

QUALITY EDUCATION FOR MINORITIES (QEM) NETWORK



The Critical Role of Historically Black Colleges and Universities in the Postsecondary Computing Education Landscape

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Between 2003 and 2013 the number of Black professionals holding jobs in Computer Science and Mathematics (CSM) increased from 178,440 to 307,509.

- Review the:
 - Landscape of HBCUs and computer science,
 - Graduate productivity, and
 - Potential alliances with CISE core programs.



Objectives

Number and Representation of Computer Science and Mathematics Professionals in the U.S. Workforce by Race and Gender

MALE

	<i>N</i>	<i>Representation</i>	<i>Expected Representation</i>	<i>+/- Representation</i>
White	1,266,601	48%	31%	54%
Black	97,420	4%	6%	-38%
Asian	468,877	18%	2%	619%
Hispanic	91,904	3%	9%	-60%
Other	45,622	2%	1%	-

FEMALE

White	400,288	15%	32%	-51%
Black	49,635	2%	6%	-68%
Asian	198,262	7%	3%	204%
Hispanic	29,471	1%	8%	-87%
Other	15,340	1%	1%	-

Source: 2013 American Community Survey, U.S. Census, Integrated Public Use Microdata Series

For the number of Black Computer Science professionals to be representative of the population we need to develop 59,553 more Black male and 122,887 more Black female Computer Science professionals.

HBCUs Computer Science Productivity

- Of 101 HBCUs, that qualify for federal support, 11 are among the top 100 postsecondary institutions for graduating Black students in CSM.
 - By contrast, of the 115 institutions of higher education with Carnegie Classification of R1 (Highest Research Activity) only 8 are in the top 100 for graduating Black students in CSM.
 - Enrollment at the R1 institutions is more than 3 million and composite enrollment of the 100 HBCUs is less than 300,000.
 - 971 Black students received CSM degrees from HBCUs in 2014 and 812 Black students received CSM degrees from R1 institutions.
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HBCUs Conferring Computer Science (CS) Degrees

- 59 of the 86 accredited 4-year HBCUs conferred Bachelors and/or Masters degrees in Computer Science in 2012/13 (Texas Southern University only conferred Masters degrees)
- 16 public HBCUs (47%) and 3 private HBCUs (12%) has accreditation from Accreditation Board for Engineering and Technology (ABET)

HBCUs Conferring Computer Science Degrees in 2012/13

Type of HBCU	Total	Bachelors	Masters	ABET	% ABET
Public 4-year	34	33	13	16	47%
Private 4-year	25	25	2	3	12%
Combined	59	58	15	19	32%

Computer Science Degrees Conferred on Black Students At HBCUs

Public:

- Bachelors degrees (81%; N=311)
- Masters degrees (47%; N=129)

Private

- Bachelors degrees (91%; N=144)
- Masters degrees (70%; N=7)

Black Graduates of HBCU Computer Science Programs in 2012/13

Type of HBCU	Bachelors	Black Bachelors	% Black Bachelors	Masters	Black Masters	% Black Masters
Public 4-year	386	311	81%	129	60	47%
Private 4-year	159	144	91%	10	7	70%
Totals	545	455	83%	139	67	48%

Top-10 HBCUs for graduating Black CS Students:

1. North Carolina Agricultural and Technical State University(38)
2. Southern University and A&M College, Baton Rouge (27)
3. Norfolk State University (26)
3. Johnson C Smith University (26)
5. Florida Agricultural and Mechanical University (24)
6. Alabama A&M University (19)
7. South Carolina State University (17)
8. Lane College (14)
9. Rust College (12)
10. University of Arkansas Pine Bluff (11)
10. Virginia State University (11)
10. Morehouse College (11)

SOURCE: <https://hbcu-levers.blogspot.com/2016/02/directory-of-hbcu-computer-science.html>

Research HBCUs with Computer Science Programs

High Research Activity – Doctoral (R2)

- Clark Atlanta University*
- Florida Agricultural and Mechanical University*
- Howard University*
- Jackson State University*

Doctoral (R3)

- Bowie State University*
- Morgan State University*
- North Carolina A & T State University*
- Prairie View A & M University*
- South Carolina State University*
- Tennessee State University*
- Texas Southern University*
- University of Maryland Eastern Shore*

