

2023 NSF Nanoscale Science and Engineering (NSE) Grantees Conference
Session 9. Integrating Education and Research in Nanobiotechnology and Nanomedicine

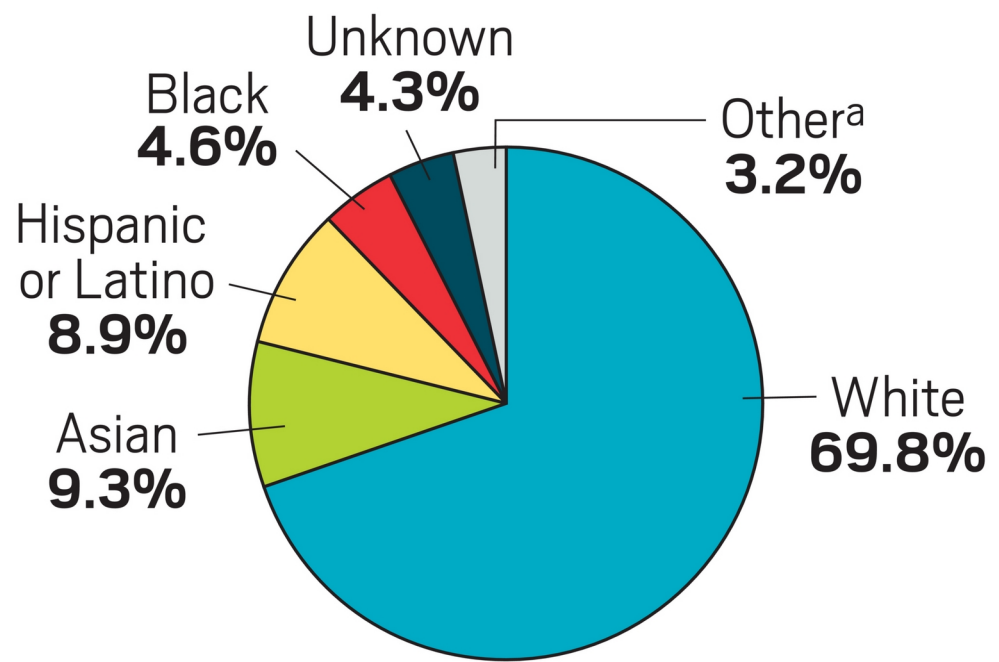
Enhancing Diversity in Nano-Biotechnology Research and Education

Paresh Chandra Ray

Department of Chemistry, Jackson State University, Jackson, MS, USA

How to get more people of color into graduate school — and keep them there?

