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# **MS-CC Cybersecurity & Research Computing Support Day Workshop Alabama A&M University**

**Oct. 30, 2024**  
**EDUROAM Access**



## Workshop Objectives

- Why is **Cybersecurity** investment strategically critical to your campus mission?
- What **resources** are available to support HBCU Cybersecurity development?
- How can **HBCUs collaborate with one another and with resource providers** to advance their Cyberinfrastructure and Cybersecurity?
- How can **HBCUs better prepare Cybersecurity students** for the competitive Cybersecurity workforce?

# Agenda Overview

Day 2

Day 2

8:00-8:50 AM Breakfast

**Early AM** Campus Cybersecurity Priorities for HBCUs Panel+ Breakout Discussion

**Late AM** Strategy workshop for rising R2 institutions

Research & data computing and CI Professionals

Lunch + Networking

**Early PM** Cybersecurity Education Programs at HBCUs/Cybersecurity Support and Workforce Requirements Panel+ Breakout Discussion

Before 3:00PM Workshop Wrap-up + Feedback

## Workshop Resources:





## Acknowledgement

This material is based upon work supported by the National Science Foundation under Grant No. 2137123. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



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# Campus Cybersecurity Priorities for HBCUs Panel

- **Dameion Brown**, Chief Information Security Officer, Jackson State University
- **Dr. Kylie Nash**, CIO, Alabama A&M University
- **Maria Laurent-Rice**, Director, Cybersecurity Program, Assistant Professor of Computer Information Systems, Stillman College
- **Kerry Hixon**, CISO / Director of Cybersecurity & IT Compliance, Spelman College



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**Workshop Resources**

**Break**  
Until 10:10 AM







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# Strategy workshop for rising R2 institutions

- **Dr. Majed Dweik**, Vice President of Research & Economic Development, AAMU
- **Dr. Jaret Riddick**, Senior Fellow, Center for Security and Emerging Technology







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# HBCU Progress to Top-Tier Research Status

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Dr. Jaret C Riddick and Brendan Oliss

MS-CC Workshop: Campus Technology, Cybersecurity, & Research Computing Support

Alabama A&M University

Huntsville, AL

30 Oct 2024

# Carnegie Classification

- The Carnegie Classification (CCIHE), was established in 1970 by the Carnegie Foundation for the Advancement of Teaching.
- The classification is a framework to classify American colleges and universities.
- The Research I, or R1, designation signals the very top-tier of research institutions, followed by Research II, or R2.
- The classifications methods have changed over the years. The PCA approach (adopted in 2018) yields two “research indices”, the aggregate level of research activity and the per-capita research activity.

# VERY HIGH RESEARCH (R1) & HIGH RESEARCH (R2) ARE BASED ON MEASURES OF RESEARCH ACTIVITY

- Institutions included in these two classifications in 2021:
  - Awarded at least **20 research/scholarship doctoral degrees** during the update year (2019-20 for 2021 classification)
    - *Excludes Special Focus Institutions and Tribal Colleges*
- **AND**
  - Reported at least **\$5 million in total research expenditures** through the National Science Foundation (NSF) Higher Education Research & Development Survey (HERD)
- Classification is based on a multi-dimensional formula that incorporates
  - Volume
  - Density/intensity
  - Comprehensiveness

# THERE ARE 10 MEASURES INCLUDED

## **Aggregate index – capturing volume**

1. Research & development (R&D) expenditures in science and engineering (S&E)
2. R&D expenditures in non-S&E fields
3. S&E research staff (postdoctoral appointees and other non-faculty research staff with doctorates)
4. Doctoral conferrals in humanities
5. Doctoral conferrals in social science
6. Doctoral conferrals in STEM (science, technology, engineering, and mathematics) fields
7. Doctoral conferrals in other research fields (e.g., business, education, public policy, social work)

