and a powerpoint presentation for use at STEM education conferences and events and for distribution to P-12 STEM educators	04/2016	On Track	IWG P-12	Comment: The P-12 IWG is exploring science.gov as the host for the repository.
Utilizing the Federal resources online repository created by the P-12 IWG (see milestone above), develop a set of recommendations for evaluating professional development for STEM teachers	06/2016	On Track	IWG P-12	
Reach consensus on a definition of activities that are considered “authentic STEM experiences” as a reference for cataloging IWG activities that are considered to be authentic STEM experiences	04/2016	On Track	FC-STEM Task Group	
Collect information on successful inter-agency collaborations that have impacted educators and share these examples	06/2016	On Track	IWG P-12	
Finalize FY17 outcomes, activities and milestones	10/2016	On Track	IWG P-12	

Work Plan Sub-goal 2: Engagement in STEM Education

Strategic Objectives

1. Access to scientific and engineering assets of the Federal government
2. Integration of STEM into school readiness and after-school programs
3. Empirical understanding of how STEM experiences influence learning or interest

Key Milestones (Lead: ED / NSF)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Identify STEM engagement activities of CoSTEM agencies	2/1/2016*	On Track	IWG - Engagement	
Identify evaluation models used to effectively study engagement	2/1/2016*	On Track	IWG Engagement	
Implementation of agency commitments related to making and student engagement announced by President Obama at the White House Maker Faire	06/2015	Complete	OSTP and Agencies	

*Due dates revised with new IWG leadership

Work Plan Sub-goal 3: Undergraduate STEM Education

Strategic Objectives

1. Implementation of evidence-based instructional practices and innovations.
2. Improve STEM education at 2-year colleges and transfer to 4-year colleges.
3. Support the development of university-industry partnerships to provide relevant and authentic experiences.
4. Address high failure rates in introductory mathematics at undergraduate level.

Key Milestones (Lead: NSF/TBD)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Leverage related efforts of IWG on Graduate Education: A) Identify opportunities for collaboration	12/2014 (A)	Complete	IWG Undergrad	
B) Develop and launch an undergraduate research experiences portal	12/2015 (B)	On track	IWG Undergrad	
C) Develop a communications plan for federal research experiences portal with Graduate Education IWG	01/2016 (C)	On track	IWG Undergrad and IWG Graduate	Dependent on B OSTP will lead announcement with newly revamped science.gov website
Identify opportunities to leverage related efforts of IWG on P-12 Education	12/2014	Complete	IWG Undergrad	
Develop an online, cross-agency resource of Federal programs of interest to community colleges	12/2014	Complete	IWG Undergrad	
Identify common evaluation elements for undergraduate authentic STEM experiences to be used across Federal agencies, beginning with a Common Indicator Metrics Analysis	08/2015	Complete	IWG Undergrad	
Outreach efforts to increase implementation of evidence-based instructional practices and innovations i) NAS Reaching Students webinar viewings ii) NAS Reaching Students book downloads iii) NAS Reaching Students number of countries	8/2015	Complete	IWG Undergrad	

Work Plan Sub-goal 3: Undergraduate STEM Education

(continued)

Key Milestones (Lead: NSF/TBD)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Include item on undergraduate mathematics instruction in National Center for Education Statistics (NCES) 2009 High School Longitudinal Survey (HSLS) second follow up: A) Decision to do in-depth cognitive testing or field testing on new item for the HSLS on undergraduate mathematics instruction B) Item integrated into HSLS Second Follow-up (develop) C) Survey data collected from HSLS D) Survey results available	12/2014 (A)	Complete	IWG Undergrad	
	4/2015 (B)	Complete	IWG Undergrad	Dependent on A
	12/2016 (C)	On track	IWG Undergrad	Dependent on B
	12/2017(D)	On track	IWG Undergrad	Dependent on C
Undergraduate Education Forum that aligns with the four strategic objectives	06/2016	On track	IWG Undergrad	
Develop an Undergraduate STEM Research Playbook.	12/2016	On track	IWG Undergrad	
Collaborate with IWG on Broadening Participation: A) Identify opportunities to leverage related efforts of Broadening Participation IWG B) Develop a Minority Serving Community College and Federal agency convening to share information and resources about agency grant opportunities with Minority Serving Institutions: i) PPEC ii) Asian American Native American Pacific Islander (AANAPISI) C) Host interagency convening to scale MSI outreach to all MSI community colleges	07/2015 (A)	Complete	IWG Undergrad	
	10/2015 (B)	Complete	IWG Undergrad	
	11/2015 (C)	On track	IWG Undergrad	

Work Plan Sub-goal 4: Broadening Participation in STEM Fields

Strategic Objectives

- Be more responsive to rapidly changing demographics
- Focus investments
- Invest in efforts to create campus climates that are effective in improving success for students from underrepresented groups

Key Milestones (Lead: NIH/NSF)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Activities to support the Broadening Participation objective on improving campus climate:				
A) Agency IWG representatives identify strategies and timeline for Incorporating campus climate guidelines and best practices into funding opportunities	A) 10/2015	On Track	IWG BP	
B) Conduct a gap analysis to assess programs that support changes to campus climate and culture in post-secondary institutions to identify areas for program development based on the FC-STEM inventory	B) 3/2016	On Track	IWG BP	Potential Barriers: • Obtaining current information from other agencies on campus climate programs • Narrowing focus of analysis and targeted variables in the FC-STEM inventory so that analysis can be completed in a reasonable period of time
C) Design a convening of campus leadership via cross-agency coordination to obtain buy-in for effective approaches to inclusion to create a campus climate where students are likely to succeed.	C) 7/2016	Not Started	IWG BP	• Identifying appropriate participants • Scheduling convening to allow for maximum participation • Obtaining buy-in from federal agencies and campus leadership

Work Plan Sub-goal 4: Broadening Participation in STEM Fields (continued)

Key Milestones (Lead: NIH/NSF)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Agencies identify and begin implementation of modifications to existing program portfolio to address gaps to provide more opportunities for URMs in STEM	12/2015	On Track	IWG BP	
Ideas proposed to maximize the impact of the federal investment with a timeline for agency adoption	12/2015	On Track	IWG BP	
Establish a protocol to receive feedback from targeted audiences on Federally funded programs with broadening participation in STEM education opportunities	9/2016	Not Started	IWG BP	Creation of protocol will depend on website portal and feedback from convening of campus leadership
Convene a workshop for external stakeholders and experts to discuss potential solutions to improve the STEM preparation of underrepresented groups (in K-12 settings) and propose a research framework and/or agenda	6/2016	On track	IWG BP	
Work with the Graduate Education IWG on a goal related to identifying best practices for defining and measuring diversity and broadening participation in graduate education	9/2017	Not Started	IWG BP	
Working with UG and Grad IWGs, develop a cross-agency effort to eliminate bias in Federally-funded higher education institutions as a strategy for enhancing inclusion and eliminating isolation. Fund interventions for evidence-based strategies for enhancing inclusion and eliminating isolation resulting from campus climate	9/2017	Not Started	IWG BP	

