NCCentral UNIVERSITY

College of Health and Sciences

Promoting Undergraduate Minority Persistence in Nuclear Physics

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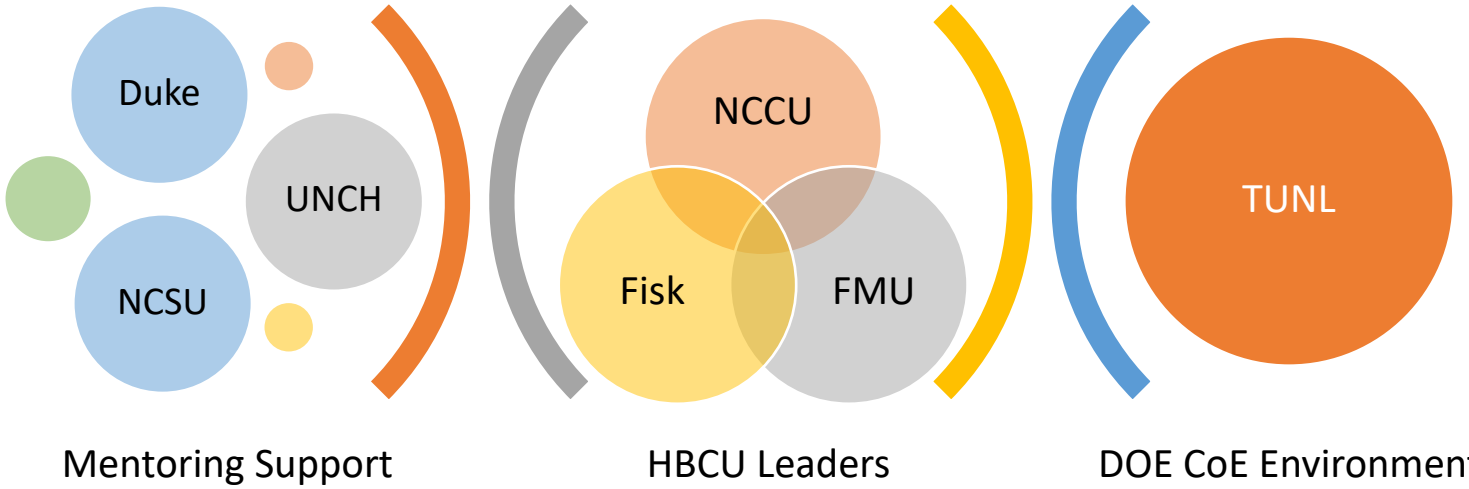
Discover what's Central to you

DOE partnership in a pilot study

Regional Training Program: Promoting Undergraduate Minority Persistence in Nuclear Physics (RTP: PUMP-NP)

Funded by DOE/ONP DE-SC0022545



DOE partnership in a pilot study

TUNL Mentors	Institution	Area of Research Expertise
M. W. Ahmed	**NCCU**	**Medium Energy NP/ Nuclear Structure, Dean CHAS, NCCU**
D. Markoff	NCCU	Neutrino Physics
C. R. Jackson	NCCU	Science Education Research/Nuclear Physics
C. R. Howell	Duke Univ.	Nuclear Structure / Medium Energy NP
P. Barbeau	Duke Univ.	Neutrino Physics
R. Longland	NC-State	Nuclear Astrophysics
M. Green	NC-State	Neutrino Physics
J. Gruszko	UNC-CH	Neutrino Physics
Non-TUNL Mentors		
S. Darko	**Florida Memorial U**	**Environmental Engineering, Provost and VC**
B. K. Wallace	**Fisk U**	**STEM Education / Rocketry and Robotics, Dean of Graduate School**

The core mission of the proposed program is to:

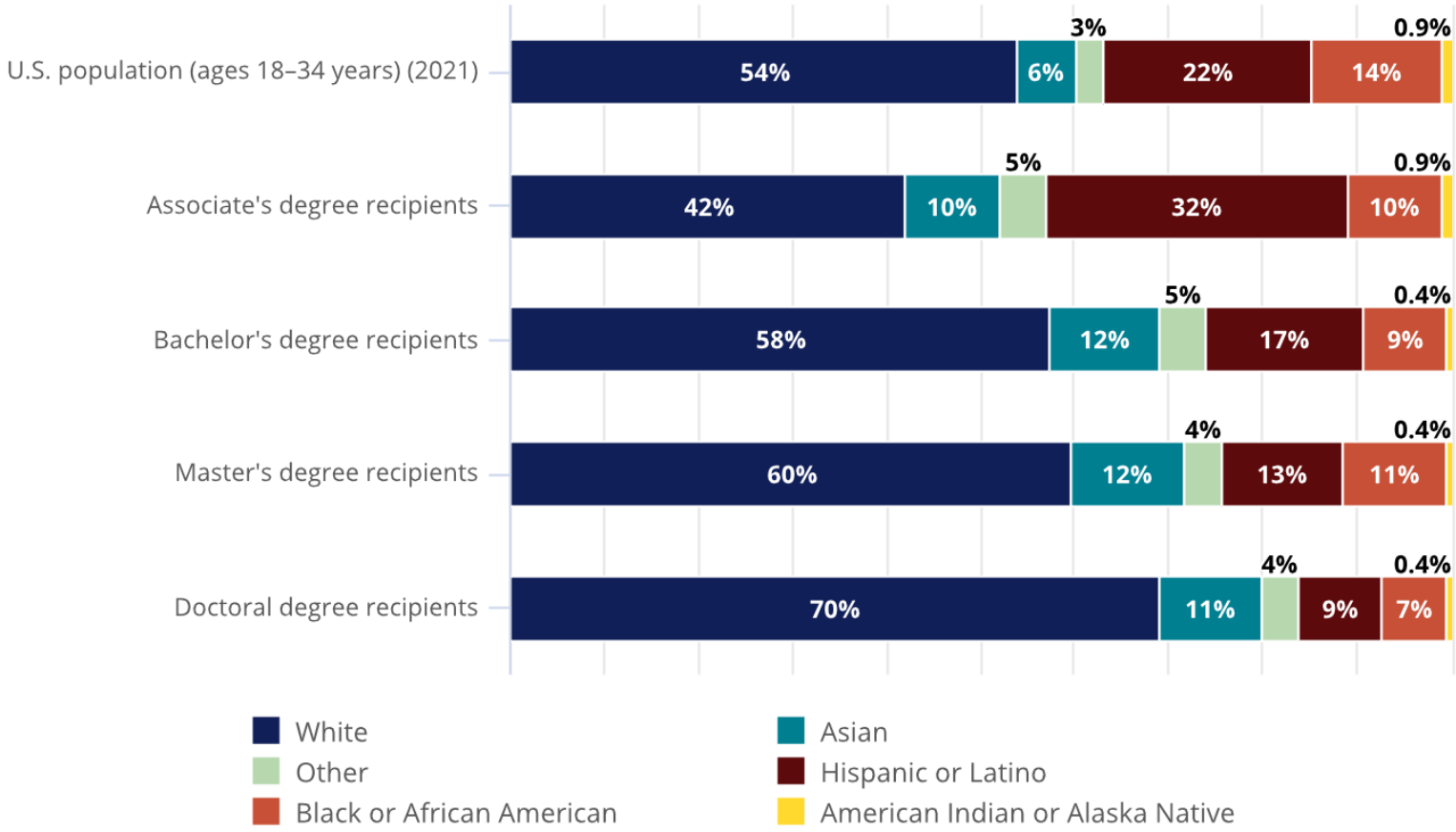
- foster an environment which nurtures in students a sense of belonging and being welcomed into the field of physics;
- help students perceive themselves as future scientists, and be perceived by others as physicists who would equally contribute to the advancement of science;
- provide roadmap to a new structure of engagement between those established in the field and minority students and their mentors.