Master's Colleges and Universities (larger programs)

- Alabama A & M University*
- Alabama State University*
- Grambling State University*
- Lincoln University of Pennsylvania*
- Norfolk State University*
- North Carolina Central University*
- Southern University and A & M College*

Master's Colleges and Universities (medium programs)

- Albany State University
- Alcorn State University*
- Delaware State University*
- Fayetteville State University*
- Hampton University*
- Mississippi Valley State University*
- Southern University at New Orleans
- Virginia State University*
- Winston-Salem State University*

Master's Colleges and Universities (smaller programs)

- Cheyney University of Pennsylvania*
- Coppin State University*
- Elizabeth City State University*
- Florida Memorial University*
- Fort Valley State University*
- Langston University*
- Lincoln University
- Savannah State University
- Tuskegee University*
- University of the District of Columbia*
- University of the Virgin Islands*
- Xavier University of Louisiana*

- Per [National Science Foundation](#), 21 of the top 50 IHEs for producing black graduates who earn their doctorates in science and engineering are HBCUs;
- 18 HBCUs have improved their Carnegie Classification within the last ten years
- Among HBCUs that have an R2-R3 Carnegie Classification the percent of the faculty that is Black or African American is 67%. By contrast, the percentage of the faculty at doctoral granting Traditionally White Institutions (TWI) that is Black is 4%.

HBCU Success

Opportunity for support from NSF CISE to HBCUs

NSF CISE Core research programs have the potential to advance research at HBCUs that can cultivate diverse research findings and enhance learning experiences of a diverse student body. However, very few HBCUs have active Core projects

CISE CORE AWARDS TO HBCUs

CISE DIVISION	Active Awards	Awards to HBCUs
Computer and Network Systems (CNS)	890	1
Computing and Communication Foundations (CCF)	1,322	0
Information and Intelligent Systems (IIS)	1,257	2

