



*Inter-agency Collaborations: Federal Agencies Working with  
Colleges and Universities to Offer Interdisciplinary Training in  
Remote Sensing, Ocean, and Marine Science*

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# Introduction

This paper documents the results of these interagency collaboration efforts:

- To attract and retain students in engineering and limnological, ocean, marine and atmospheric-related science through postdoctoral levels, and
- To retrain individuals with experience in other disciplines for careers in these fields.



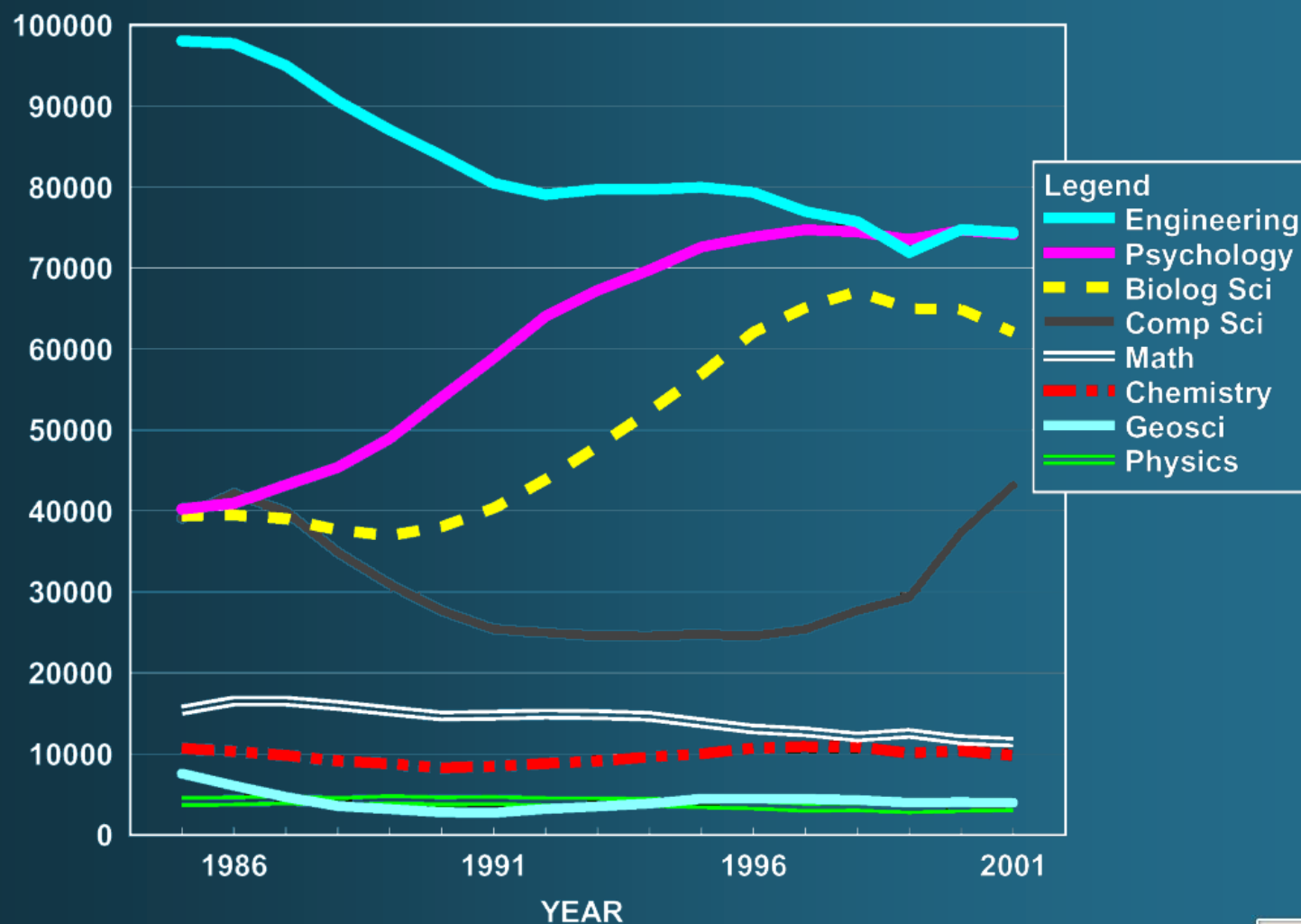
In particular, this paper looks at how effective these collaborations, over the past ten years, have been in allowing NOAA to achieve its goals of a diverse scientific work force.



