Enhancing Diversity in Nano-Biotechnology Research and Education

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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

- White: 69.8%
- Asian: 9.3%
- Hispanic or Latino: 8.9%
- Black: 4.6%
- Unknown: 4.3%
- Other\(^a\): 3.2%

Number of students = 14,156

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### Physics

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

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)

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

Pathway for our success

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