Work Plan Sub-goal 5: Graduate STEM Education

Strategic Objectives

- Recognize and provide financial support to students of high potential
- Provide opportunities for fellows' preparation in areas critical to the nation
- Combine and enhance mechanisms that evaluate the impact of fellowships to inform future federal investments

Key Milestones (Lead: NSF/NIH)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Establish MOUs across agencies to broaden research opportunities of NSF-funded fellows	10/2014	Complete	IWG Grad	
Assemble inventory of evaluation approaches for Federally funded programs in graduate education	01/2015	Complete	IWG Grad	
Identify available resources for the evaluation of graduate programs	01/2015	Complete	IWG Grad	
Identify options such as courses and internships to enhance the quality of graduate training to better address the needs of a future STEM workforce	01/2015	Complete	IWG Grad	
Create common portal for fellowship and traineeship opportunities for graduate students	03/2015*	Complete	IWG Grad	
Hold a workshop with the PIC to begin to identify new milestones and indicators for 2016	04/2015	Complete	IWG Grad	
Initiate discussions with the National Center for Science and Engineering Statistics (NCSES) to explore the possibility of modifying the Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) to provide better quality and more complete information about federal support for graduate education.	06/2015	Complete	IWG Grad	

*Due date revised. The original due date was 02/2015. Additional time was needed for design of the portal.

Work Plan Sub-goal 5: Graduate STEM Education (continued)

Key Milestones (Lead: NSF/NIH)	Milestone Due Date	Milestone Status	Owner	Anticipated Barriers or Other Issues Related to Milestone Completion
Based on the discussions with the NCSES: • Design a modification to the survey instrument to allow universities to report support from any federal agency, including small agencies	06/2016	On Track	IWG Grad	
• Determine if information about federally-funded teaching assistantships should continue to be collected on the survey	06/2016	On Track	IWG Grad	
Expand MOU partners to include most CoSTEM agencies in opportunities for NSF-funded fellows	12/2015	On track	IWG Grad	
Expand Portal to include undergraduate research opportunities	12/2015*	On track	IWG UG and IWG Grad	
Initiate discussions with the Broadening Participation IWG to develop a goal related to identifying best practices for defining and measuring diversity and broadening participation in graduate education	02/2016		IWG BP and IWG Grad	
Convene a Graduate Research Internship Program (GRIP) Host Agency Summit As of 11/15, host agencies include: U.S. Census Bureau, Department of Homeland Security, the Environmental Protection Agency, the Federal Bureau of Investigation, the National Oceanic and Atmospheric Administration, the Office of Naval Research, Smithsonian Institution, and the U.S. Geological Survey	06/2016	On Track	IWG Grad	No barriers identified at this time.
Expand the outreach for GRIP with a goal of increasing the number of applications by 25% in 2016	06/2016	On Track	IWG Grad	
Work with the Undergraduate IWG to explore expanding GRIP to undergraduate students supported by NSF's S-STEM program	12/2016	On Track	IWG UG and IWG Grad	

*Due date revised. The original due date was 02/2015. Additional time was needed for design of the portal.

Key Indicators

Key Implementation Data						
Indicator	**Source**	**Baseline Date/Data**	**Target**	**Frequency**	**Latest data**	**Trend**
Percentage of high school mathematics and science teachers who hold degrees in their teaching field or in science or mathematics education	S&EI 2014	2012/ 73% and 82% [Table A]	⬆	Biannually but based on variable survey	2012	N/A
Number of STEM bachelor's degrees earned annually	S&EI 2014	2011/ 554,365 [Table B and C]	⬆	Biannually	2011	N/A
Number of STEM Certificates earned annually	NCES, IPEDS	2013/ 60,887 [Table J]	⬆	Biannually		
Number of STEM Associate's Degrees earned annually	NCES, IPEDS	2013/88,795 [Table J]	⬆	Biannually		
How many undergraduate students enroll in 4-yr institutions?	S&EI 2014	2013/ 21,260,976 [Table D]	Stable	Biannually	2011	N/A
What is the retention rate in U.S. 4-yr institutions?	S&EI 2014	2011/ 57.8% [Table E]	⬆	Biannually	2011	N/A
What percentage of STEM certificates and degrees do women and racial/ethnic minorities earn?	S&EI 2014	2011[Tables F, G, H, I,K,L,M,N]	⬆ women in computer science and engineering; ⬆ Hispanic Pop.	Biannually	2011	N/A
How many degrees are earned in STEM and what subfields are most popular?	S&EI 2014	2011/ 554,365; Computer Science and Engineering [Table B]	⬆ computer science and engineering	Biannually	2011	N/A
How many views did the Reaching Students webinar receive?	NAS, NRC, BOSE	114 times	Anticipated to ⬆ in Q4	Quarterly	2015	N/A
How many times has Reaching Students been accessed and downloaded?	NAS, NRC, BOSE	16,512 downloads	⬆	Quarterly	2015	⬆
In how many countries has Reaching Students been accessed and downloaded?	NAS, NRC, BOSE	149	⬆	Quarterly	2015	

Appendices

Appendix A: Undergraduate Education IWG Source Data and Explanatory Captions
(corresponding tables on following slides)

Table A.	Mathematics and Science Teachers with an Undergraduate or Graduate Degree in Mathematics or Science, by Grade Level (2012)
Table B.	Number of STEM Bachelor's Degrees Earned Annually (2011)
Table C.	Bachelor's Degrees by Broad Field of Degree: 2000-11 (2011)
Table D.	Undergraduate and total enrollment in higher education, by Carnegie institution type: 1996–2011 (2011)
Table E.	Persistence and outcome of postsecondary students beginning 4-year colleges or universities in 2004:2009 (2012)
Table F.	Percentage of Bachelor's Degrees Awarded to Women
Table G.	Women's Share of S&E Bachelor's Degrees by Field: 2000-11
Table H.	Percentage of Bachelor's Degrees Awarded by Race and Ethnicity (2011)
Table I.	Share of S&E Bachelor's Degrees among U.S. Citizens and Permanent Residents by Race and Ethnicity: 2000-11
Table J.	Number of STEM Certificates and Associate's Degrees, disaggregated by gender (2008-2012)
Table K.	Percentage of STEM certificates awarded by gender (2008-2012)
Table L.	Percentage of STEM certificates awarded by race and ethnicity (2008-2012)
Table M.	Percentage of STEM Associate's degrees awarded by gender (2008-2012)
Table N.	Percentage of STEM Associate's degrees awarded by race and ethnicity (2008-2012)

