My HBCU Faculty Experience

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Department of Chemical Engineering
Hampton University

Ohio State University “Preparing Future Faculty” Seminar
February 16, 2022
Quick facts about Hampton University

- **Founded:** April 1, 1868, as *Hampton Normal & Agricultural Institute*
  - Became *Hampton Institute* in 1930
  - Became *Hampton University* in 1984
- **Founder:** General Samuel Chapman Armstrong
- **President:** Dr. William R. Harvey
- **Motto:** The Standard of Excellence
- **University Colors:** Reflex Blue & White
- **Mascot:** Pirates
- **Enrollment:** 4,269
- **Student/Faculty Ratio:** 10:1
- **Average Class Size:** 25
Established to meet the educational needs of black students

HBCUs account for 3% of colleges and universities in the US, yet produce 27% of the African American degrees students earning bachelor degrees in STEM fields (Department of Education, 2016).

- biology (42.2 %) and engineering technology (33%)

HBCUs are not homogeneous

Trends:

- 76 percent Black/African American
- 13 percent white
- 1 percent Asian, Native Hawaiian or other Pacific Islander and American Indian or Alaska Native
- 3 percent Hispanic/Latino
I. Background/Influence
   a. Vanderbilt/GA Tech Outreach
   b. NIH IRACDA Program Experiences/Morehouse

II. Hampton University Trajectory
   a. Bioinspired Polymer Engineering Lab (HU)
   b. Balancing Research, Service, and Teaching
   c. My Trajectory

III. Student Impact
Vanderbilt and GA Tech Outreach

• Active in mentoring both high school and undergraduate students
NIH IRACDA Program

- Institutional Research and Academic Career Development Awards (IRACDA) (K12)
- Emory University- (Fellowships in Research and Science Teaching) FIRST Program
NIH IRACDA Program

Year 1: ~80% research, 20% teaching preparation
Year 2: ~75% research, 25% teaching
Year 3: ~75% research, 25% teaching
One year as non-tenure track faculty at Morehouse
“Typical” Responsibilities as Assistant Professor at HBCU

• 8-12 credit hours of courses
• Service committees
• Research
• Student Support!
Grants are available!

- NSF
- NIH
- DOE, DOD
- Private Funding
QUALITY EDUCATION FOR MINORITIES (QEM) NETWORK

Professional Development Workshop on Research Mentoring of Early Career STEM Faculty at Historically Black Colleges and Universities (HBCUs)
Hilton Baltimore BWI Airport, 1739 West Nursery Road, Linthicum Heights, MD
February 26-27, 2016

CAREER ADVANCEMENT PLAN (CAP)

The purpose of the Career Advancement Plan (CAP) is to provide you with a framework for planning and monitoring the steps you are taking/plan to take to advance your career in four critical areas: (1) Promotion to Associate Professor; (2) Achievement of tenure at the rank of Associate Professor/Professor; (3) Scholarly productivity (proposal preparation; preparation and publishing of research papers; and research presentations at professional meetings); and (4) Mentoring/instruction/professional development of STEM underrepresented minority students. Over time, you may need to periodically revise and/or make additions to your CAP.

**GOALS:** Briefly describe below goals and objectives you wish to achieve in each of the four critical areas and briefly describe the activities in which you propose to engage to accomplish the objectives required to meet each goal.

**OBJECTIVES:** For each goal, describe measurable objectives that will enable you to achieve that goal.

**ACTIVITIES:** Briefly describe the activities in which you propose to engage to accomplish each of these objectives.

**SKILLS/RESOURCES NEEDED:** Briefly describe the skills you will use/develop and the resources you will need to carry out these activities.

