

NP Traineeship Awards: Overview and Outlook

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Outline: NP Pilot Program

- ▶ Creation and Awards
- ▶ Preliminary Assessment
- ▶ Future Directions



25 Years Ago

National and university laboratories have also committed resources to recruit students from Historically Black Colleges and Universities (HBCU's) and Hispanic Serving Institutions (HSI's) to participate in the laboratories' summer science research programs. These programs sometimes include support for HBCU faculty participation. For example, CEBAF's efforts have contributed to a significant growth in faculty hirings in HBCU's and HSI's. As a result, Hampton University has developed a new Ph.D. program and graduated about 20 undergraduates, all African American, one third of whom have done research in nuclear science. Mentoring programs for promising minority undergraduate have been instituted by CEBAF and various universities.

Programs initiated over the past several years, as well as laudable efforts at several leading research universities and laboratories, attempt to address the paucity of women and minorities in the field. Nuclear Scientists have been very active in these programs, such as the American Physical Society Women in Physics project. However, there is still a severe underrepresentation of women and minorities in physics and the community must continue its efforts to correct this situation.

Nuclear Science: A Long Range Plan

The DOE/NSF Nuclear Science Advisory Committee



February 1996

U.S. Department of Energy
Office of Energy Research
Division of Nuclear Physics

National Science Foundation
Division of Physics
Nuclear Science Section

NP Pilot to Build a More Diverse Community

Lack of diversity in the NP community is a persistent impediment to reaching the communities full potential. Activities exist within the community to build on:

- Several national labs have strong connections to MSIs and HBCUs with faculty engagement, summer schools, and intern programs (SULI etc).
- Several HBCUs and MSIs have NP funded research programs including an HBCU which is part of a center-of-excellence graduating 10% of all Nuclear Physics Ph.D.s.

Yet, In 2019, out of 88 NP-supported students receiving their Ph.D.'s, only 5% were Black or Hispanic; nearly a factor of 7 below representation in the US population.

Concept for the Pilot Program

Many existing programs, while providing benefits, appear to leave most participants feeling like nuclear physics is great but not the choice for them

Our goal has been to address this gap with a pilot program informed by

- 1) personal mentoring experience and observations of the NP portfolio,
- 2) community reports esp. TEAM-UP,
- 3) examples of effective efforts from within our community,
- 4) many phone calls with PIs from MSIs, HBCUs, and R1s, enthusiastic supporters, hesitant skeptics, etc.

This led to the concept of paid, long-term, research traineeships for undergraduates with an emphasis on faculty-to-faculty engagement; organically grown within the research community.

Goals for the Pilot Program

Leverage existing infrastructure; Enable research groups from National Labs and Universities to work with MSIs and provide training and **mentorship for undergraduates.**

Create **extended duration** traineeships to provide financial and mentoring support during the **summer and academic year**

Remove barriers to graduate school following recommendations of the TEAM-UP Report:

- Increase a **sense of belonging**
- Facilitate the development of a **physics identity**, and
- Provide support to **help students advance academically while earning money**

Answer key questions like, *“how much interest will there be?”*

Provide guidance for further efforts within NP and across the DOE

Interest From the Field



Detail of two San Francisco Bay Area collaborations



NP Pilot Program: Community Response

- ▶ Interest exceeded expectations
- ▶ NP received 36 proposals to create collaborations with more than 40 MSIs, and to host over 200 trainees.
- ▶ The enthusiastic response of the NP Community was noticed across DOE, and by Congress.
- ▶ The requests for funding exceeded planned funding (~\$3M) by a factor of 4 (\$12M). This made selecting awards a challenge.