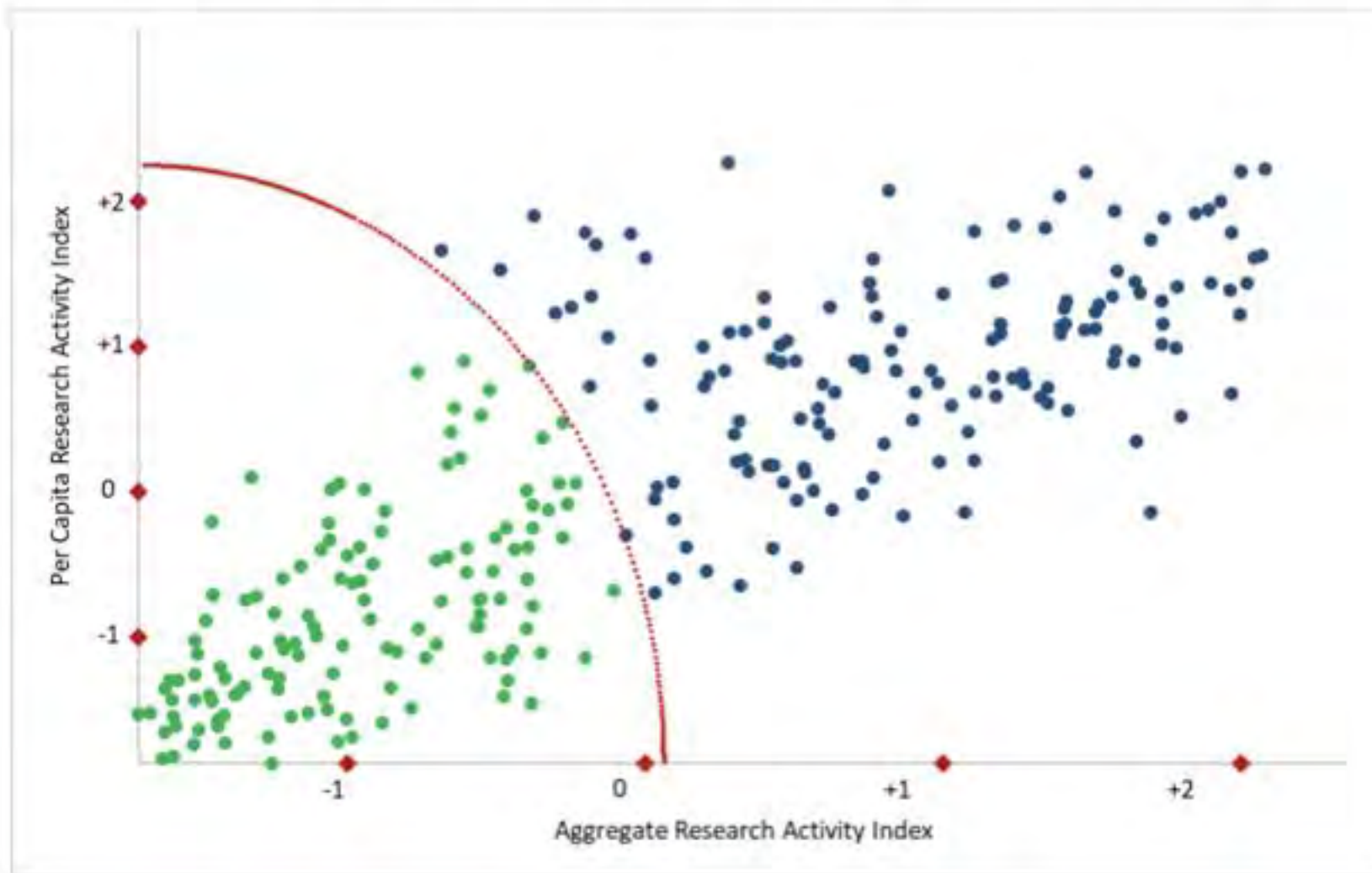
## **Per capita index – capturing density/intensity**

1. R&D in S&E divided by the number of full-time faculty within the assistant, associate, and full professor ranks
2. R&D in non-S&E divided by the number of full-time faculty within the assistant, associate, and full professor ranks
3. S&E research staff divided by the number of full-time faculty within the assistant, associate, and full professor ranks

Professional Practice doctorates (MD, JD, PharmD, DDS, DVM, etc.) are not included