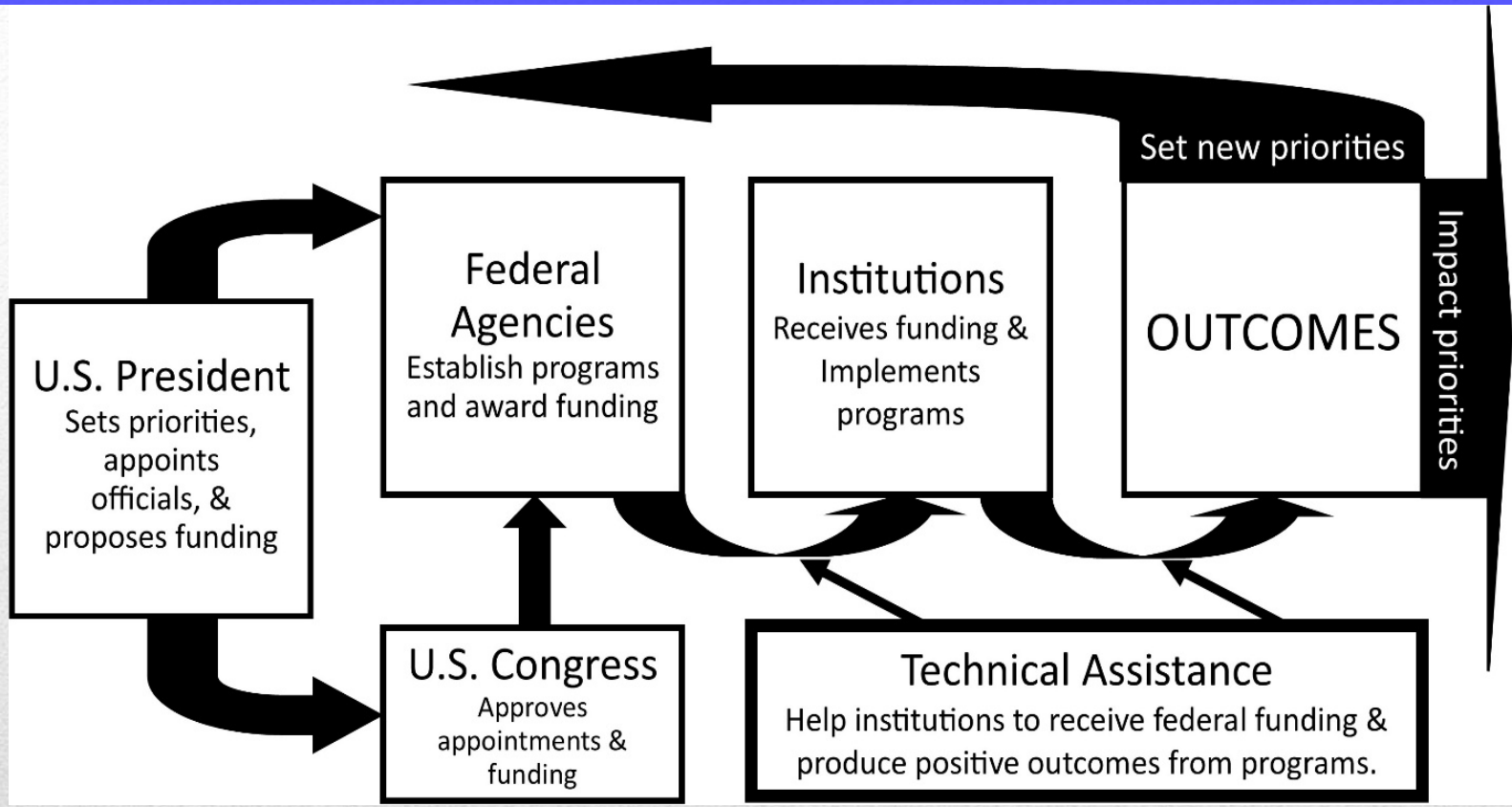


Figure 1: Conceptual model illustrating the relationship between executive-level priorities, congressional actions, federal agency funding to institutions, and technical assistance to produce desired outcomes.

How QEM works with Federal Agencies

OUR WORK WITH NSF AND MSIs

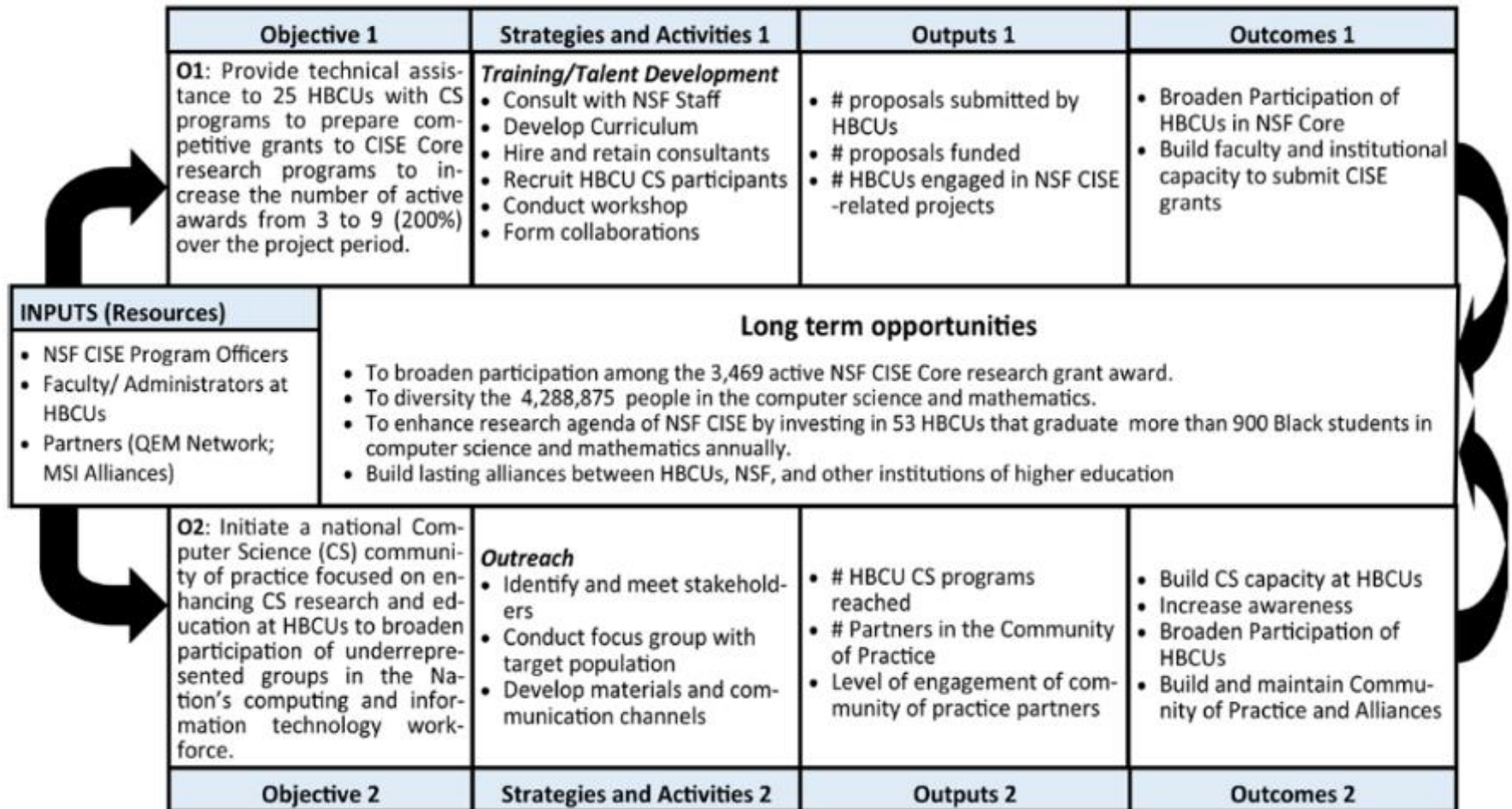
QEM has over 10 years of experience in providing technical assistance to MSIs to increase their participation and competitiveness in National Science Foundation (NSF)-funded programs to enhance/build their STEM research and education capacity and to support their preparation of minority students for STEM-focused careers.