- ▶ **Tan Ahn** (*Notre Dame, Nuclear Experiment, Experienced Undergrad Mentor*)
- ▶ **Ketevi Assamagan** (*BNL ATLAS Experiment, NSBP, Outstanding Mentor, co-founder of African School of Physics*)
- ▶ **Brian Beckford** (*DOE, HEP Intensity Frontier Program Manager, AIP Team-up Task Force*)
- ▶ **Tommy Boykin II** (*UMD, Cond. Matter Exp., APS Bridge Program Grad, Inclusive Graduate Education Network Advisory Board*)
- ▶ **Juan Burciaga** (*Colorado College Vis. Prof., Molecular Theory and interstellar space, AAPT, Education Officer NSHP*)
- ▶ **Jason Detwiler** (*UW Nuclear Experiment, Early Career Award, Physics Dept. Mentoring Award, Breakthrough Prize*)
- ▶ **Paul DeYoung** (*Hope College, APS Outstanding Research and Mentoring at an Undergrad Inst.*)
- ▶ **Evie Downie** (*GWU, Nuclear Experiment, Muse, Committee on the Status of Women in Physics*)
- ▶ **Renee Fatemi** (*UK, Nuclear Experiment, STAR, g-2, Excellent Undergraduate Research Mentor Award*)
- ▶ **J'Tia Hart** (*Nuclear Engineer, ANL, WIST Program Initiator, Co-chair High School Research Program, City Year Chicago Board*)
- ▶ **Roy Lacey** (*Stony Brook, Chemistry Dept., Nuclear Experiment, STAR, AAPT, NSTA*)
- ▶ **Dina Myers-Stroud** (*Executive Director Fisk-Vanderbilt Bridge Program*)
- ▶ **Jesus Pando** (*DePaul U, Nuclear Experiment, National Society of Hispanic Physicists, SACNAS*)
- ▶ **Diana Parno** (*Carnegie Mellon, Nuclear Experiment, Organizer LGBT+ Physics advocacy group, Best Practices*)
- ▶ **Carol Scarlett** (*Florida A&M, Nuclear Theory, Axion Tech LLC.*)
- ▶ **Yolanda Small** (*York College/CUNY, Theoretical Chemist, Chair Undergraduate Research Symposium*)
- ▶ **Daniel Tapia Takaki** (*Kansas, Nuclear Experiment, ALICE and CMS Collaborations*)



NP Pilot Program: Award Selection

21 awards total: 10 awards in Phase 1;
11 awards in Phase 2

HEP is partially funding 8 awards

NP support: Medium Energy, Fundamental Symmetries, Nuclear Theory, Nuclear Data, Nuclear Structure & Nuclear Astrophysics, Accelerator R&D

5 DOE Labs, 1 DOE User Facility,
2 Centers of Excellence, and
37 Colleges and Universities



NP Pilot Program: Award Selection



- ▶ Center at FRIB “The Institute for Nuclear Science to Inspire the next Generation of a Highly Trained workforce” (INSIGHT)
 - ▶ Center to support and coordinate a nationwide traineeships effort
 - ▶ Also offers traineeships at FRIB by leveraging its scientific opportunities
 - ▶ Will be run by Geraldine Cochran starting 22 November
- ▶ Dissemination through conferences
 - ▶ DNP
 - ▶ NSBP
 - ▶ April APS (planned)



NP Pilot Program: Demographic Information

5 DOE Labs, 1 DOE User Facility, 2 Centers of Excellence, and **37 Colleges and Universities**

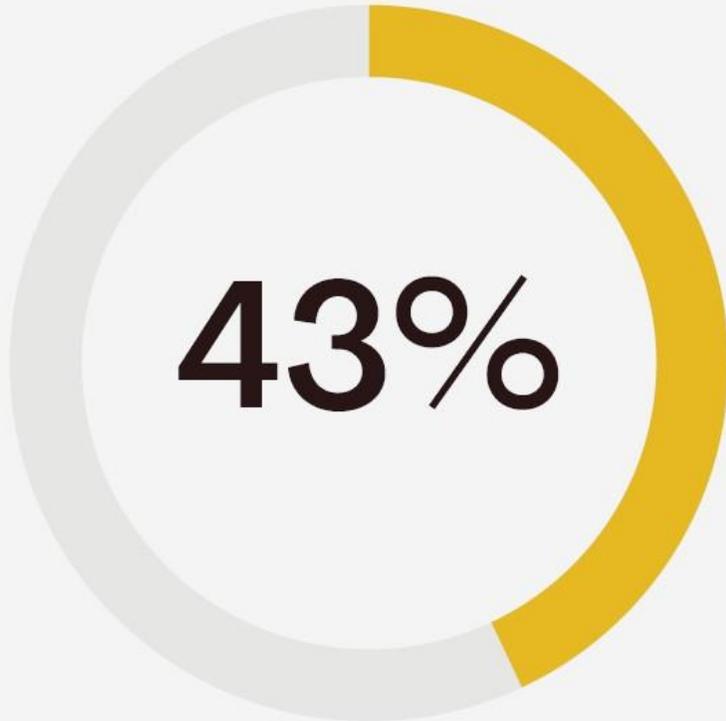
73% of academic institutions are Minority Serving Institutions (MSIs)