Appendix B: Acronyms

Table A. Mathematics and Science Teachers with an Undergraduate or Graduate Degree in Mathematics or Science, by Grade Level (2012)

Mathematics and science teachers with an undergraduate or graduate degree in mathematics or science, by grade level: 2012

(Percent)

	Mathematics teachers' degree				Science teachers' degree			
Grade level	Mathematics	Mathematics education	Mathematics or mathematics education	None of these fields	Science or engineering	Science education	Science, engineering, or science education	None of these fields
Elementary	4	2	4	96	4	2	5	95
Middle	23	26	35	65	26	27	41	59
High	52	54	73	27	61	48	82	18

SOURCE: Banilower ER, Smith PS, Weiss IR, Malzahn KA, Campbell KM, Weis AM, *Report of the 2012 National Survey of Science and Mathematics Education* (2013).

Table B. Number of STEM Bachelor's Degrees Earned Annually (2011)

S&E degrees awarded, by degree level, Carnegie institution type, and field: 2011

		S&E field									
Degree and institution type	All fields	All S&E	Agricultural sciences	Biological sciences	Computer sciences	Earth, atmospheric, and ocean sciences	Mathematics	Physical sciences	Psychology	Social sciences	Engineering
Bachelor's	1,734,229	554,365	22,759	93,654	43,586	5,299	18,021	19,198	101,568	172,181	78,099
Doctorate-granting universities—very high research a	444,695	210,425	10,283	37,626	8,193	2,023	6,682	6,852	28,402	69,114	41,250
Doctorate-granting universities—high research activi	249,963	82,410	3,812	13,668	4,909	869	2,176	2,490	13,832	23,135	17,519
Doctoral/research universities	121,588	30,818	874	4,391	4,231	265	835	964	5,389	10,657	3,212
Master's colleges and universities	647,346	158,483	5,162	24,340	16,319	1,397	5,677	5,614	40,877	47,776	11,321
Baccalaureate colleges	199,039	64,878	2,577	12,804	5,554	728	2,626	3,206	12,620	21,163	3,600
Associate's colleges	6,079	845	33	21	778	0	0	0	6	1	6
Medical schools and medical centers	6,435	66	0	66	0	0	0	0	0	0	0
Schools of engineering	1,329	1,168	0	5	41	14	9	25	0	2	1,072
Other specialized institutions	48,610	3,929	0	623	2,679	0	5	37	320	204	61
Tribal colleges	230	68	18	0	2	0	0	0	3	45	0
Not classified	8,915	1,275	0	110	880	3	11	10	119	84	58

NOTES: Medical and other health sciences are included in non-S&E. Carnegie institution type corresponds to the 2010 Carnegie Classification of Academic Institutions.

SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey; National Science Foundation, National Center for Science and Engineering Statistics, Integrated Science and Engineering Resources Data System (WebCASPAR), http://webcaspar.nsf.gov.

Science and Engineering Indicators 2014

Table C. Bachelor's Degrees by Broad Field of Degree: 2000-11

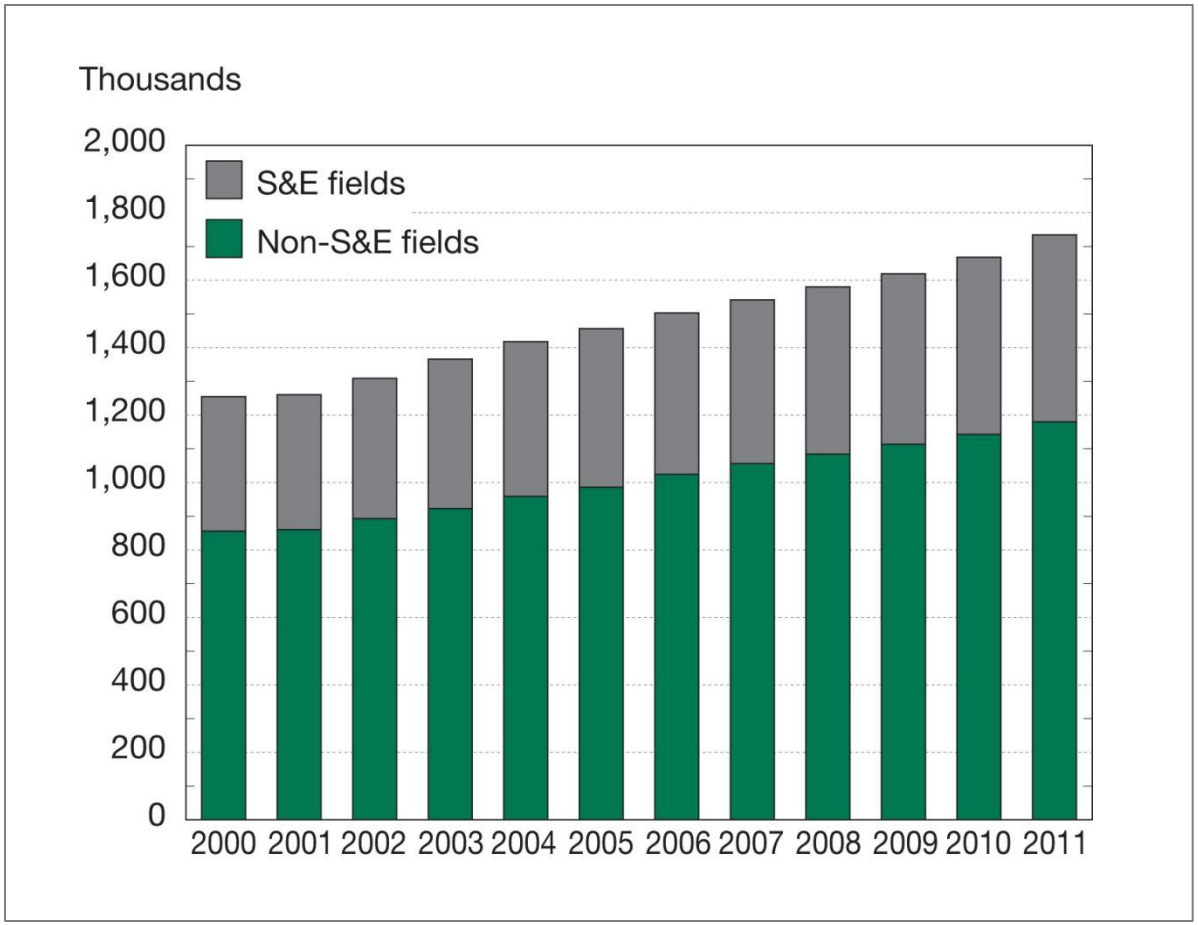


Table D. Undergraduate and total enrollment in higher education, by Carnegie institution type: 1996–2011