Race of chemistry graduate students who are citizens or permanent residents



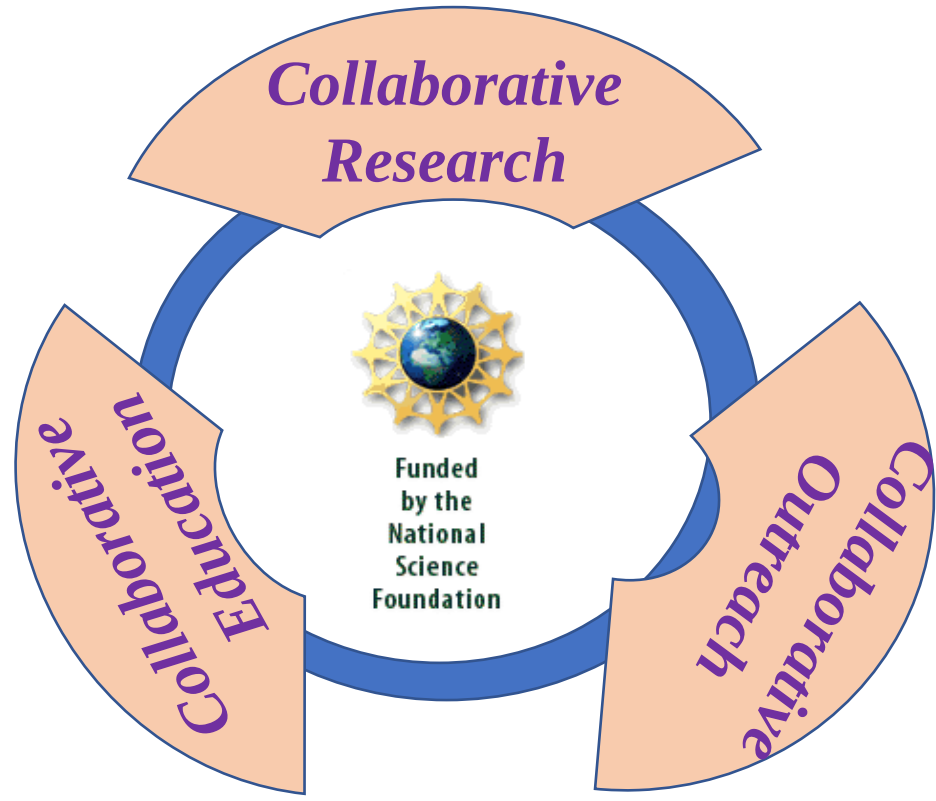
Number of students = 14,156

Physics

Year	Total PhDs	Black	Latinx	Native American
2019	2008	11 (0.5%)	54 (2.7%)	0 (0%)
2018	1988	13 (0.7%)	54 (2.7%)	2 (0.1%)
2017	1883	22 (1.2%)	57 (3.0%)	0 (0%)
2016	2006	19 (0.9%)	46 (2.3%)	0 (0%)
2015	2192	13 (0.6%)	42 (1.9%)	2 (0.1%)

From Table 22 of NSF Survey of Earned Doctorates:
<https://www.nsf.gov/statistics/srvydoctorates/#tabs-2>
[/statistics/srvydoct](#) @ohdearz

Collaborative Research and Education in nano-bio material Science using NSF-PREM



Jackson State University-University of California, Santa Barbara MRSEC

Enhancement of the JSU Chemistry Graduation after JSU-UCSB-PREM Grant Started

Our PhD program started at 1999

1999- 2006 numbers of graduate students graduated were

PhD = 2 **Average less than 1 per year,**
MS = 3 **Average less than 1 per year,**

From 2007-2022, during our PREM grant period, numbers of graduate students graduated are