- ▶ 14 Historically Black Colleges or Universities (HBCUs)
- ▶ 9 Hispanic Serving Institutions (HSIs)
- ▶ 1 Black Serving Institution
- ▶ 1 Predominantly Black Institution (PBI)
- ▶ 2 Asian American and Native Pacific Islander Serving Institutions (AANAPISIs)
- ▶ 1 Native American Serving Institution



Dr. Felecia Commodore

NP Pilot Program: Demographic Information



The average percentage of Pell Grant awardees at participating institutions

Federal Pell Grants usually are awarded only to undergraduate students who display exceptional financial need and have not earned a bachelor's, graduate, or professional degree.

Source: <https://studentaid.gov/understand-aid/types/grants/pell>

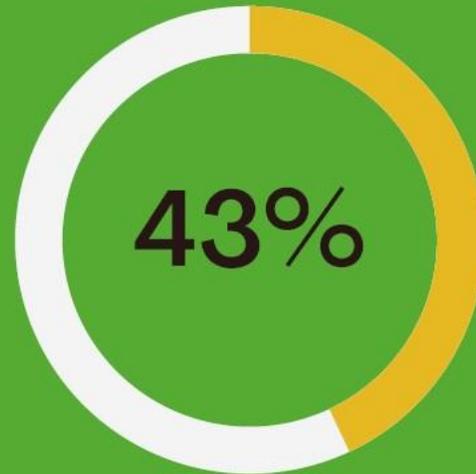


NP Pilot Program: Demographic Information

Average Pell Grant
Population at
Participating
HBCUs



Average Pell Grant
Population at
Participating HSIs



Average Pell Grant
Population at
Participating Non-
MSIs



Example 1: Coordinated Through DOE Lab

Broad effort led by BNL with significant organizational and research infrastructure. Stony Brook provides catch-up coursework for participants if needed.

Supports 10 traineeships for two-years including 16 hours of educational and research programs at their universities during the academic year, and full-time research during a 10-week summer residence at BNL

Strong Faculty-to-Faculty engagement. 4 HBCUs, 1 HSI, and Stony Brook

Leverages the Office of Educational Programs (Noel Blackburn) with strong connections to a number of MSIs and HBCUs.



Example 2: Coordinated Through Community College

Led by Skyline College (Wamba and Hein) leveraging research groups supported by DOE at SLAC and Stanford. **Includes funds for lab infrastructure at Skyline.**

Strong Faculty-to-Faculty collaboration

Supports four research traineeships per year focused on local research opportunities.

Includes many community outreach components: Students learn about nuclear physics and share their knowledge with their communities.

Paraphrasing Emilie Hein: *I'm impressed with how inspired the students have been and how they have jumped in, learned the skills, and integrated into to the work at SLAC and Stanford.*



Kolo Wamba



Emilie Hein



Gratta group at Stanford and the nEXO group at SLAC

Example 3: Coordinated Through DOE Lab

Aims to recruit indigenous women from the Four Corners Region and nearby Fort Lewis College.

Opportunities for 4 trainees. Two paired internships per year with access to Native American Groups, resources and outreach activities.

Students will help design and 3D print optical connectors, take and analyze cosmic data.

Participate in detector installation and monitoring.

Two-week visit to CERN: tour the LHCb cavern. Five-day data acquisition shift controlling the experiment