*The need to develop all the nation's science and engineering talent demands a commitment that goes beyond policy and polemic. It will require a comprehensive and collaborative effort (Colwell, 2003).*

From a pure statistical standpoint, the total number of Blacks and Hispanics receiving PhDs in the science, engineering, technical and mathematical (STEM) fields has decreased.

## Total number of bachelor's degrees granted by discipline, 1985 to 2001

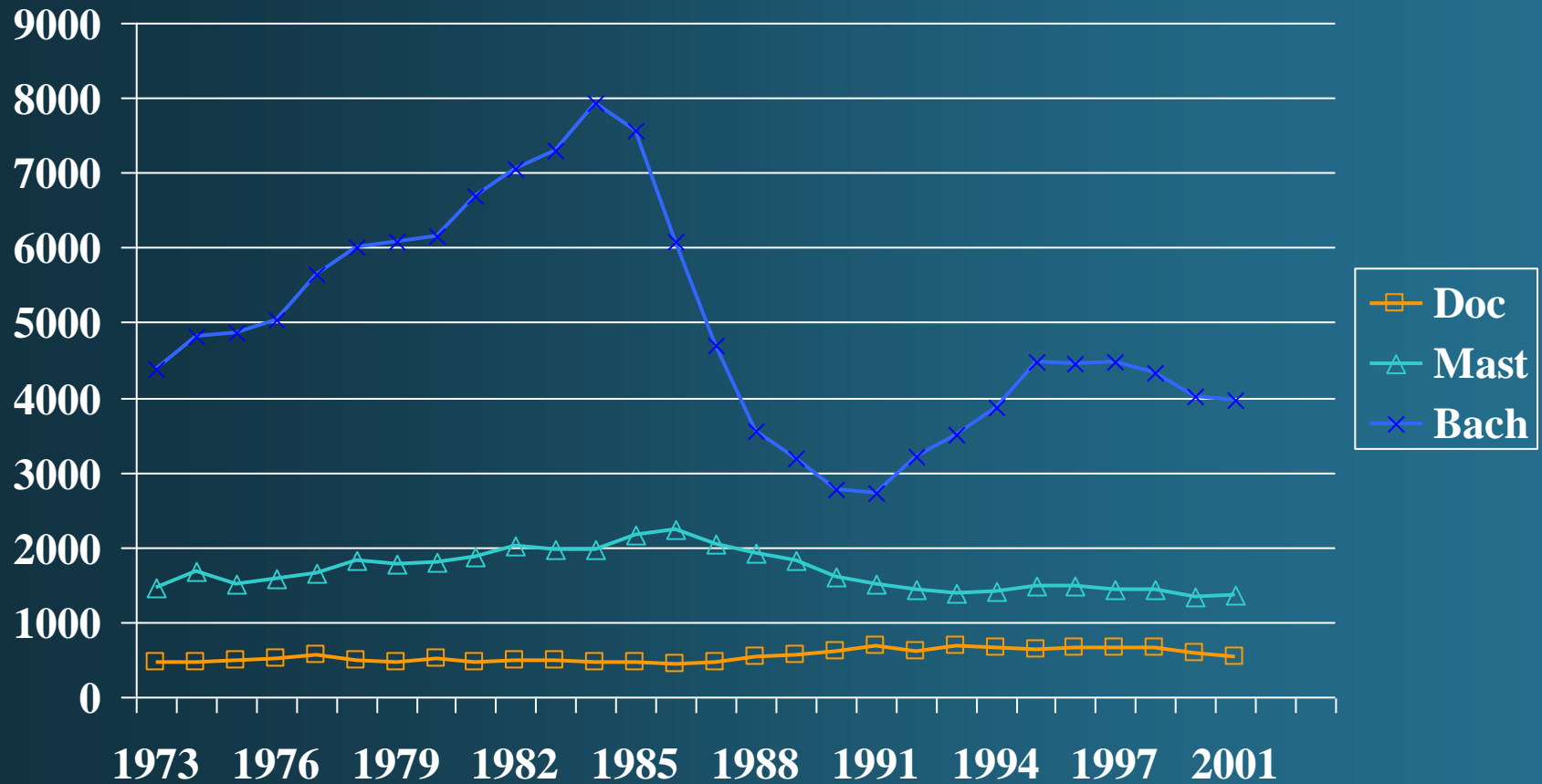


Source: AIP Statistical Research Center compiled data from NSF WebCASPAS Database System, February 2004



# Geosciences Degrees Granted 1973-2001

Source: NSF WebCASPAR



# HBCU's & Geosciences



It is crucial to note that almost 30% of the total (336) bachelors degrees earned in the geosciences over the five year period, 1996 – 2001 were awarded by degree-granting departments at HBCU's.