# CARNEGIE PUBLISHED DISTRIBUTION



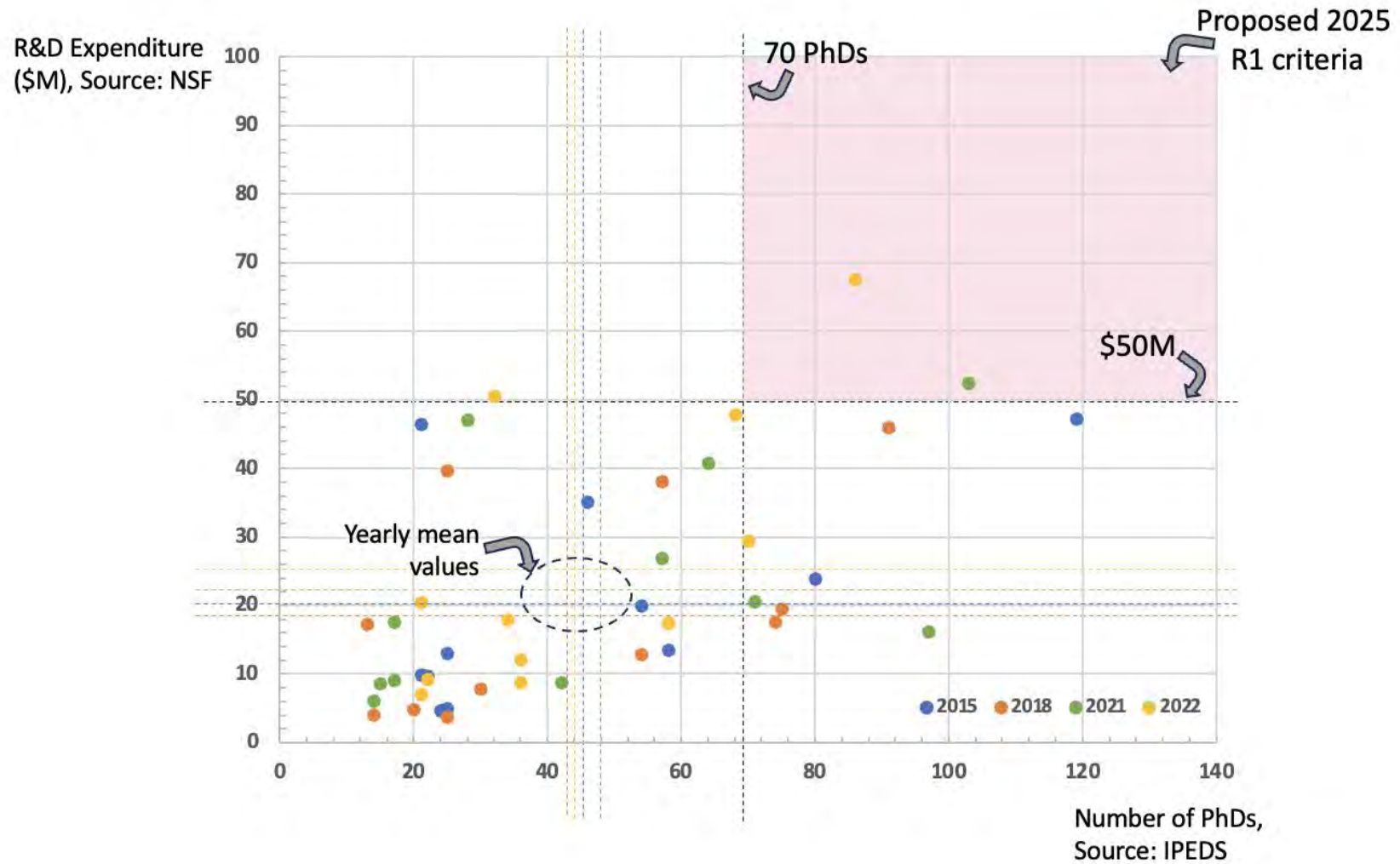
The 11 R2 HBCUs are as follows:

- Clark Atlanta University
- Florida A&M University
- Howard University
- Jackson State University
- Morgan State University
- North Carolina A&T State U
- Prairie View A&M University
- Southern University and A&M College
- Tennessee State University
- Texas Southern University
- University of Maryland - Eastern Shore

# The Carnegie Change for 2025

- R1 classifications influence an institution's ability to attract faculty, funding, and students. As such, R1 classifications influence college leaders' decisions about planning budgets, infrastructure, and academic offerings.
- The 2025 classifications change aims to simplify the “complicated and opaque” classification method, offering stability in pursuing R1 classification.
- The new classification will consider
  - *1) total expenditures on R&D and 2) total number of research doctorates. Effective in 2025, institutions that spend over \$5 million on R&D and have over 20 research doctorates will be R2, and institutions that spend more than \$50 million on R&D and have over 70 research doctorates will be considered R1.*

# Yearly HBCU R2 R&D Expenditure and Research PhD Production





# Impact for HBCUs


- Although the new classifications are simple, they have drawbacks, particularly for historically underfunded HBCUs and non-STEM institutions.
  - The new classifications solely consider R&D expenditures and research doctorate production, and underfunded or non-STEM schools may struggle to meet these.

<b>Source of Funding</b>	<b>Average R2 HBCU (in thousands)</b>	<b>Average R2 (in thousands)</b>
Total R&D Expenditures	\$23,123	\$41,894
Federal Funding	\$16,465	\$22,171
State and Local Funding	\$1,655	\$2,773
Institutional Funds	\$4,306	\$12,327
Research Expenditure per PhD	\$462	\$639
Median Number of Research Doctorates	42	56






# White House Council of Economic Advisors



Administration Priorities

MAY 16, 2024

## The Economics of HBCUs

 CEA  WRITTEN MATERIALS  ISSUE BRIEFS

Historically Black Colleges and Universities ([HBCUs](#)) have been essential institutions for educating Black Americans since the early 19th century. Before the legal integration of education in the 1950s and 1960s, Black students were prevented from obtaining higher education at many state and private colleges. This led to the establishment of colleges and universities with the explicit mission of educating Black students. Although the legal landscape, social fabric, and education system of the United States has changed significantly since the mid-1900s, many of the schools founded during that era to educate Black students still exist today and carry forward their rich legacy of higher education for more than 180 years as HBCUs: Congressionally [defined](#) as institutions established before 1964 with the primary mission of educating Black Americans.