S&E Degrees

National Center for Science and Engineering Statistics | NSF 23-315

Figure 7-4

U.S. population ages 18–34 and S&E degree recipients, by degree level and race and ethnicity: 2020

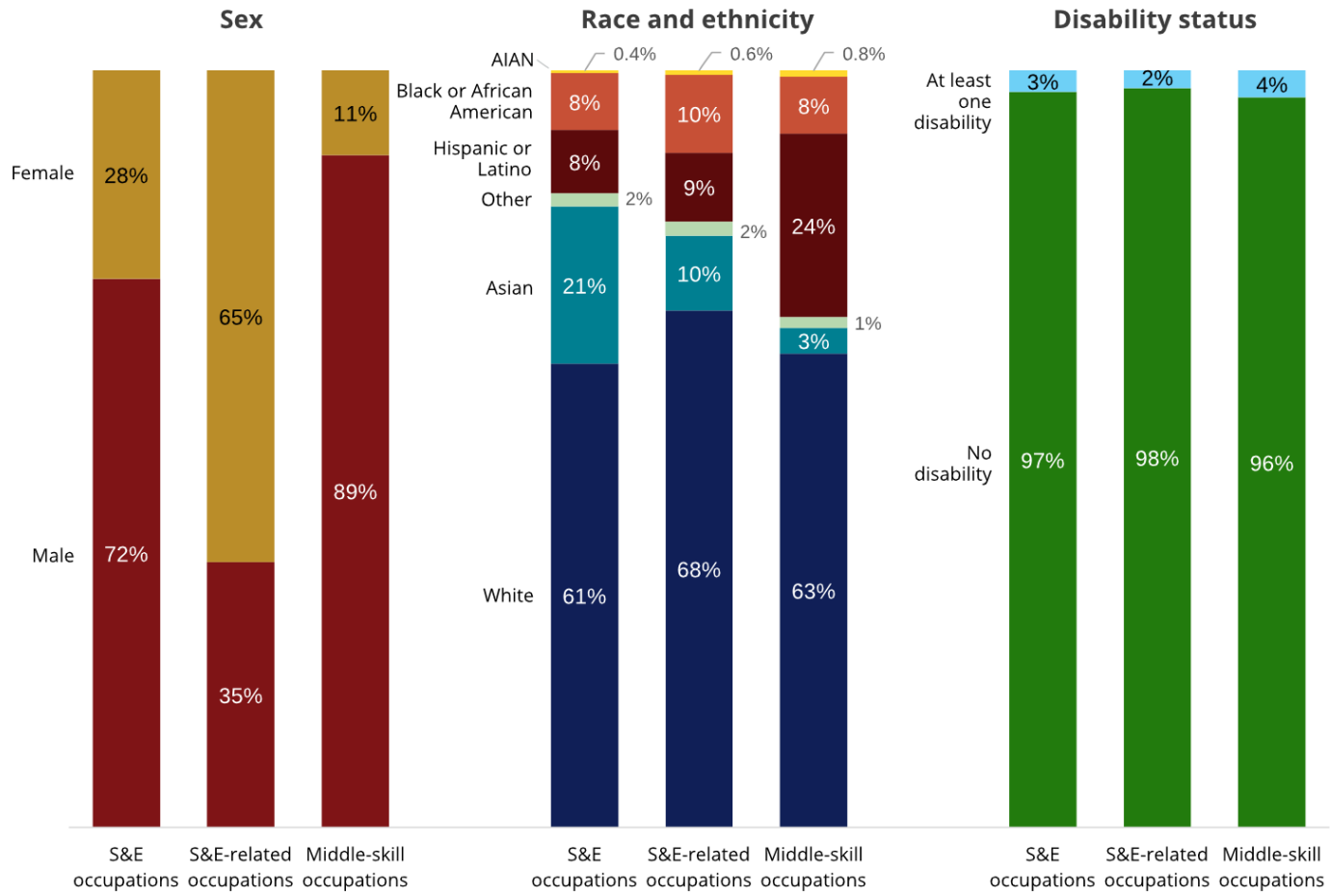


S&E Workforce

National Center for Science and Engineering Statistics | NSF 23-315

Figure 3-2

Characteristics of the STEM workforce ages 18–74, by occupation: 2021



Changing the (stereotypical) face of S&E

www.spsnational.org

Understanding what works

- Entering the realm of STEM for students from diverse backgrounds often involves **crossing a cultural boarder**.
- It is argued that when crossing this boarder, **minority students often confront societal barriers** that are difficult to navigate.
- **Negative stereotypes discourage minority students from choosing STEM careers**, and STEM fields are perceived as subjects reserved for certain people (Brenda R. Brand, 2006).
- Numerous studies have shed light on the best practices to cross these boarders, especially with **consciousness of learning preferences in African American students**.
- It is established that African American students have a preference towards a relational learning style. Their relational learning preference is characterized as **freedom of movement**, variation, **creativity, divergent thinking**, inductive reasoning, **focus on people,** cues from the environment, are **people oriented**, and prefer harmonious interaction (Berry, 2010).

What is DEI?

Image created by Imagine AI Generator

Inclusion is not bringing people into what already exists; ***it is making a new space, a better space for everyone***

- George Dei

How we created this new, better space

Removal of barriers which have persistently resisted the success of African American students: An example of finances

- **We made sure finances did not play a role in students' decision to join, or being part of the cohort**
- **Financial Equity**: we offered students in the traineeship the same financial package as the all other summer research students at TUNL;
- Upfront Stipends, fully pre-paid travel, housing, meal plans
- Onboarding management: Payroll, employment verification, bank deposits
- Local transportation

Images created by Imagine AI Generator

How we created this new, better space

Perceive themselves as future scientists, and where they are perceived by others as physicists: Developing the Identity

- Mentoring partnership of students at HBCUs with DOE Center of Excellence (TUNL) researchers; **Authentic Experience**
- Integration of **DOE traineeship** cohort with **NSF REU students**
- All students lived together at an apartment facility