Undergraduate and total enrollment in higher education, by Carnegie institution type: 1996–2011

Year	All institutions	Doctorate-granting universities—very high research activity	Doctorate-granting universities—high research activity	Doctoral/research universities	Master's colleges/universities	Baccalaureate colleges	Associate's colleges	Medical schools/medical centers	Schools of engineering	Other special-focus institutions	Tribal colleges	Not classified
Undergraduate enrollment												
1996	12,492,977	1,644,593	1,070,468	437,218	2,612,051	1,020,698	5,267,882	16,734	8,478	140,561	16,239	258,055
1997	12,612,475	1,657,573	1,081,126	436,854	2,631,151	1,034,249	5,327,041	15,974	8,647	156,608	12,612	250,640
1998	12,624,375	1,685,713	1,095,420	442,904	2,639,439	1,050,440	5,243,060	15,710	8,045	165,752	12,919	264,953
2000	13,329,803	1,719,504	1,125,321	462,975	2,723,233	1,081,439	5,739,088	13,491	9,169	190,714	13,603	251,266
2001	13,895,335	1,764,724	1,156,958	489,260	2,826,759	1,117,917	6,104,082	13,268	9,244	210,579	13,835	188,709
2002	14,444,738	1,802,603	1,187,781	511,419	2,928,162	1,158,480	6,424,455	12,634	9,217	228,511	15,343	166,133
2003	14,666,119	1,824,259	1,202,071	536,510	3,006,325	1,182,415	6,485,355	12,563	9,295	242,865	17,527	146,934
2004	14,974,136	1,830,746	1,215,495	577,482	3,087,511	1,204,451	6,611,034	13,331	9,237	268,907	17,180	138,762
2005	15,157,730	1,845,961	1,220,299	580,383	3,231,039	1,219,702	6,638,361	13,325	9,291	286,259	16,879	96,231
2006	15,379,340	1,867,178	1,235,926	629,485	3,264,180	1,225,916	6,733,782	13,281	9,599	298,458	17,071	84,464
2007	15,799,911	1,889,120	1,255,393	691,830	3,345,697	1,235,007	6,947,933	13,315	9,557	310,276	17,222	84,561
2008	16,570,857	1,933,487	1,276,090	774,634	3,511,605	1,285,197	7,368,489	13,939	9,487	326,798	16,798	54,333
2009	17,778,741	1,966,982	1,309,390	866,197	3,702,312	1,355,993	8,155,018	14,113	9,377	356,043	19,507	23,809
2010	18,312,649	1,995,701	1,340,538	830,631	3,797,734	1,407,205	8,401,309	14,559	9,158	372,277	21,014	122,523
2011	18,299,791	2,023,129	1,369,440	836,182	3,836,672	1,417,598	8,211,697	14,873	9,041	355,331	18,777	207,051
Total enrollment												
1996	14,550,056	2,347,141	1,428,519	610,253	3,192,552	1,055,057	5,269,455	75,914	9,078	243,649	16,390	302,048
1997	14,680,488	2,356,066	1,440,299	607,876	3,228,823	1,069,883	5,328,274	76,861	9,359	258,231	12,734	292,082
1998	14,711,280	2,382,444	1,451,533	616,107	3,254,684	1,087,531	5,244,783	76,653	8,799	271,358	13,273	304,115
2000	15,506,922	2,424,538	1,484,966	643,689	3,388,391	1,121,015	5,740,898	76,973	10,213	303,793	13,680	298,766
2001	16,129,629	2,483,646	1,526,997	685,362	3,521,101	1,157,008	6,105,526	78,162	10,455	324,681	13,996	222,695
2002	16,822,915	2,558,455	1,577,560	730,727	3,685,743	1,198,815	6,426,331	80,595	10,663	351,093	15,468	187,465
2003	17,118,126	2,593,906	1,599,392	778,843	3,781,023	1,224,072	6,488,052	82,081	10,830	374,566	17,776	167,585
2004	17,492,964	2,604,610	1,615,367	844,762	3,882,875	1,246,922	6,613,895	87,260	10,765	409,349	17,605	159,554
2005	17,710,640	2,620,649	1,618,433	863,683	4,042,334	1,263,421	6,642,190	90,647	10,773	430,521	17,167	110,822
2006	17,985,045	2,651,949	1,636,192	921,489	4,101,270	1,270,345	6,737,208	93,438	11,094	445,196	17,255	99,609
2007	18,474,977	2,691,983	1,665,194	998,984	4,205,276	1,281,708	6,951,546	96,616	11,016	459,801	17,418	95,435
2008	19,338,981	2,748,682	1,695,467	1,110,746	4,406,031	1,336,829	7,372,093	101,675	10,883	479,510	17,014	60,051
2009	20,671,503	2,809,366	1,746,651	1,219,751	4,640,495	1,415,001	8,159,022	106,789	10,809	516,766	19,686	27,167
2010	21,280,059	2,854,408	1,785,934	1,193,468	4,741,562	1,471,538	8,406,072	111,305	10,681	540,877	21,225	142,889
2011	21,260,978	2,886,167	1,810,490	1,195,172	4,745,798	1,483,886	8,214,689	114,420	10,582	525,754	18,920	255,100

NOTES: Data are not available for 1999. Data are based on degree-granting institutions eligible to participate in Title IV federal financial aid programs. Carnegie institution type corresponds to the 2010 classification.

SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System, Fall Enrollment Survey (various years); and National Science Foundation, National Center for Science and Engineering Statistics, Integrated Science and Engineering Resources Data System (SESTAT), http://sestat.nsf.gov.