This issue brief highlights a few key facts about the importance of HBCUs in

“...Standard economic theory (and common sense) dictates that when particular sectors are highly productive, one should invest more heavily in these sectors. However, this has not been the case with HBCUs—which historically have been relatively underfunded...”

*CEA, 2024*

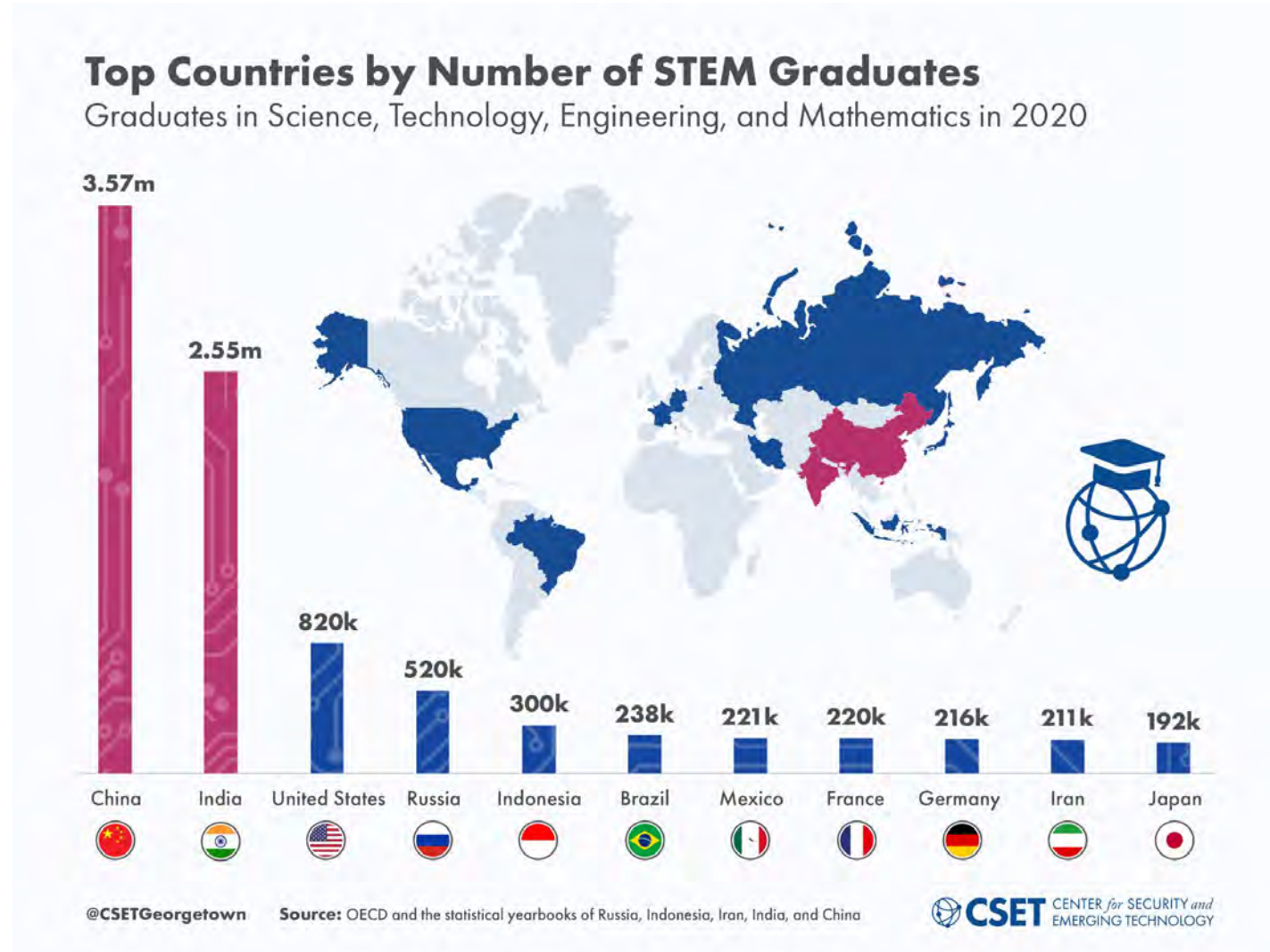
# Strategic Importance of HBCU R&D

- While HBCUs represent only 3 percent of U.S. colleges and universities in the United States, they graduate 25 percent of Black students with bachelor's degrees in STEM fields, and are the institution of origin for almost 30 percent of Black graduates of science and engineering PhD programs
- Our analysis indicates that while HBCUs comprised 7.4% of the institutions that received federal R&D funding from the U.S. government, HBCUs received 0.8% – 8/10 of 1% – of that federal funding in fiscal year 2021.
- R2 HBCUs account for about 6.5% of the research doctorates coming from R2 institutions while making up only about 4% of the total U.S. R2 R&D expenditures, in a given year.