IMPACT

NSF made **718 awards totaling \$386,848,260** to individuals participating/institutions represented in one or more NSF-supported QEM Proposal and Professional Development Workshops.

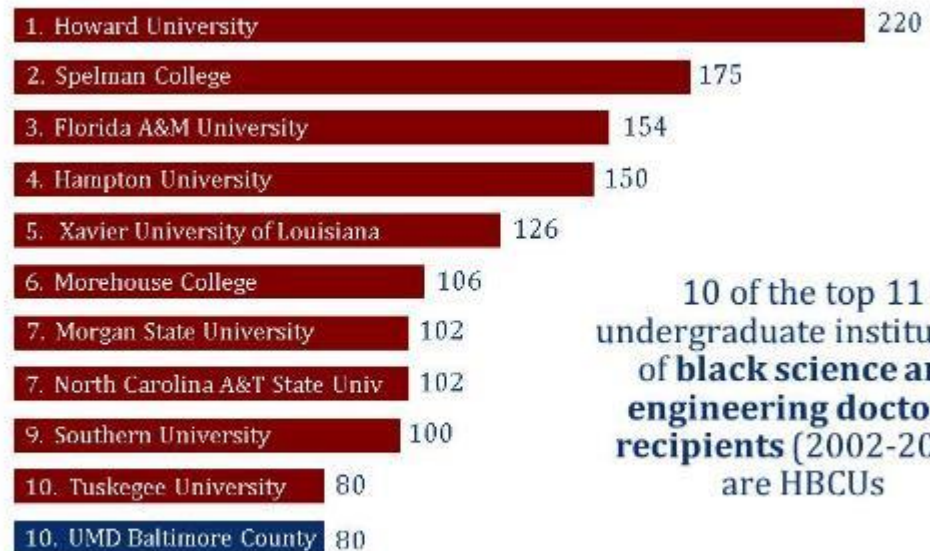
PROJECT PLAN

Project Logic Model



- Where do we go from here?

HBCUs as Effective Producers in STEM



10 of the top 11 undergraduate institutions of **black science and engineering doctoral recipients (2002-2011)** are HBCUs

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Earned Doctorates.



Questions and Discussion