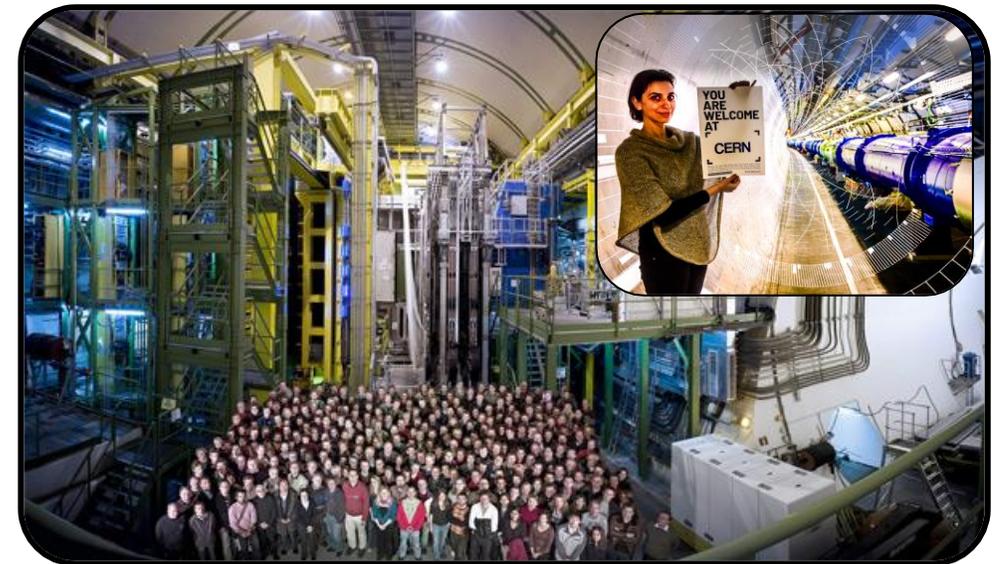
Daily interactions and mentoring with postdocs, CERN scientists and managers involved in the experiment.



Caesar de Silva, Los Alamos National Lab



Astrid Morreale, Los Alamos National Lab



The LHCb Experiment located at CERN in Geneva Switzerland

What We Can Learn from the Pilot

What is the **level of interest within the research community**? What arrangements will they find most useful for advancing the goals of the program?

What challenges will they face in **recruitment**? What activities, programs, resources, or procedures are most effective in enabling the recruitment of minoritized students into the field?

What challenges will they face in **retention**? What activities, programs, resources, or procedures are most effective in enabling the retention of minoritized students in the field.

What is a realistic expectation for the number of participants that can be recruited? Of those recruited, **how many will go on to study nuclear physics or a related field in graduate school? How many will receive a Ph.D.?**

For barriers to 1) recruitment, 2) retention, and 3) advancement, **what mitigation strategies can we build into potential next stages** of the program?

This program can continue to source ideas and strategies from leaders in the field who have demonstrated success. We will track what works and what doesn't to help develop best-practices.

Reaching a New Energy Sciences Workforce (RENEW)

** FY 2022 President's Request, SC-wide Initiative*



- Outreach
- Listening tours & round tables to:
- Gain understanding about challenges
- Develop evidence-based solutions



- Identify unique SC Lab opportunities
- Partner with MSIs & professional societies
- Implement action plan

Competitively support new traineeship awards resulting in:

- “Hands on” experiences, mentoring, enhanced workforce DEI



- Tracking of post-traineeship outcomes
- Assessing program effectiveness

Forward Looking: Conferences

- ▶ We don't know who we don't know - conferences are one way to fix that
- ▶ NP attended SACNAS for the first time
 - ▶ Society for Advancement of Chicanos/Hispanics and Native Americans in Science
 - ▶ National Diversity in STEM Conference
 - ▶ DOE has historically been absent from these conferences
 - ▶ Almost every other science agency attends and then some: NSF, NASA, NIH, NSA, SBA/DOC/NOAA, NIST, DOS, EPA, USGS, USDA, and the individual national labs
- ▶ In addition to finding people to reach out to, we can advertise DOE opportunities

Forward Looking: SC Resource Hub

- ▶ SC would like to make it easier for people to find funding opportunities
- ▶ Developing online resources
 - ▶ Creating hub of recorded presentations and other videos
 - ▶ Creating a corporate slide deck with one slide per program office and then slides on funding opportunities
 - ▶ For TBD, it would be nice to have the following:
 - ▶ A one-pager, brochure, recorded presentation, webpage

Forward Looking: WH Best Practices

- ▶ In September, the White House released "Best Practices for Diversity and inclusion in STEM Education and Research: A Guide by and for Federal Agencies"
- ▶ 16 Federal Agencies participating, including DOE
- ▶ NP can use the report as a checklist of recommended policies/ practices
 - ▶ Many are already satisfied by TBD

Thank you!

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