# Strategic Importance of HBCU R&D



- China is significantly outpacing the United States in the production of STEM graduates at all levels.
- HBCUs represent a proven pipeline to this; and Section 223 gives the DOD new lifeline to increased defense research capacity.





# Sec. 223, Connection to HBCUs

- Beginning in the 1987 NDAA, Congress has long sought to strengthen engagement between the DOD and HBCUs.
- Congress recently passed Section 223 of the 2023 National Defense Authorization Act (NDAA), authorizes DOD programs targeting R1 status for these institutions.
- *Section 223 based on the 2015 Carnegie classification criteria.*



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The 2023 Morehouse College commencement ceremony in Atlanta, Georgia. PARAS GRIFFIN / GETTY IMAGES

IDEAS

## To compete with China in STEM, Pentagon should invest in HBCUs

The DOD can't leave the potential of historically Black colleges and universities untapped.

[cset.georgetown.edu](https://cset.georgetown.edu)

*Thank you...*



# Background: BSME-Howard; MSME-NCA&T; PhD-VT

- Currently, Senior Fellow at the Center for Security and Emerging Technology (CSET) at Georgetown University
- Prior, twenty year in the Department of Defense (DOD) Science and Technology (S&T) enterprise; primarily at Army Research Laboratory (ARL)

## Career Accomplishments/ Highlights

ARL FOUNDATIONAL RESEARCH COMPETENCIES



ARL Research Competencies

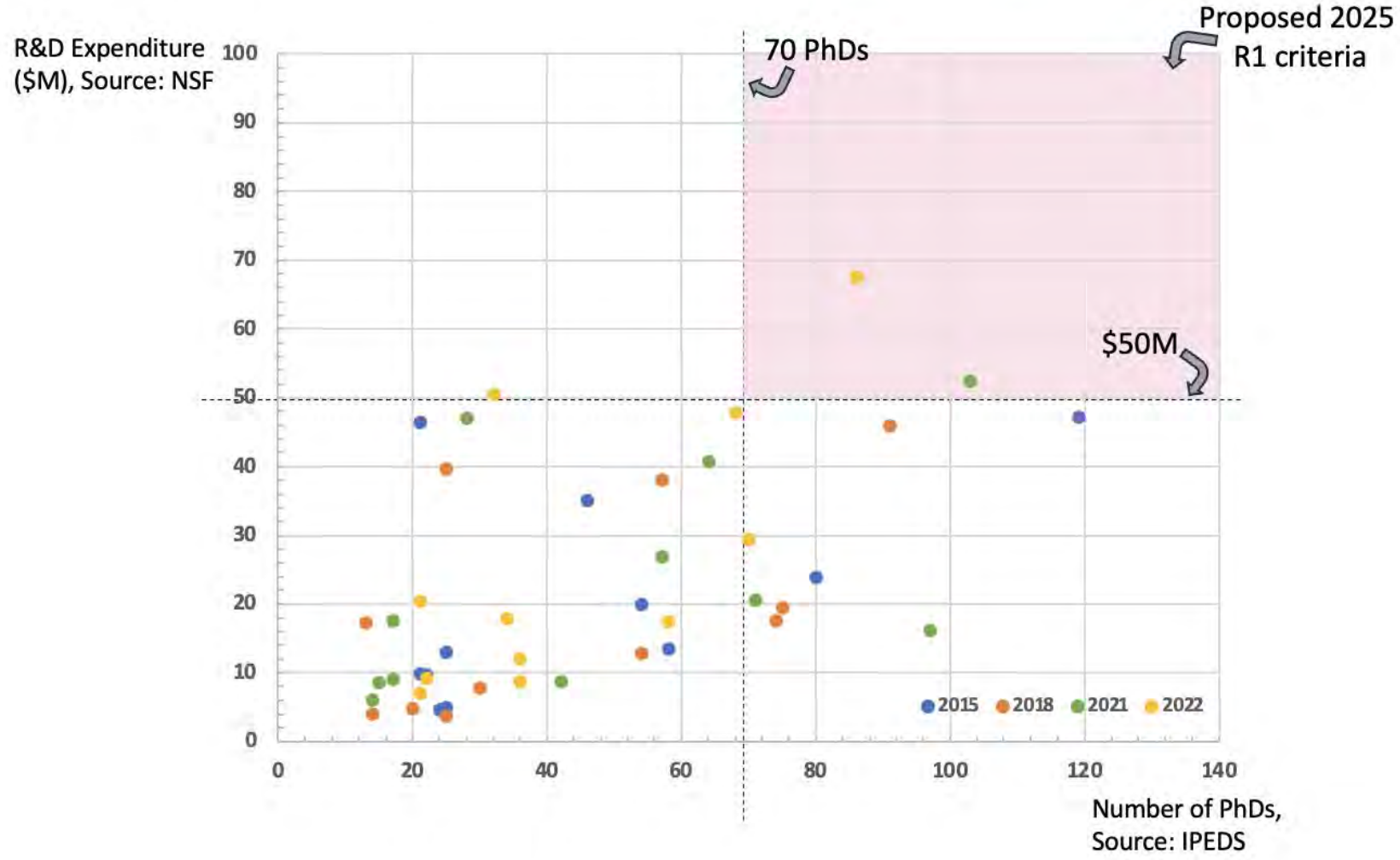


ARL Robotics Research Collaboration Campus

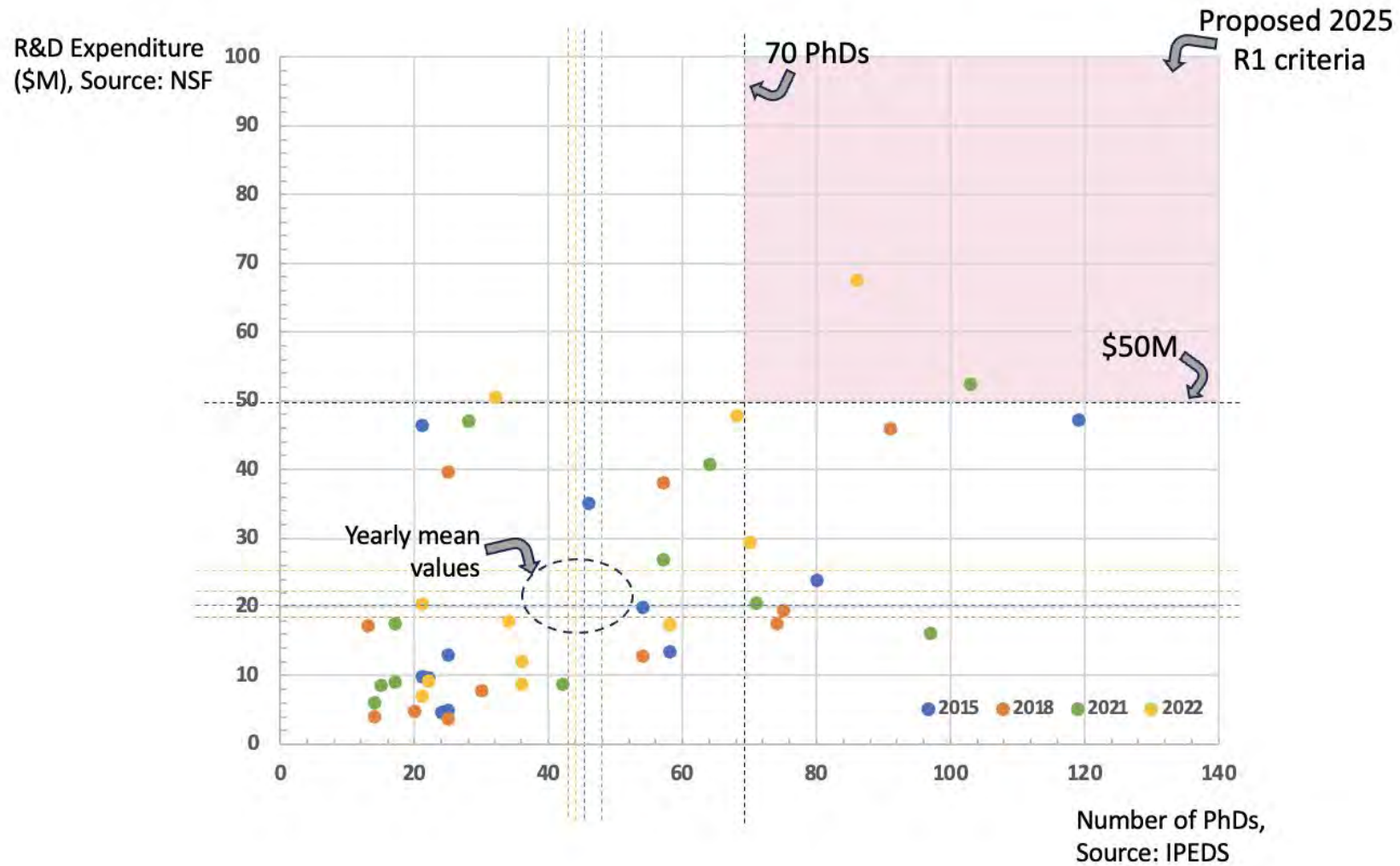


DoD initiative on Trusted Autonomy/ HBCU UARC

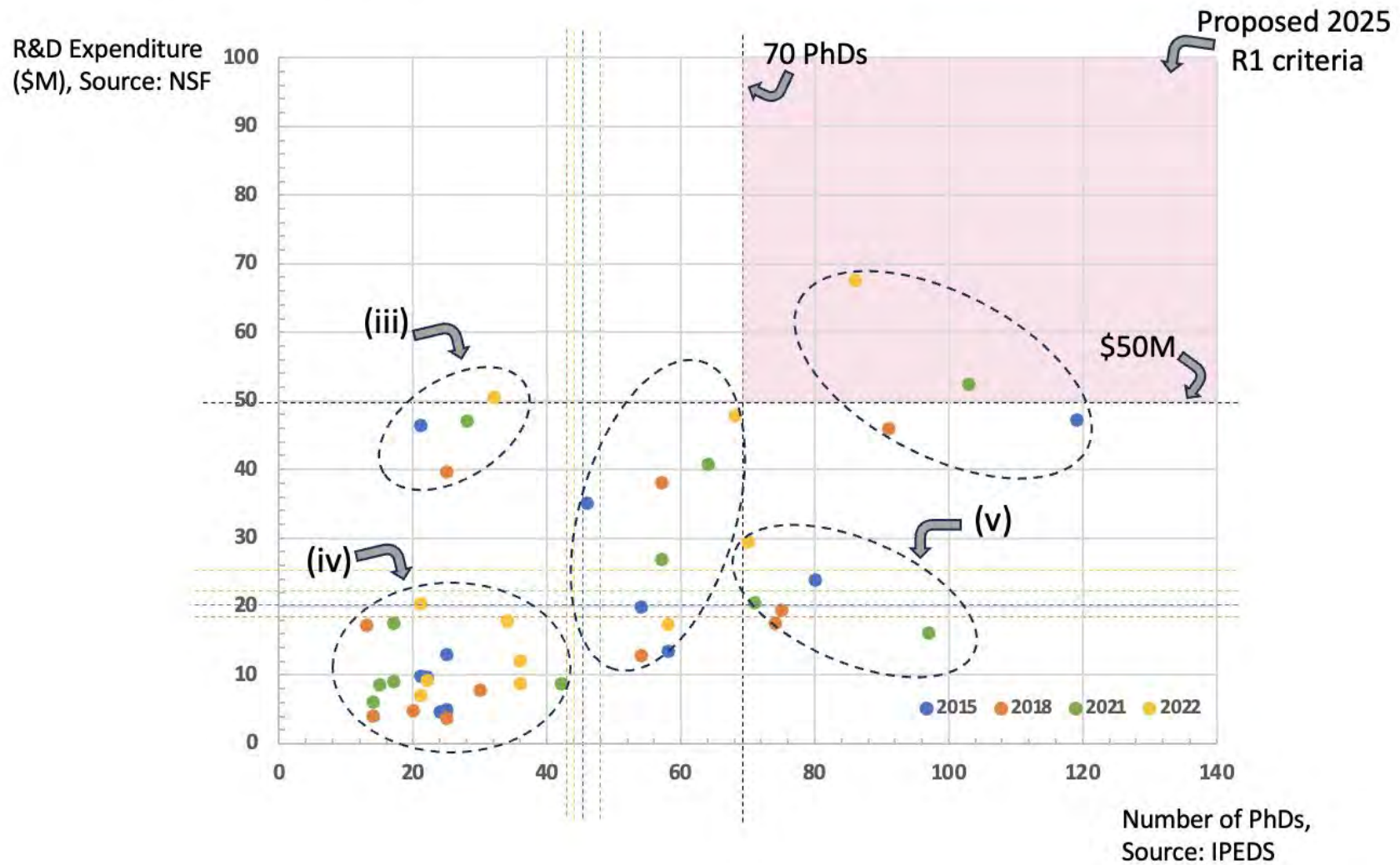
# Yearly HBCU R2 R&D Expenditure and Research PhD Production