# **African-American Bachelor's in the Geosciences**

**Departments that awarded the largest number of bachelor's over the last 5 years**

## **African-American five-year totals**

<b>42</b>	<b>Hampton University (VA)</b>
<b>15</b>	<b>Spelman College</b>
<b>14</b>	<b>United States Naval Academy (MD)</b>
<b>13</b>	<b>Savannah State University</b>
<b>11</b>	<b>Elizabeth City State University</b>
<b>11</b>	<b>Jackson State University</b>
<b>7</b>	<b>University of Oklahoma, Norman</b>
<b>7</b>	<b>CUNY City College</b>
<b>7</b>	<b>Cleveland State University</b>
<b>5</b>	<b>University of South Carolina at Carolina State</b>

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<b>336</b>	<b>Total Number of African American geoscientists from all degree-granting departments, 1996 through 2001</b>
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# Bachelor's Degrees Awarded in Selected Fields by Race

## Class of 2001

	African American %	Hispanic American %	Total Number
Psychology	10	8	74,124
Computer Science	10	5	43,597
Business & Management	9	8	275,287
Chemistry	8	7	9,815
Biological Sciences	8	7	62,010
Mathematics & Statistics	7	5	11,437
Education	7	6	118,492
Engineering	8	7	71,825
Physics	4	4	3,447
Geosciences	1	4	3,968
<b>TOTAL</b>	<b>8</b>	<b>7</b>	<b>1,260,308</b>

Engineering includes Engineering Technologies

Source: NSF WebCASPAS database. Compiled by AIP Statistical Research Center





# Hispanic-American Bachelor's in the Geosciences

Departments that awarded the largest number of bachelor's over the last 5 years

## Hispanic-American five-year totals

58	University of Puerto Rico – Mayagüez
29	United States Naval Academy (MD)
19	Texas A&M University
16	University of Texas – El Paso
14	Stanford University
14	University of Texas – Austin
12	University of New Mexico
10	University of Washington – Seattle
9	University of California – Santa Barbara
9	University of Arizona
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618	Total Number of Hispanic American geoscientists from all degree-granting departments, 1996-2002

# **African American PhDs in the Geosciences**

**Universities that awarded the largest numbers of PhDs, 1973-2002**

## **African American totals over the last 30 years**

**9U of Texas – Dallas**  
**8Jackson State University**  
**8 U of Michigan**  
**6U of California – Los Angeles**  
**6 U of South Carolina**  
**6 U of Arizona**  
**6 U of Wisconsin**  
**5U of Washington**  
**5 U of Texas – El Paso**  
**4 Georgia Institute of Technology**  
**4Harvard University**  
**3U of California – Santa Cruz**

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**117Total Number of African American Geoscience PhDs**  
**Awarded by all Universities from 1973 through 2002**