Science and Engineering Indicators 2014

Table E. Persistence and outcome of postsecondary students beginning 4-year colleges or universities in 2004:2009

Persistence and outcome of postsecondary students beginning 4-year colleges or universities in 2004: 2009

		Cumulative persistence outcome, 2009 (%)			
Major in 2004	Number	Bachelor's	Associate's or certificate	Still enrolled	No longer enrolled
All majors	1,657,800	57.8	6.2	12.2	23.7
S&E	397,500	63.3	4.5	11.7	20.5
Agricultural/biological sciences	80,600	71.4	3.1	10.2	15.3
Physical/math/computer sciences	85,300	51.7	7.4	11.3	29.5
Engineering	107,300	60.8	4.5	14.2	20.5
Social/behavioral sciences	124,300	62.4	3.4	14.7	19.1
Non-S&E	790,900	55.2	7.3	13.0	24.5
Missing/undeclared	469,400	57.5	5.9	11.3	25.3

NOTE: Physical sciences include earth, atmospheric, and ocean sciences. Social sciences include history.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003–04 Beginning Postsecondary Students Longitudinal Study, Second Follow-Up (BPS:04/09), http://nces.ed.gov/datalab/index.aspx.

Science and Engineering Indicators 2012

Table F. Percentage of Bachelor's Degrees Awarded to Women

Women's share of S&E bachelor's degrees, by field: 2000–11

(Percent)

Year	Physical sciences	Biological/agricultural sciences	Mathematics	Computer sciences	Psychology	Social sciences	Engineering
2000	40.8	55.8	47.8	28.0	76.5	54.2	20.5
2001	41.6	57.3	48.0	27.6	77.5	54.8	20.1
2002	42.7	58.6	46.9	27.5	77.5	54.8	20.9
2003	41.7	59.7	45.6	27.0	77.7	54.7	20.3
2004	42.2	60.1	45.9	25.1	77.8	54.5	20.5
2005	42.6	59.9	44.6	22.3	77.8	54.2	20.0
2006	42.2	59.8	44.9	20.7	77.4	53.7	19.5
2007	41.1	58.6	43.9	18.6	77.4	53.8	18.5
2008	41.1	58.2	43.9	17.7	77.1	53.5	18.5
2009	41.0	58.2	43.0	17.9	77.2	53.6	18.1
2010	40.9	57.8	43.1	18.2	77.1	53.7	18.4
2011	40.3	58.1	43.0	17.7	77.0	54.2	18.8

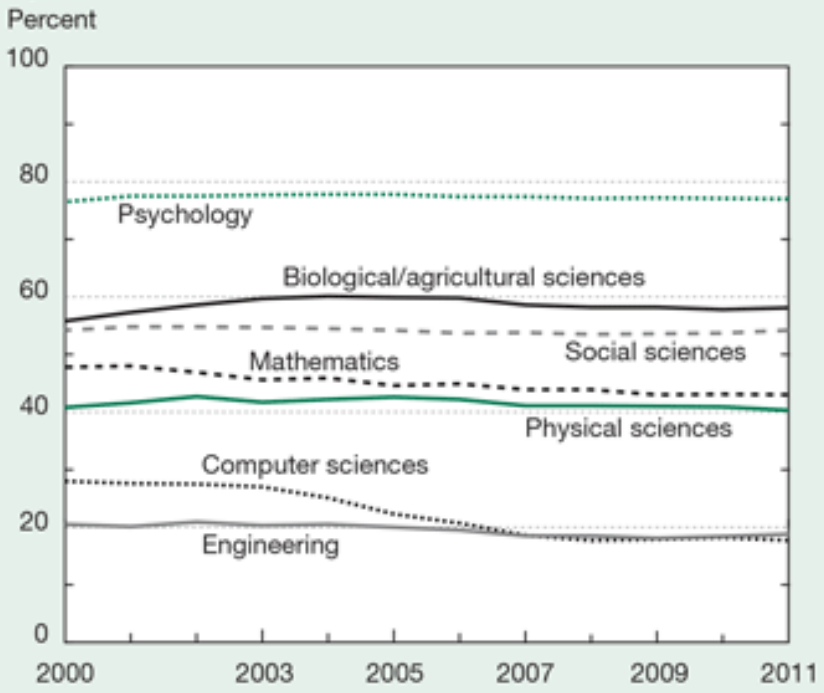
NOTE: Physical sciences include earth, atmospheric, and ocean sciences.

SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey; National Science Foundation, National Center for Science and Engineering Statistics, WebCASPAR database, http://webcaspar.nsf.gov.

Science and Engineering Indicators 2014

Table G. Women's Share of S&E Bachelor's Degrees by Field: 2000-11

Figure 2-18
Women's share of S&E bachelor's degrees, by field: 2000–11



NOTE: Physical sciences include earth, atmospheric, and ocean sciences.

SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey; and National Science Foundation, National Center for Science and Engineering Statistics, WebCASPAR database, http://webcaspar.nsf.gov.

Science and Engineering Indicators 2014

Table H. Percentage of Bachelor's Degrees Awarded by Race and Ethnicity (2011)

Share of S&E bachelor's degrees among U.S. citizens and permanent residents, by race and ethnicity: 2000–11

(Percent)

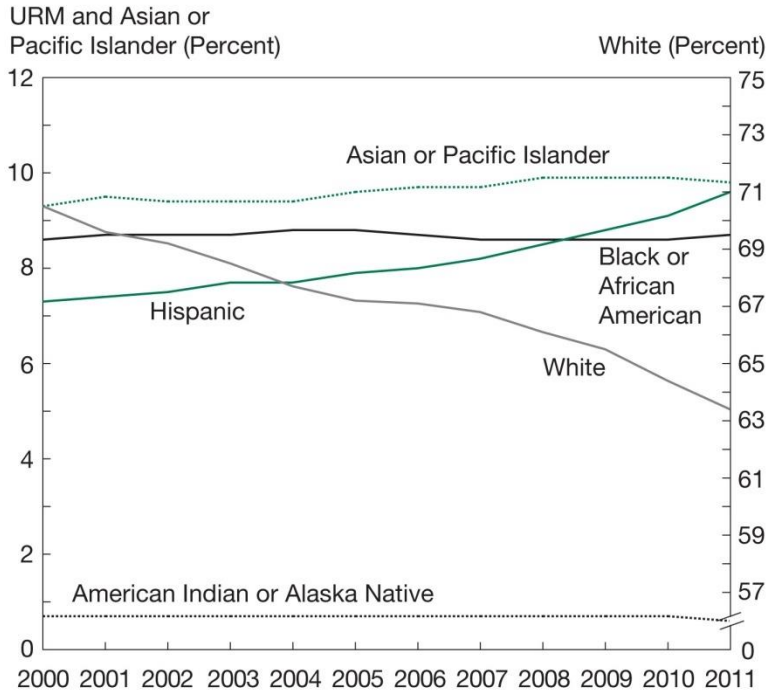
Year	Asian or Pacific Islander	Black or African American	Hispanic	American Indian or Alaska Native	White
2000	9.3	8.6	7.3	0.7	70.5
2001	9.5	8.7	7.4	0.7	69.6
2002	9.4	8.7	7.5	0.7	69.2
2003	9.4	8.7	7.7	0.7	68.5
2004	9.4	8.8	7.7	0.7	67.7
2005	9.6	8.8	7.9	0.7	67.2
2006	9.7	8.7	8.0	0.7	67.1
2007	9.7	8.6	8.2	0.7	66.8
2008	9.9	8.6	8.5	0.7	66.1
2009	9.9	8.6	8.8	0.7	65.5
2010	9.9	8.6	9.1	0.7	64.4
2011	9.8	8.7	9.6	0.6	63.4