PhD = 66 **Average 4.5 per year**
MS = 88 **Average 5.5 per year**

**19 graduate students graduated in last 4 years
(100% US URM & 63% women)**



Latasha Franklin



Richard Neal



Zaniqua Bullock



Harmon Moeisha



Markie'Sha James



Fredrick Allen



Boby Portis



Sabrevian Davis



Obie Allen



Christen Robinson



Shawnta Wood



Kaelin Gates



jasmine collins



Takia Smith



Ajayi Oluwatomi



Lakeeta Sanders



Kimberly Madison

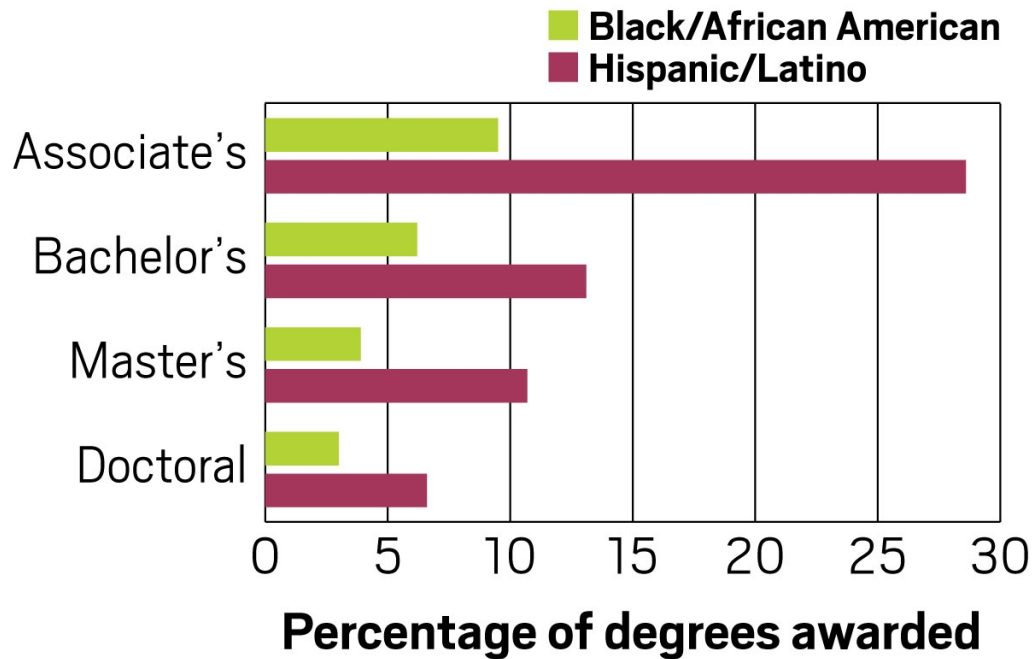


Christopher Copeland



Christine Tchounwou

All are in academia or industry



2,431 African Americans earned doctorates from U.S. universities in 2021
2.3% is in Chemistry.

On an average, 50 African-American students receive Ph. D.s in chemistry nationwide each year.

JSU-UCSB PREM produced 10 percent of the national total African-American Ph. D.s in chemistry.