# Hispanic American PhDs in the Geosciences

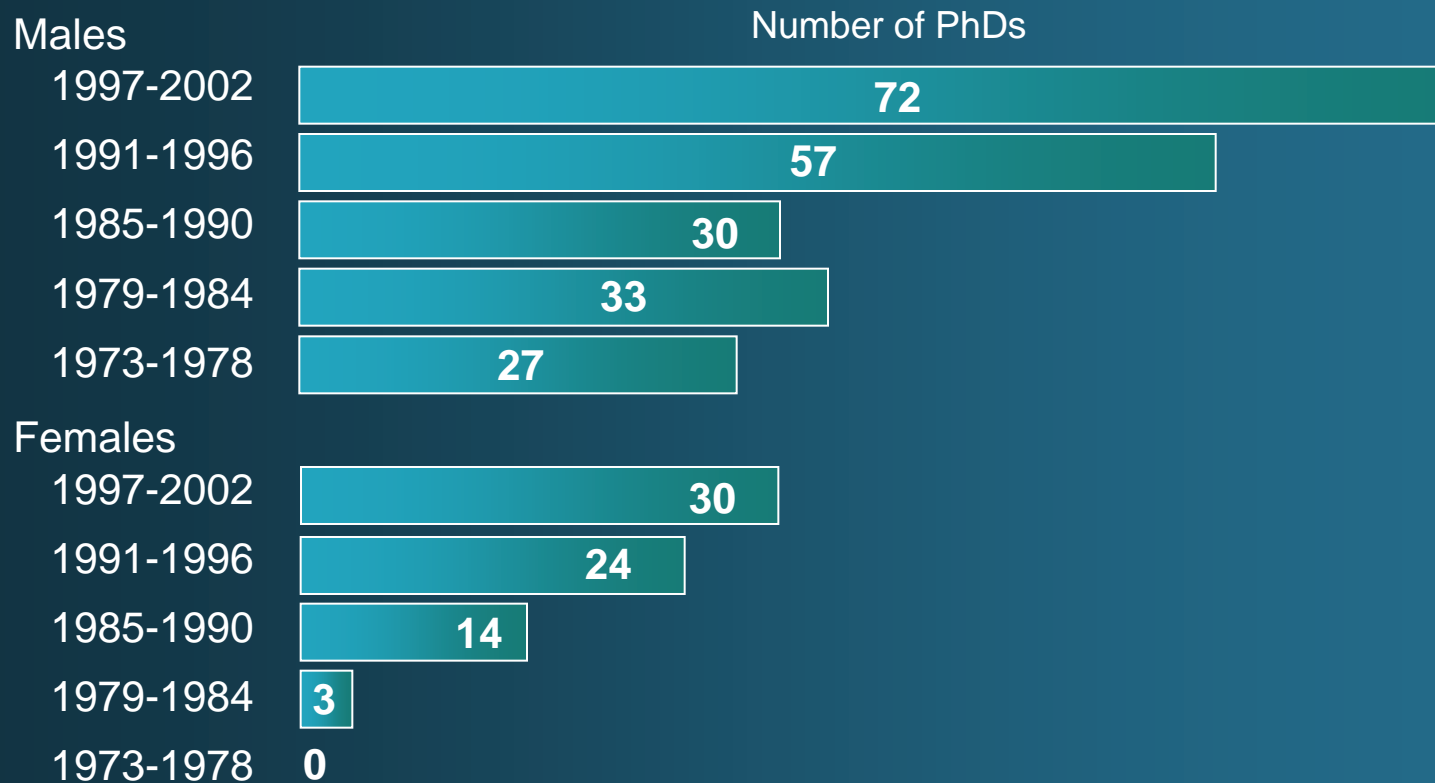
Universities that Awarded that Largest Numbers of PhDs, 1973-2002

