INCREASE

*I*nterdisciplinary *C*onsortium for *R*esearch and *E*ducation *A*ccess in *S*cience and *E*ngineering

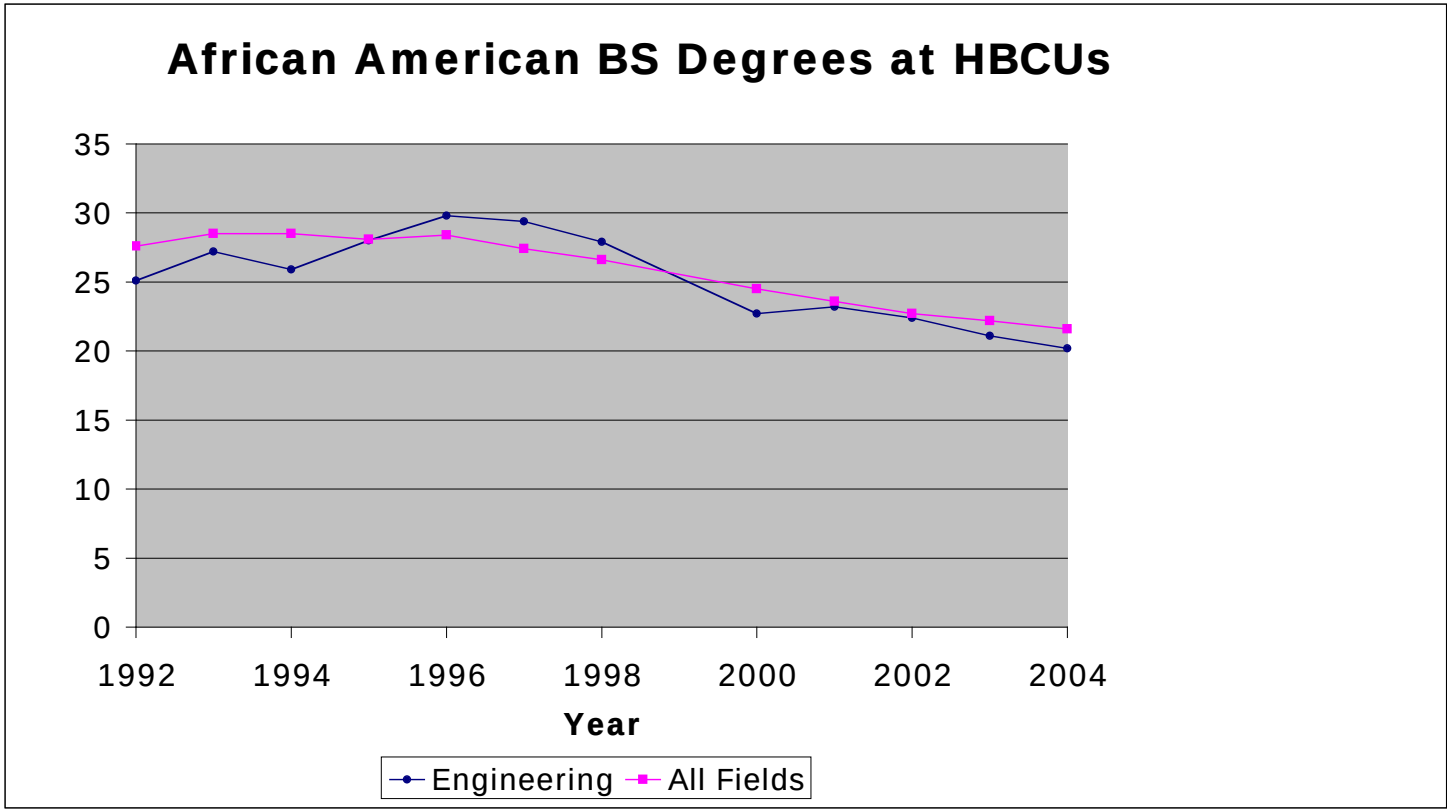
Eric J. Sheppard

Hampton University

Why HBCU Collaboration?

- Low HBCU participation in large research facilities - no critical mass on campus in some areas
- Researchers at HBCUs desire to create competitive research teams
- Team access to resources can level the research playing field

HBCUs must be key participants in broadening participation



Benefits of Multidisciplinary Partnerships

- Teams focused on tools or products of common interest rather than specific research areas (accelerators, high performance computing facilities...)
- Learning across disciplines
- Tackle issues no one school or discipline could
- Educational benefits to students in teaming projects

Our Solution: Integrating Research and Education

- Developing a discovery and learning based HBCU community
- Forming *I*N*t*erdisciplinary *C*onsortium for *R*esearch and *E*ducation *A*ccess in *S*cience and *E*ngineering (INCREASE)
- Taking first step at BNL/NSLS

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
  - Online content
  - Summer interns
  - NSDL participation

Benefits of Teaming with BNL for Research Opportunities

- Multidisciplinary critical mass forming consortium (engineering, physics, geophysics, biology)
- NSLS researchers are excited about the research and partnership and bring added credibility to the proposal thereby increasing the likelihood of success

Growing partnership

- 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

INCREASE: Status and Goals

- **Status**
  - Several successful workshops
  - Several certified beam users
  - Several funded projects amongst participants
  - Some visibility
  - Strong partnership with BNL and NSLS
- **Goals**
  - Short term:
    - Justify Consortium
    - Create structure
  - Long term:
    - Sustainable, visible Consortium
    - NSF Science and Technology Center

INCREASE Evolutionary Plan

- Pilot: assemble consortium; workshops for dissemination, visibility (done)
- Intermediate: competitive individual and small group projects, viable structure, build strategic partnerships (where we are now)
- Ultimate: NSF Science and Technology Center run by HBCU team and supported by National Lab(s) (action plan for next few years)

Objectives for Workshop

- Research
  - Find common theme(s) across participants
  - Consider strategic partners and structure for research and management
  - Build action team(s)
- Education
  - Determine course and curricular needs
  - Outreach to K-12 teachers across participants
  - Graduate education
  - Build action team(s)

NSF Science and Technology Centers

- NSF entertains STC preliminary proposals and full proposals in all areas of research and education normally supported by the Foundation.
- Successful participants must show a strong science/technology theme and clear products outcomes
- Successful participants must demonstrate a sustainable management and teaming structure
- Successful participants must show how the teaming structure enables more than the individual partners could do (synergy)

STC: Explore INCREASE Theme Ideas

- Energy?
- Energy and the Environment??
- Energy, Materials and the Environment: Research and Graduate Education (EMERGE)???
- ????
- Need to look at participant interests

Need Focused Theme

- Focus on outcomes/product(s)
- Such as:
  - The _____ Center promotes research and technology development to create useful tools to study _____.
  - The Center for _____ was commissioned by NSF in xxxx to focus research efforts in the field of _____.
- Theme should include other partners, other programs, too

Context: NSF GPRA Goals

- Discoveries at and across the frontiers of science
- Connections between discoveries and their use in service to society
- Diverse, globally-oriented science and engineering workforce
- Improved achievement in mathematics and science skills needed by all Americans
- Timely and relevant information on the national and international science and engineering enterprise