**22 undergraduate students graduated in last 4 years
(100% US URM & 85% women)**



Frederick Jackson



Airee Nelson



Conkle Keonna



Ola Olafuyi



Sadia Nowshin



Daria Weathersby



Webb Micah



Jawnaye Nash



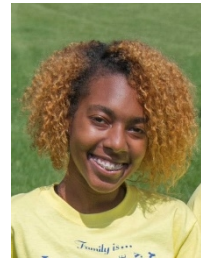
Raelyn Burns



Jada Emodogo



Denver Hall



Ledeira Hall



Breanna Horn



Jaiden Moore



Derrilynn A. Leach-Wilson



Zariya Perkins



Destiny Taylor



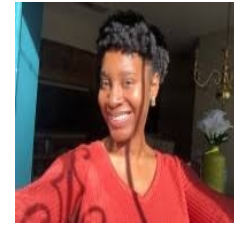
Anderson Micah



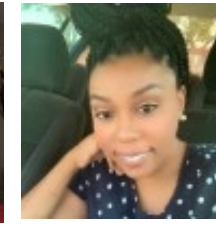
Oliva Jones



Hailey Greer



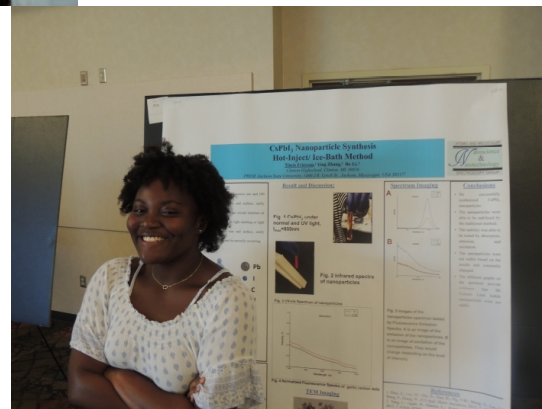
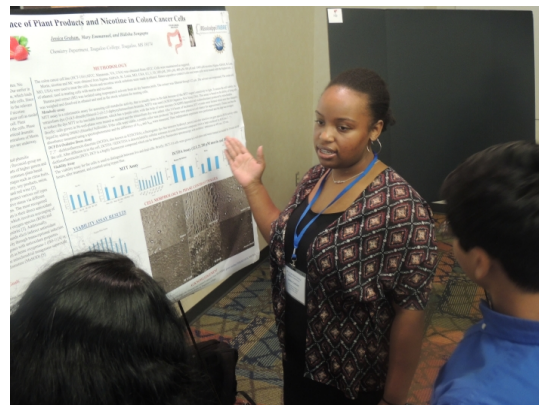
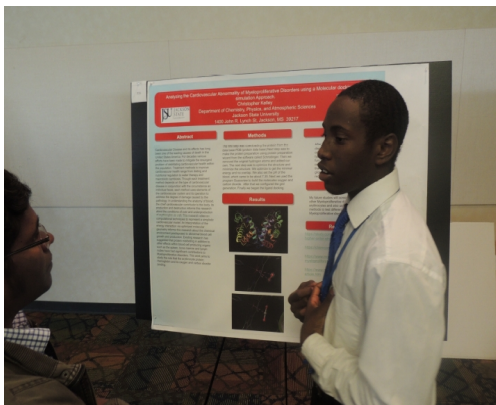
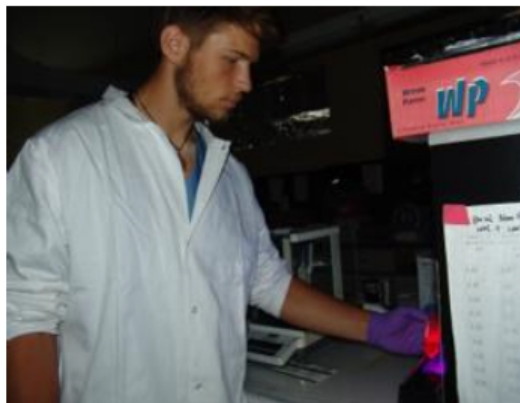
Jessica Leggett



Jasmine Weatherspoon

22 undergraduate students graduated (100 % US URM, all are in academia or industry)

**46 K12 students graduated in last 4 years
(100% US URM & 60% women)**



Next generation of URM materials scientists

46 K12 students graduated (100 % US URM, all are in academia)

Collaborative Student Mentoring Helps Bridging to Doctorate Programs

Started as a high school student and now
finished PhD



Christine, started PREM as a High School Student, finished MS in previous PREM, finished PhD in the current PREM at UCSB.



Lakeeta Sanders, started PREM as a High School Student, finished BS in previous PREM, finished MS and PhD in the current PREM.



Obie Allen, started PREM as a High School Student, finished BS in previous PREM, finished MS and PhD in the current PREM.

Research Accomplishments

PREM is instrumental for JSU to become a leader in nano-bio materials Research

- **68 Publications in the last 4 years**
- **Six publications with K-12 students**
- **33% collaborative publications (*More than one PREM faculty involved*)**
- **Total presentations: 80**
- **Student presentations:60**

Acc. Chem. Res., Acc. Mater. Res, Chem. Soc. Rev., Adv. Energy. Mater., J. Am. Chem. Soc., ACS Nano, Phys. Rev. Lett., ACS Appl. Mater. Sci., J. Phys. Chem. Lett., ACS Appl. Bio. Mater.,

Pathway for our success



We utilize innovative and creative approaches in collaborative mentoring and education in nano-bio research.

Collaborative Summer Internship: *Exchange of ideas*



JSU graduate and undergraduate students performed 10 weeks summer research at UCSB

Collaborative Course: *Exchange of knowledge*



Collaborative Spectroscopy Course was taught by Prof. Mattanjah S. de Vries , UCSB

Collaborative Scientific Group Discussion *Exchange of knowledge*



Collaborative group discussion between UCSB and JSU PREM members



Collaborative mentoring workshop between UCSB and JSU members

Collaborative Symposium: *Exchange of students and scientific ideas*

Annual PREM Material Science Conference at JSU and UCSB