## Hispanic American Totals over last 30 years

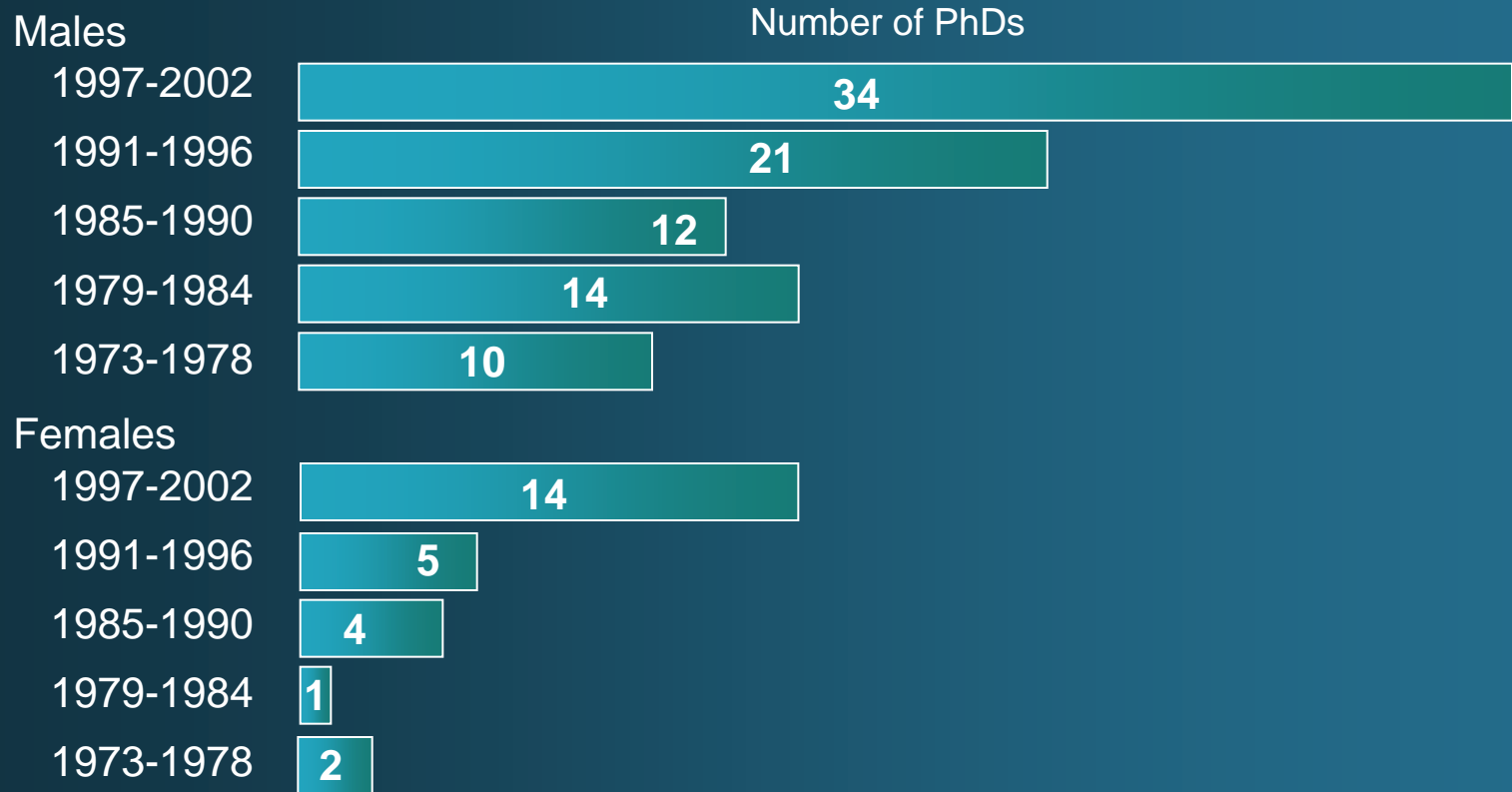
- 14 Texas A&M
  - 13 U of Arizona
  - 12 U of California – San Diego
  - 12 U of California – Santa Cruz
  - 11 Stanford University
  - 10 U of Puerto Rico – Mayagüez
  - 8 Mass Institute of Technology
  - 8 U of Colorado – Boulder
  - 8 U of Michigan
  - 7 Columbia University
  - 7 U of California – Berkeley
  - 7 U of California – Los Angeles
- 

**294 Total Number of Hispanic American Geoscience PhDs  
Awarded by All Universities from 1973 through 2002**

# Number of Hispanic-Americans Who Earned PhDs in the Geosciences by Gender and Degree Years: 1973-2002



# Number of African-Americans Who Earned PhDs in the Geosciences by Gender and Degree Years: 1973-2002





# Recommendations



A gulf still separates minority and majority participation in scientific fields which NOAA depends on to meet its mission and honor the public trust (Jearld, 1999).

This gulf also exists within other agencies.  
How can we change this?

# Clarifying the Link

We need to clarify the link to employment for higher education programs supported by federal agencies. For example, a program or an institution may get a Memorandum of Understanding (MOU) or funding to train students that includes internship opportunities at NOAA, but there is no defined connection after that step.

To ensure a healthy collaboration, agencies need to move away from merely employing internships without any commonly defined mission, structure, or planning effort.



# Examination and Consideration

We need to examine if there are unconscious biases during the application process. Are we perhaps valuing degrees from major research universities more than we do those from HBCU's?

We need to consider if we are unwittingly constructing a two-tiered system that values diversity in internships (Hayden, 2004), temporary research positions, and the like, while reinforcing the status quo in permanent employment.

In other words, if there is a tendency for the agency to cultivate a “farm team system” through internship appointments which includes appointment of minorities, which precludes them from being hired into permanent positions at the same rate as non-minorities?





# Collaboration

Let us return to collaboration. How can collaboration help us achieve the changes outlined previously?

We need to return to the true definition of a collaborative relationship. A relationship that has mutual goals, a jointly developed structure and shared responsibility, mutual authority and accountability for success, and sharing of resources and rewards, (Weiner, M.)

In short, we need a collaboration in which working together accomplishes something that cannot be accomplished alone. No where is this more critical than in changing the culture of an agency in terms of diversity.



# Programs that Work

We need to actively identify, support, and learn from programs that have added to the professional workforce.

