STEM at Spelman: Shining Stars for Tomorrow’s Needs

- History of STEM at Spelman College
- Significance of STEM success at Spelman
- Institutional Context
- Strategic Initiatives
- Planning for the Future: Role of HBCUs in preparing future scientists
History of STEM at Spelman College

- Biology and Mathematics Departments established prior to 1950
- Chemistry Department established in 1976
- Computer and Information Sciences: 1992
- Physics Department: 2001
Albro-Falconer-Manley Science Center
STEM Majors at Spelman College

- Total College enrollment = 2150
- STEM majors account for 30% of all majors
- Majority of these majors are in Biology
- One third of all graduates are STEM majors
Spelman’s Role in Producing African American PhDs in STEM

- Ranked by NSF in 2008 as the #2 undergraduate institution of origin of Black PhDs in STEM
- In 2006, 29.3% of all Black PhDs in STEMs earned their bachelors at HBCUs
  - This represents 10.1 Black PhDs per 1,000 bachelors
  - For non-HBCUs, 7.9 Black PhDs per 1,000 bachelors

Percent

HBCU = historically black college or university.


FIGURE 2. Black S&F doctorate recipients per thousand black bachelor’s degrees awarded in all fields 9 years earlier, by HBCU and non-HBCU institutions: Selected years, 1986–2006

Ratio

Year of doctorate

HBCU = historically black college or university.


FIGURE 3. Black S&E doctorate recipients per thousand black bachelor’s degrees awarded in all fields 9 years earlier by selected Carnegie group and HBCU status: Selected years, 1986–2006

Ratio

HBCU = historically black college or university.

NOTES: Includes only U.S. citizens and permanent residents. Research universities are the Carnegie group "doctorate-granting universities—very high research activity." Other doctorate-granting institutions include doctorate-granting institutions, high research activity and doctoral/research universities. Bachelor’s degree data by race were not collected in 1978, 1980, 1982–84, 1986, and 1988.

Top 10 bac. origin institutions: 1997-2006 Black STEM PhDs

- 1. Howard University
- 2. Spelman College
- 3. Hampton University
- 4. Florida A & M University
- 5. Morehouse College
- 6. North Carolina A & T University
- 7. Southern University A & M College – Baton Rouge
- 8. Xavier University
- 9. Harvard University
- 10. University of Maryland at College Park

Source: NSF, Division of Science Resources Statistics, Survey of Earned Doctorates and National Ctr. For Education Statistics, IPEDs Completion Survey, 1977-2006
How did Spelman accomplish this?

- **Institutional Vision**
  - Leadership of Dr. Etta Falconer and Dr. Shirley McBay
  - Collaboration of faculty and administrators

- **Strategic Planning and Implementation**
  - Intentional development and growth of the sciences
  - Increasing majors in the sciences and mathematics

- **Resources**
  - External funding
  - Partnerships and collaborations
10% of all majors were in the sciences
9% of degrees awarded were in the sciences
Small enrollments in sciences courses beyond the first year level
Biology and Mathematics were the only departments with majors
“The science building was dark and uninviting” (Falconer, 1989)
Strategic Planning and Implementation

- Concerted initiatives to increase majors
- Pre-freshman summer programs - recruiting efforts
  - Biomedical/Health focus
  - Mathematics/CIS/Physical sciences and engineering focus
- Establishment of Health Careers Office
- Office of Science, Engineering, and Technical Careers
- Supplemental instruction and “early warning system,” Math Lab
Cultivating Resources

- NASA: Women in Science and Engineering (WISE)
- NASA: Model Institutions of Excellence
- NIH/NCMHD: Research Infrastructure in Minority Institutions (RIMI)
- NIH/MORE: MBRS-RISE, MARC-U STAR
- NIH/MORE: SCORE
- Howard Hughes Medical Institute
Cultivating Resources

- 2001: Albro-Falconer-Manley Science Center opened
- Collaborations: Georgia Tech, Emory, Georgia State
- Atlanta University Center: Morehouse, Clark Atlanta University, Morehouse School of Medicine
- MOUs: Environmental Protection Agency, Princeton University, Department of Transportation
STEM Research and Training Funding

$31.3 billion

- Biology
- CIS
- Env Sci
- Math
- Physics
- Psych
- Chemistry
- Other
Creating an Environment for Excellence

- “Departmental Culture” (Whitten et al., 2007)
  - Culture is “inclusive of women, students of color, and others”
  - Tutorial programs (students as tutors)
  - Seminar speakers
  - Connections with alumnae/mentors
  - Informal social activities
  - Connections among students in the major
Promoting an Environment of Excellence

- High faculty expectations of student success in the sciences and mathematics
- Small class sizes, 11:1
- Focus on undergraduate research
  - Availability of several research training programs
  - Atlanta Univ. Consortium, Ga Tech, Emory, GSU
- Many African American and African American women role models and mentors
- High drive of students
STEM Culture at Spelman College

- Strong cohort of students in sciences and math
  - Math, Physics, Chemistry, Biology, CIS clubs, student Environmental Task Force
- SpelBots: competed in three RoboCups; only undergraduate, women, HBCU team to ever qualify
- WISE Scholars, Xerox Scholars, Boeing Scholars
- College-wide annual Research Day
- Support for student travel to research conferences
- Dual Degree in Engineering Program
- STEM represents 95% of all external funding
Culture of Academic Excellence

- Spelman’s mission as the leading HBCU for women of African descent
- Distinctiveness of a woman’s college
- Unique features of a liberal arts college
- Connections among academic excellence and service learning/leadership/community outreach
New Initiatives

- G-STEM: “Enhancing Global Research and Education in STEM at Spelman College;” proposal under review at NSF
- Quality Enhancement Plan for SACS Reaffirmation:
  - “Internationalizing the Curriculum”
Preparing Tomorrow’s Scientists

- Interdisciplinary, collaborative perspectives and experiences
  - ASPIRE Project
  - ARTSI Project
  - Health Disparities Scholars
- Interdisciplinary Curricular collaborations
- Global Experiences
- Teamwork and mentoring
Building on Success for the Future