NOTES: Hispanic may be any race. American Indian or Alaska Native, Asian or Pacific Islander, black, or African American and white refer to individuals who are not of Hispanic origin. Percentages do not sum to 100 because data do not include individuals who did not report their race and ethnicity.

SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey; National Science Foundation, National Center for Science and Engineering Statistics, WebCASPAR database, http://webcaspar.nsf.gov.

Science and Engineering Indicators 2014

Table I. Share of S&E Bachelor's Degrees among U.S. Citizens and Permanent Residents by Race and Ethnicity: 2000-11



URM = underrepresented minorities (black, Hispanic, and American Indian or Alaska Native).

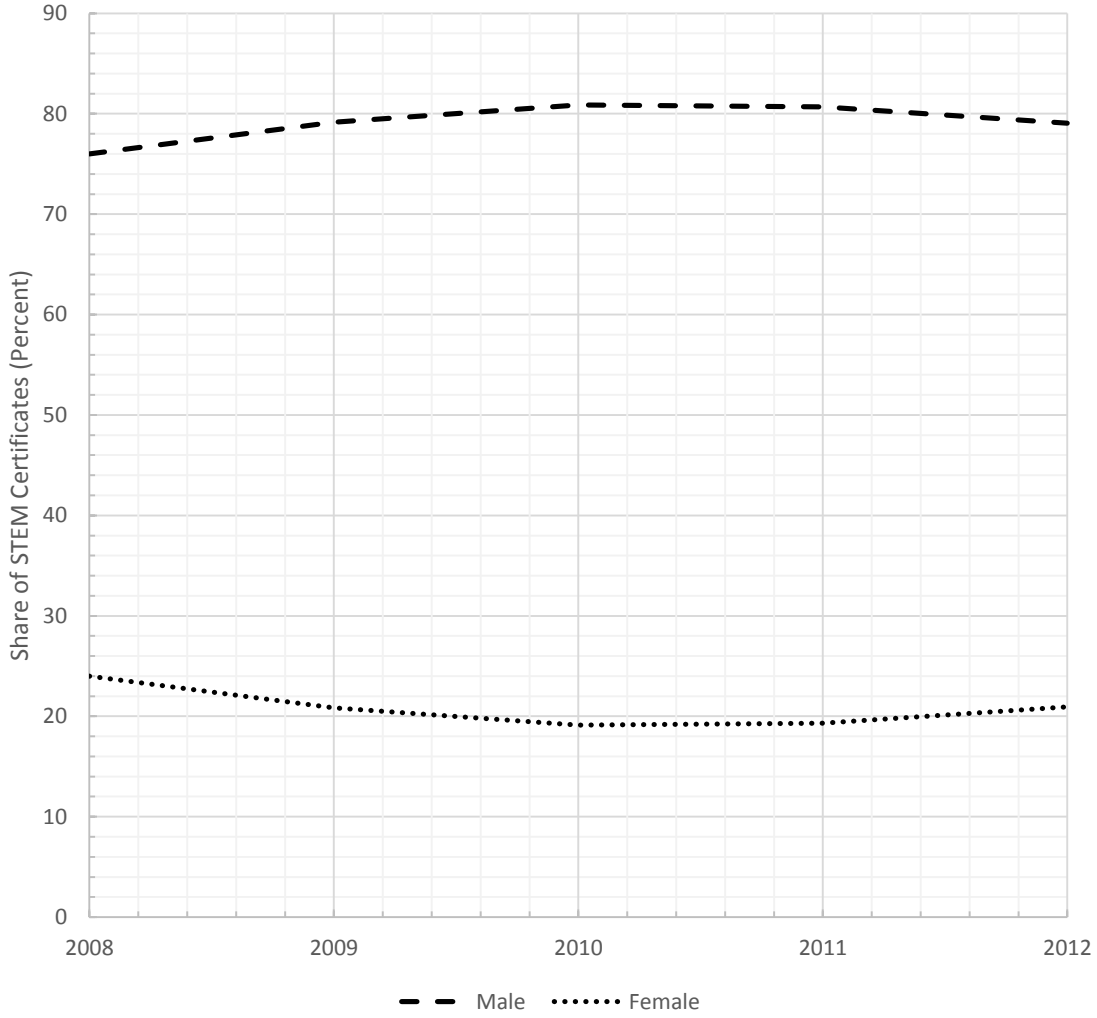
NOTES: Hispanic may be any race. American Indian or Alaska Native, Asian or Pacific Islander, black or African American, and white refer to individuals who are not of Hispanic origin. Percentages do not sum to 100 because data do not include individuals who did not report their race and ethnicity.

