

# Research and Education in Synchrotron Science and Engineering Applications

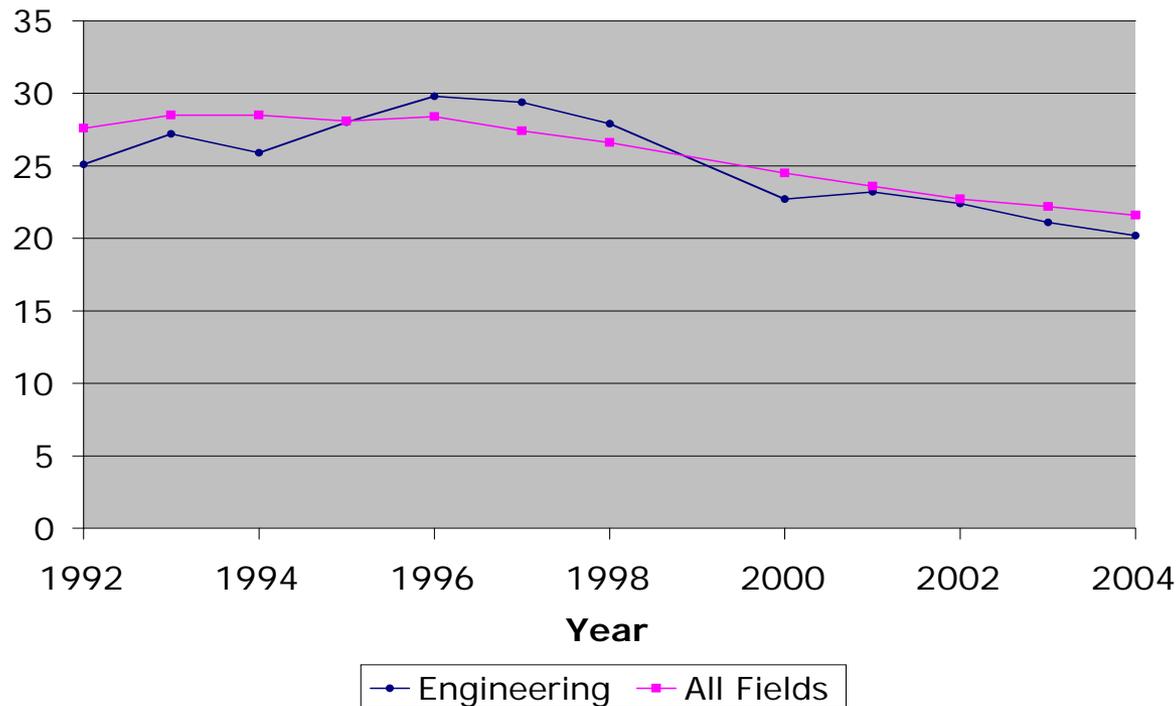
Second Annual HBCU Workshop  
BNL/NSLS

# Landscape: Where we Start

- **Low African American and HBCU participation in large research facilities, including accelerators**
- **Researchers at HBCUs desire to create competitive team through synchrotron-related research**
- **We need to motivate and direct students: African Americans face 50/50/50 high school graduation/entering college/finishing college hurdles**

# HBCU B.S. Production (NSF 07-308)

## African American BS Degrees at HBCUs



Just over 100 HBCUs and 13 HBCU engineering programs. 3

# Philosophy

- **Booker T. Washington:**
  - “Cast down your bucket where you are”
  - “...separate as the fingers, yet one as the hand in all things essential to mutual progress”
- **HBCU Consortium in Accelerator Science and Engineering has formed, teamed with BNL**

# HBCU-Interdisciplinary Consortium for Research and Education Access in Science and Engineering (INCREASE)

- **Pilot Goal: Develop a discovery and learning based research and education community amongst MSIs and other scholars, a model for the future**
- **Pilot Consortium: AL A&M, AL State U, DE State U, Hampton U, Southern U - BR, Southern U - NO, TN State U**
- **First Annual Workshop in 2007, Second Workshop for summer 2008**
- **Three individual investigators are beam users**

# Strategy: Step 1: Sustain People Infrastructure Through Learning

- **Create Accelerator Science and Engineering (S&E) Courses to prepare students**
- **Create pipeline of HBCU students with accelerator S&E interests/experience**
- **Pilot support for HBCU faculty members research at BNL-NSLS**

# Research Interests

- **Variety of disciplines represented: physics, biology, geology, chemical and electrical and chemical engineering, materials**
- **Provides our students with options, provides faculty members with a variety of potential collaborators**
- **Examples:**
  - **Electrical Engineering: instrumentation**
  - **Chemical Engineering: catalysis**
  - **Geology: Delaware State**
  - **Materials: material characterization**

# Education Approach: Two-Course Sequence

- **Synchrotron S&E**
  - Multidisciplinary
  - Junior-level technical elective
  - Prepare HBCU students for summer BNL NSLS program
  - Offer at BNL/SUNY-SB for other students

- **Synchrotron S&E Applications**
  - Multidisciplinary
  - Module-based, modules will be developed based on research interests of consortium faculty

# Education Outcomes: Examples

- **Workforce for BNL NSLS/other accelerators**
- **Potential Users via Professoriate:**
  - **Graduate programs in instrumentation: SUNY Stonybrook, for example**
  - **Graduate programs at NSLS user institutions**
  - **Potential collaborations with HBCUs**

# Summary

- **Team to create a competitive community of discovery and learning**
- **Commitments:**
  - **HBCUs: to develop courses, to develop research**
  - **BNL NSLS: to support research, to provide mentors**
- **Discovery-based, cyber-enabled, mentored, student-centered approach**

# Objectives/Deliverables, 4 years

## ● Research:

- Consortium beam time access
- Each school has a beam user
- Full participation in annual beam users conferences
- Mentoring from BNL NSLS
- Sustain proposals
- Expand to other MSIs

## ● Education:

- Two-course sequence developed and offered
- Students in pipeline to workforce and professoriate
- Expand to other MSIs
- NSDL participation