**TIMELINE:** Provide the proposed timeline for starting and completing each activity, assuming the resources needed are available.
<table>
<thead>
<tr>
<th>GOALS</th>
<th>OBJECTIVE(S)</th>
<th>ACTIVITIES</th>
<th>SKILLS/RESOURCES NEEDED</th>
<th>TIMELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do I want/plan to achieve?</td>
<td>What do I need to do to realize this goal? (Must be specific/attainable/measurable)</td>
<td>Methodology – What specific activities will I undertake to achieve each objective listed?</td>
<td>Resources/assistance from Research Mentor (RM) and Dean/Chair (DC)</td>
<td>When will I start/complete each of the activities listed?</td>
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<tr>
<td>GOAL I: Promotion to Associate Professor</td>
<td>Objective 1. Research establishment/scholarly deliverables</td>
<td>1.1 Active writing of 3 research proposals 1.2 Attending grant writing workshops 2.1 Attending on campus workshops 2.2 Attending off campus workshops</td>
<td>-access to genomics core facilities -environmental/resource description documents -sharing of network/contacts -reviewing prepared proposals</td>
<td>-complete P20 portion by 3/11 -complete SC2 by 4/30 -complete RIA intent by 6/1</td>
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<td></td>
<td>Objective 2. Excellence in teaching/mentoring</td>
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<td>GOAL II: Achievement of Tenure at Associate/Full Professor Level</td>
<td>Objective 3. Become a leader in bioinspired polymer engineering</td>
<td>3.1 Attend 3 major conferences per year. 3.2 Publish 2 papers per year in peer reviewed journals 4.1 Propose new bio-themed courses in chemical engineering. 4.2 Transition department to chemical and biomolecular</td>
<td>-increase awareness of travel awards -reviewing manuscript drafts -review of new course proposals</td>
<td>-curriculum proposals are to be completed by the end of Fall 2017</td>
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</table>
My Trajectory

Assistant Professor (tenure track)

Associate Professor

Chair
Fundamentally, we are interested in polymer composite theory, “natural” micro/nanoparticles, novel advanced manufacturing techniques and cell/ECM interactions.
III. Student Impact
Engineering identity is key for student success

• Study in collaboration with Dr. Isi Ero-Toliver (Hampton University-Biological Sciences)

• Previous studies have shown that participation in authentic research experiences has an influence on students’ level of engagement, interest in science, and retention in STEM majors and careers.

• Engineering identity is key for students to have a sense of belonging.
### Demographics and Sample Questions

#### Table 1. Racial Self-Identity and Gender

<table>
<thead>
<tr>
<th>Racial/Ethnic Identification</th>
<th>Percentage of Sample</th>
<th>Gender</th>
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<tbody>
<tr>
<td>African American or Black</td>
<td>85.7%</td>
<td>Female 66.6%</td>
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<tr>
<td></td>
<td></td>
<td>Male 33.3%</td>
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<tr>
<td>More than one race</td>
<td>14.2%</td>
<td>Female 0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male 100%</td>
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#### Table 2. Sample questions from the PITS Survey

<table>
<thead>
<tr>
<th>Factor</th>
<th>Individual Item on PITS survey</th>
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<tbody>
<tr>
<td>Project Ownership</td>
<td>I am confident that I can use scientific literature and reports to guide my research</td>
</tr>
<tr>
<td></td>
<td>I have discussed my research in this course with my friends.</td>
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<tr>
<td>Scientific Identity</td>
<td>The daily work of a scientist is appealing to me.</td>
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<tr>
<td></td>
<td>I have come to think of myself as a scientist.</td>
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<tr>
<td>Self-Efficacy</td>
<td>I am confident I can generate a research question to answer</td>
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<td>I feel like I belong in the field of science.</td>
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Preliminary results suggest that undergraduate research gives students a sense of belonging

- **78.5%** of the students felt they belonged in the field of science/engineering. Some of the students personally knew scientists in their field of interest and stated that this partially influenced their decision to enter STEM fields.

- **72%** of the students stated that during their summer internships outside their current university, they were encouraged by their research mentors (none that were African American) to pursue graduate degrees and so they felt somewhat welcomed to join the field.
Preliminary results suggests that undergraduate research gives students a sense of belonging.
Social support appears to be a likely barrier to students in achieving an engineering identity.

Rating Scale:
1-Not at all likely
5-Extremely Likely
Summary

• A majority of our students felt they belonged in the field of science/engineering.

• A majority of our students found the daily work of a scientists/engineers appealing and looked forward to being part of a larger scientific community over time.

• Over time, we anticipate a higher level of project ownership and increased networking as students experience novel findings.
Chemical engineering junior selected for student group that spoke with VP Kamala Harris

https://www.youtube.com/watch?v=MxHqUi3AzDQ
I am looking for a postdoc (polymeric materials)

**Hampton-Brandeis PREM**

**Chemistry**
- Photo-responsive metallohydrogels

**Inorganic photonic materials**

**Physics**
- Mixed halide perovskites

**Electrical Engineering**

**Chemical Engineering**
- Optoactive polymeric materials

**Optofluidics**
- Research that combines the advantages of microfluidics and optics.

**Applications**
- Displays, Biosensors, Lab-on-chip devices, and energy

**Psychology**
- Education and Outreach Activities