Table J. Number of STEM Certificates and Associate's Degrees, disaggregated by gender (2008-2012)

		2008-09	2009-10	2010-11	2011-12	2012-13
Number of STEM Certificates		45,525	55,121	66,649	60,304	60,887
	Males	34,601	43,631	53,910	48,658	48,133
	Females	10,924	11,490	12,739	11,646	12,754
Number of STEM Associate's Degrees		83,046	88,526	86,031	92,464	88,795
	Males	68,402	73,292	67,699	73,348	69,839
	Females	14,644	15,234	18,332	19,116	18,956

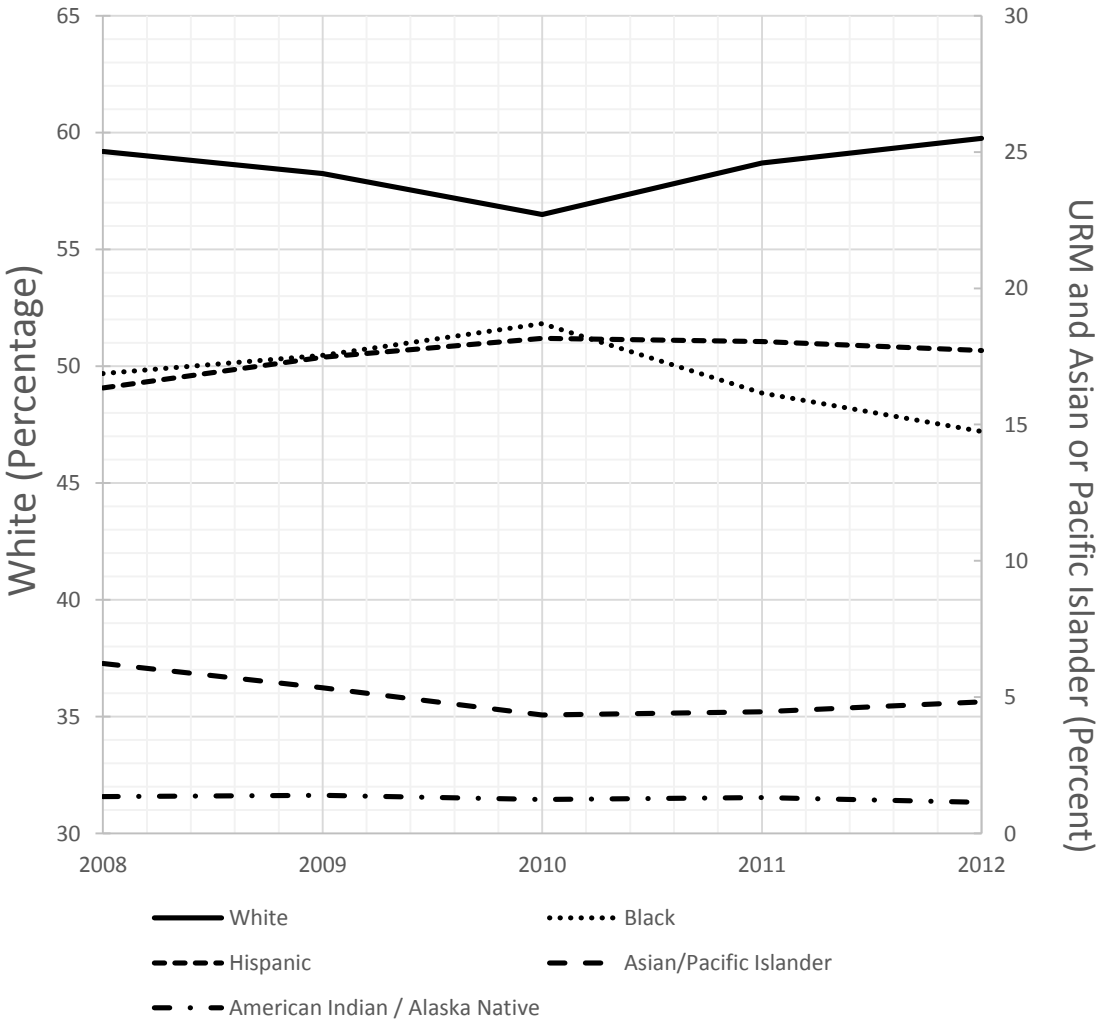
SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System Completions Survey.

Table K. Percentage of STEM certificates awarded by gender (2008-2012)



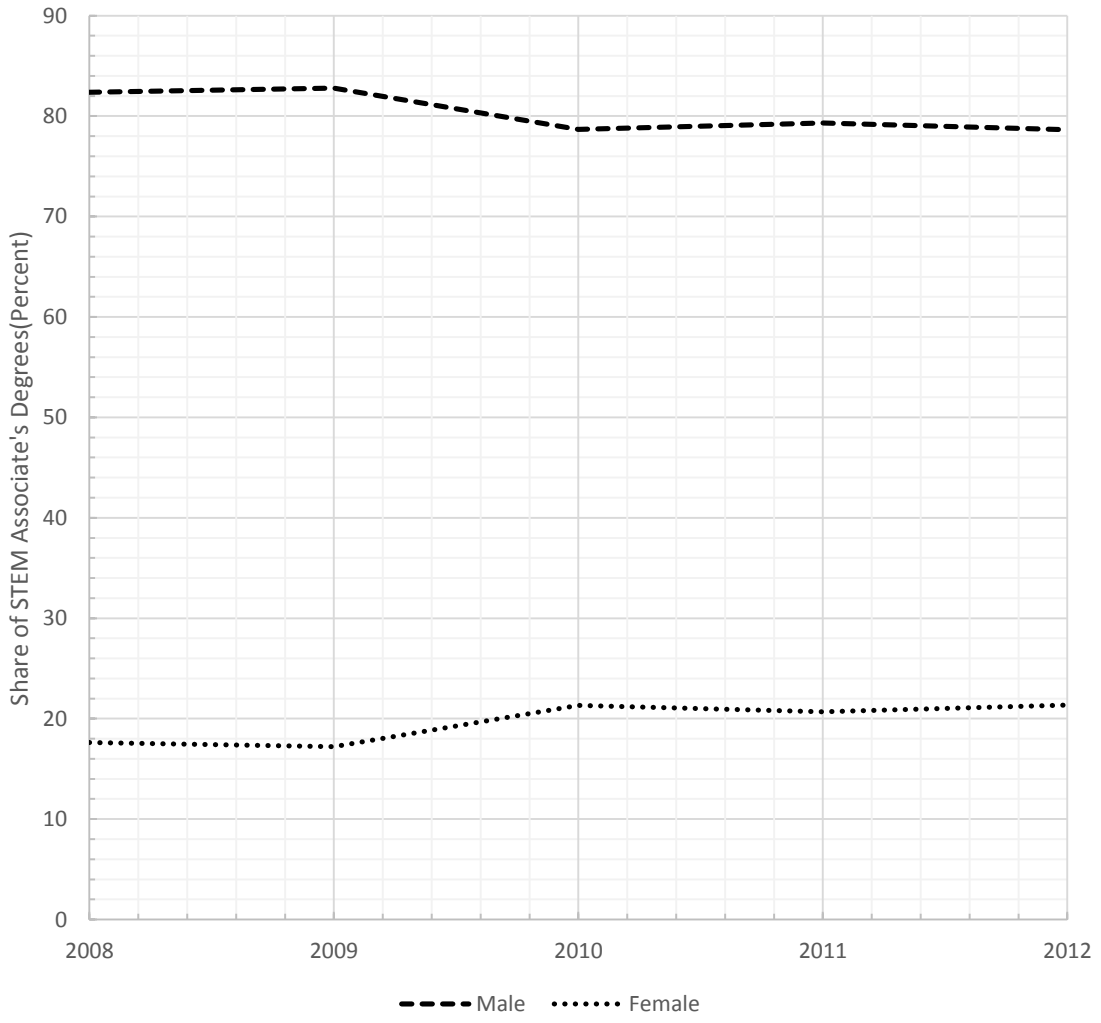
SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System Completions Survey.