Existing programs include:

## **ASLO Minorities Program, Hampton University**

Ben Cuker (NSF) <http://www.hamptonu.edu/science/ASLO.htm>

## **Minorities in Marine Science Undergraduate Program MIMSUP**

Brian Bingham (NSF) <http://www.wvu.edu/~mimsup>

## **Center of Excellence in Remote Sensing Education and Research, ECSU**

Linda Hayden (NAVY) <http://cerser.ecsu.edu>

## **JSU Program in Fisheries Stock Assessment, MS**

Paulinus Chigbu (NOAA) <http://ccaix.jsu.edu/~marine/info.html>

## **CEA-CREST Programs**

Carlos Robles (NSF) <http://cea-crest.calstatela.edu>

## **Collaboration to Integrate Research and Education (CIRE) Program**

Matt Gilligan (NSF)  
<http://www.savstate.edu/scitech/MarineSci/MBI.html>





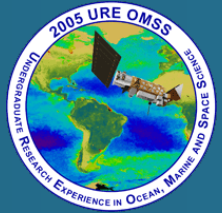
# California State University



CEA-CREST (pronounced "sea crest") offers students exciting opportunities for focused and interdisciplinary research in the environmental sciences. Student Fellows participate in the center research teams, the interdisciplinary curriculum, and the university accredited internships with off-campus agencies. Teams of senior scientists from biology, chemistry, geography, geology, and engineering advise student collaborators in four emphasis areas:

- 1.Coastal marine population dynamics
- 2.Monitoring changing ecosystems at multiple spatial scales
- 3.Molecular genetics in evolution, ecology, and conservation
- 4.Biogeochemical processes
- 5.Hydrology of regional aquifers and riparian areas in arid zones

# Elizabeth City State University



The existing URE- Ocean, Marine and Space Science program supports active research participation by undergraduate students in areas of interest to the Office of Naval Research and NASA. The program is based on a model for undergraduate research programs supported by the National Science Foundation. URE projects feature high quality interaction of students with faculty and/or other research mentors; access to appropriate facilities; and professional development opportunities.

The objective is to promote the professional development of minority undergraduate students through their participation in ongoing Ocean and Marine Science research.



# Jackson State University



NOAA and JSU introduced science and technology students to studies in fisheries science. The class was taught by scientists from NOAA's National Marine Fisheries Service and from the Jackson State University faculty. Many costs were covered. Students earned credit, and spent time at a NOAA Fisheries Laboratory for an additional four-eight weeks experience in fisheries research and stock modeling once you finish.



# Hampton University

**ASLO** Advancing the science of  
limnology and oceanography



Hampton University, the American Society of Limnology and Oceanography (ASLO), and the National Science Foundation offer special opportunities for under-represented minority students (undergraduate and graduate) interested in aquatic sciences (oceanography, limnology, stream ecology, marine biology, fisheries, etc.).

Minority students are provided full support (travel, housing, food, and registration) to participate in the annual meetings of ASLO. Students will gain valuable learning experiences and exposures to the most recent developments in the aquatic sciences. Participants make important professional contacts that will help them achieve academic and career objectives.





# Savannah State University

The program at SSU consists of a mixture of lectures, laboratories, field trips, and collaborative learning sessions to introduce students to marine science and the scientific method. At the Harbor Branch Oceanographic Institution (HBOI), students learn about careers in marine science, are introduced to ongoing research at the institution, and work (in groups of 2 or 3) on research projects under the supervision of a staff scientist.

At both locations, the program includes visits to other marine laboratories and field trips to a diversity of marine habitats. Students are introduced to oceanographic methods aboard the R/V Blue Fin at the Skidaway Institute of Oceanography and participate in a research cruise aboard a research vessel at HBOI.





# Partnerships

We have current, effective, partnerships with universities that are changing the rate of graduation for minorities overall, as well as within the agency's fields of interest. The partnership with Elizabeth City State University is a prime example. What we do not have yet, and what we need if we are ever to achieve parity, is a clear relationship between training and employment.

The collaboration we need to develop now, in addition to continuing our work in expanding opportunities, is to collaborate within the NOAA structure to allow for the training, hiring, and advancement of women and minorities.

# SUMTP

We need a current version of NOAA Scientific Upward Mobility Training Programs (SUMTP).

Only by creating a true collaboration between training and employment can NOAA reach its goal of achieving meaningful diversity and reflecting, more accurately, the face of America in the twenty-first century.



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