- All students were subject to same expectations: projects, lectures, presentations
- All students are given the same opportunity to attend conferences after the summer is over
- Some of the students continue to do their senior thesis with TUNL faculty as advisors

Images created by Imagine AI Generator

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How we created this new, better space

Research experience with focus on development of knowledge base and technical skills: Example of Projects

- **Radioisotope Labeling of Plants**
- **GEANT-4 simulation to model neutron radiation dosage:** The Radiation Countermeasures Centers of Research Excellence
- **Cosmogenic Exposure Tracking with CosmicWatch**
- **Xbox Kinect 3D imaging**
- **Arduinos and Neutrinos**
- **COHERENT Preliminary Data Analysis**
- **Developing a detector construction and testing device**

Images created by Imagine AI Generator

How we created this new, better space

Provide professional development opportunities for career development: Weekly PDW

"Monday" Weekly REU Cohort Schedule			
Date	Time	Session Description	Location
June 6	1-2 pm	Introduction to Scientific Writing	DFELL 117
June 13	1-2 pm	Peer Review Process	DFELL 117
June 21*	1-2 pm	Ethics in Research	DFELL 117
June 27	1-2 pm	Preparing a Research Poster	DFELL 117
July 5*	1-2 pm	Oral Presentation Tips	DFELL 117
July 11	1-2 pm	Presentation Practice	DFELL 117
July 18	1-2 pm	Presentation Practice	DFELL 117
July 25	1-2 pm	Final Presentation Practice	DFELL 117

Wednesday Weekly Career Development and Mentoring Schedule			
Date	Time	Session Description	Location
June 1	1:15-3:15 pm	STEM Identity & Belonging	TUNL
June 8	2-5 pm	Career Workshop 1	UNC-CH
June 15	2-5 pm	Career Workshop 2	UNC-CH
June 22	1:15-3:15 pm	Mentoring	TUNL
June 29	2-5 pm	Career Workshop 3	UNC-CH
July 13	12-5 pm	Career Workshop 4 + UNC lunch & visit	UNC-CH

Images created by Imagine AI Generator

The outcome

- Over two years, students from Fisk U, Florida Memorial University, NCCU, and UNC-CH have participated in the program
- First cohort after the COVID-19 was five students; Second cohort this year was nine students, **a total of 14 students over two years**
- **Projects do not end in summer, but can continue over the next year**
- More than a traineeship program, a social experiment
- Students are tracked after they leave the program
- Students are supported through the year
- PIs at participating institutions are provided sub-awards for development of their infra-structure

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The changing face of S&E

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