Table L. Percentage of STEM certificates awarded by race and ethnicity (2008-2012)



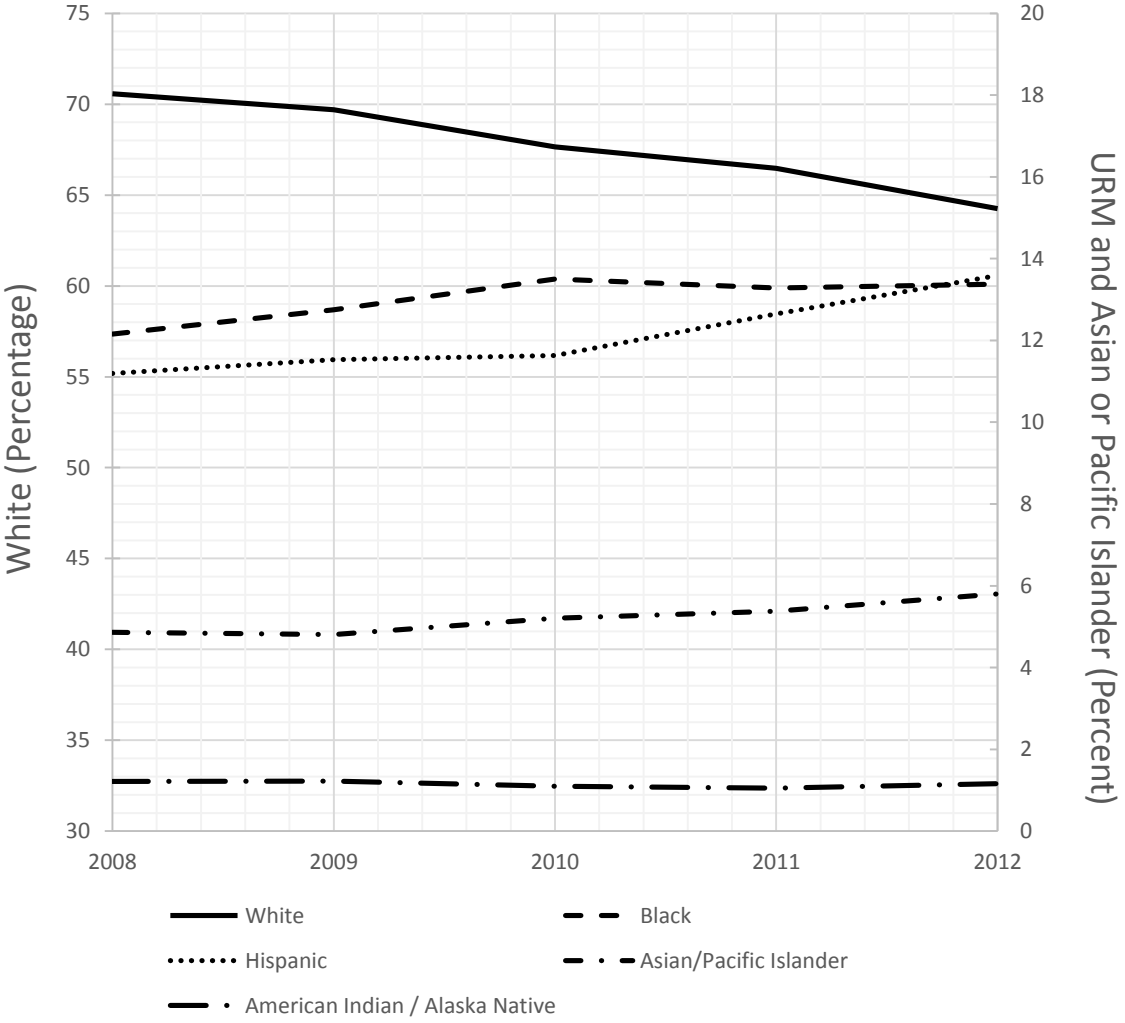
SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System Completions Survey.

Table M. Percentage of STEM Associate's Degrees awarded by gender (2008-2012)



SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System Completions Survey.

Table N. Percentage of STEM Associate's Degrees awarded by race and ethnicity (2008-2012)



SOURCES: National Center for Education Statistics, Integrated Postsecondary Education Data System Completions Survey.

Appendix B: Acronyms

Acronym	Description
AANAPISI	Asian American Native American Pacific Islander Serving Institutions
CAP	Cross Agency Priority
CCIC	Community College Innovation Challenge
E.O.	Executive Order
ED	US Department of Education
FY	Fiscal Year
GRIP	Graduate Research Internship Program
GSS	Survey of Graduate Students and Postdoctorates in Science and Engineering
HSLS	High School Longitudinal Study
IHE	Institutes of Higher Education
IWG	Interagency Working Group
MOU	Memorandum of Understanding
MSI	Minority Serving Institutions
NAS	National Academies Press
NASA	National Aeronautics and Space Administration
NCES	National Center for Education Statistics
NCSES	National Center for Science and Engineering Statistics
NIH	National Institutes of Health
NSB	National Science Board
NSF	National Science Foundation
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
P-12	Grades preschool through twelve
PIC	Performance Improvement Council
PPEC	Pacific Postsecondary Education Council
Q(Q1)	Quarter (1-4)
S&EI	NSB Science and Engineering Indicators Report
STEM	Science, Technology, Engineering and Mathematics
TCUP	Tribal Colleges and Universities Program
UG	Undergraduate
URM	Underrepresented Minorities
USDA	US Department of Agriculture