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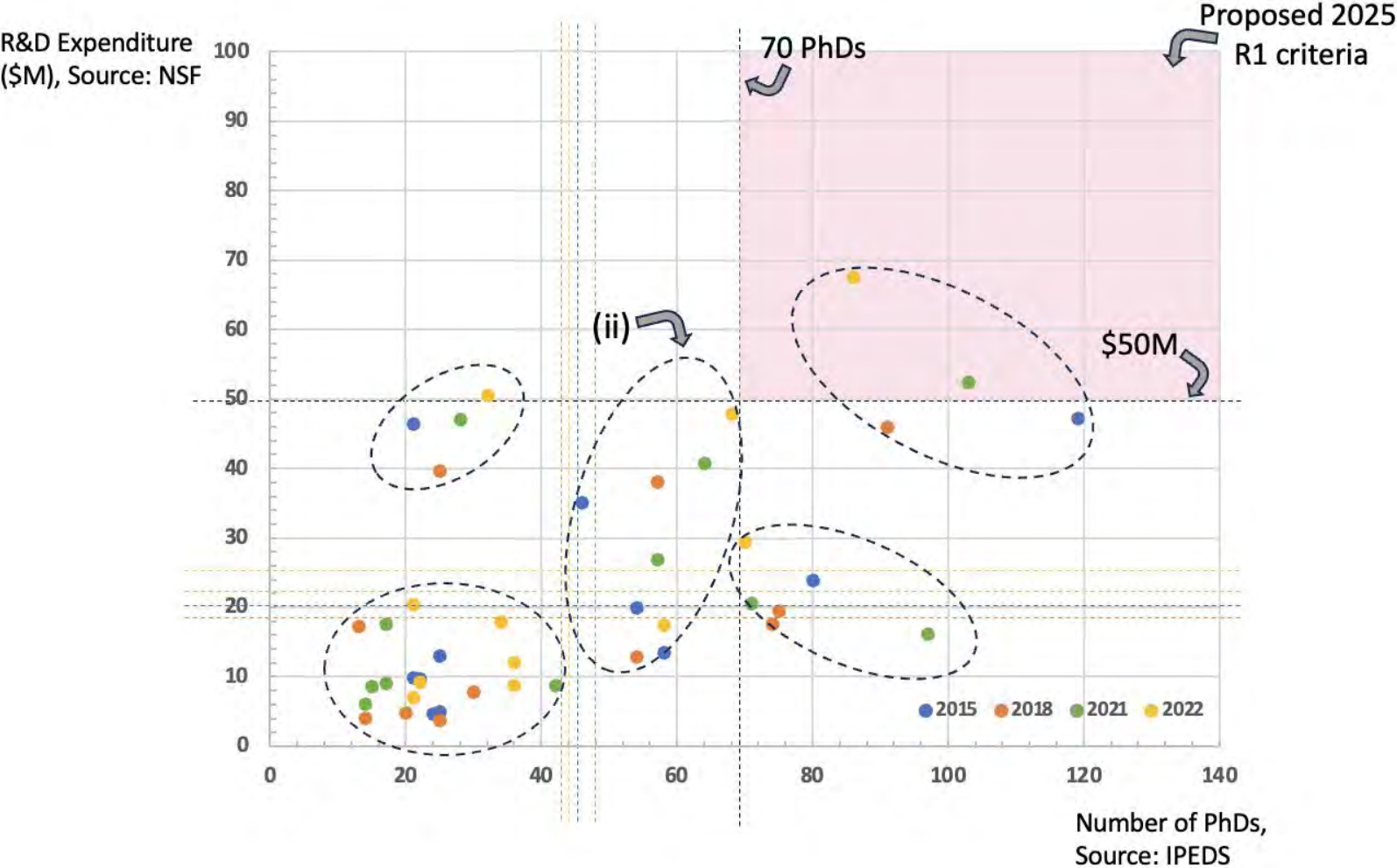


# Impact for HBCUs

- Considering the Carnegie classification criteria proposed for 2025, R2 HBCUs fall into three major categories:
  - one (Howard University) will likely exceed both the yearly thresholds of \$50M R&D expenditure and 70 research PhD conferred; if so, reaching R1 status in 2025;
  - a significant cluster of institutions fall well below one of the thresholds, or both, indicating much less likelihood of achieving R1 status in the foreseeable future; and
  - one is within striking distance of both thresholds (North Carolina A&T State University), with the potential likely to achieve R1 status in the 2026-27 timeframe.



# Yearly HBCU R2 R&D Expenditure and Research PhD Production



# CSET Policy Brief coming soon...Recommendations:

- Congress, DOD and HBCU leadership, together, should revisit the goals and objectives of Section 223 to develop strategies for investment, programming, and sustainment based on the Carnegie classification criteria being adopted in 2025.
- For both the key objectives of achieving and sustaining R1 status, strategies for eligible R2 HBCUs should focus on increasing the proportion of STEM research PhD degrees to greater than 33%.
- Building up endowment income to increase the proportion of institution funding of R&D is key to addressing one of the most significant gaps in research funding between R2 HBCUs and other research institutions.
- To achieve goals of Section 223, focus should be placed on those institutions closest to 70 research PhD conferrals per year, where near term infusions of state and local R&D expenditures can create an “on-ramp” for long term strategies to grow the proportion of institution funding.



# Road Map

- Personal Background
- Sec. 223 and the Connection to HBCU Carnegie Classification
- Strategic Importance - Why we're discussing HBCUs
- The Carnegie Change for 2025
- Impact for HBCUs
- Conclusions



# Discussion

- Underfunding and overproduction
- Several institutions are “trapped”
- The 11 R2 HBCUs have very different profiles for CCIHE, with three broad groups:
  - (1) those that will exceed both the yearly threshold of \$50M R&D expenditure and 70 research PhD awarded; (2) those within striking distance of both thresholds; and (3) a significant cluster of institutions that will miss meeting either one of the thresholds, or both

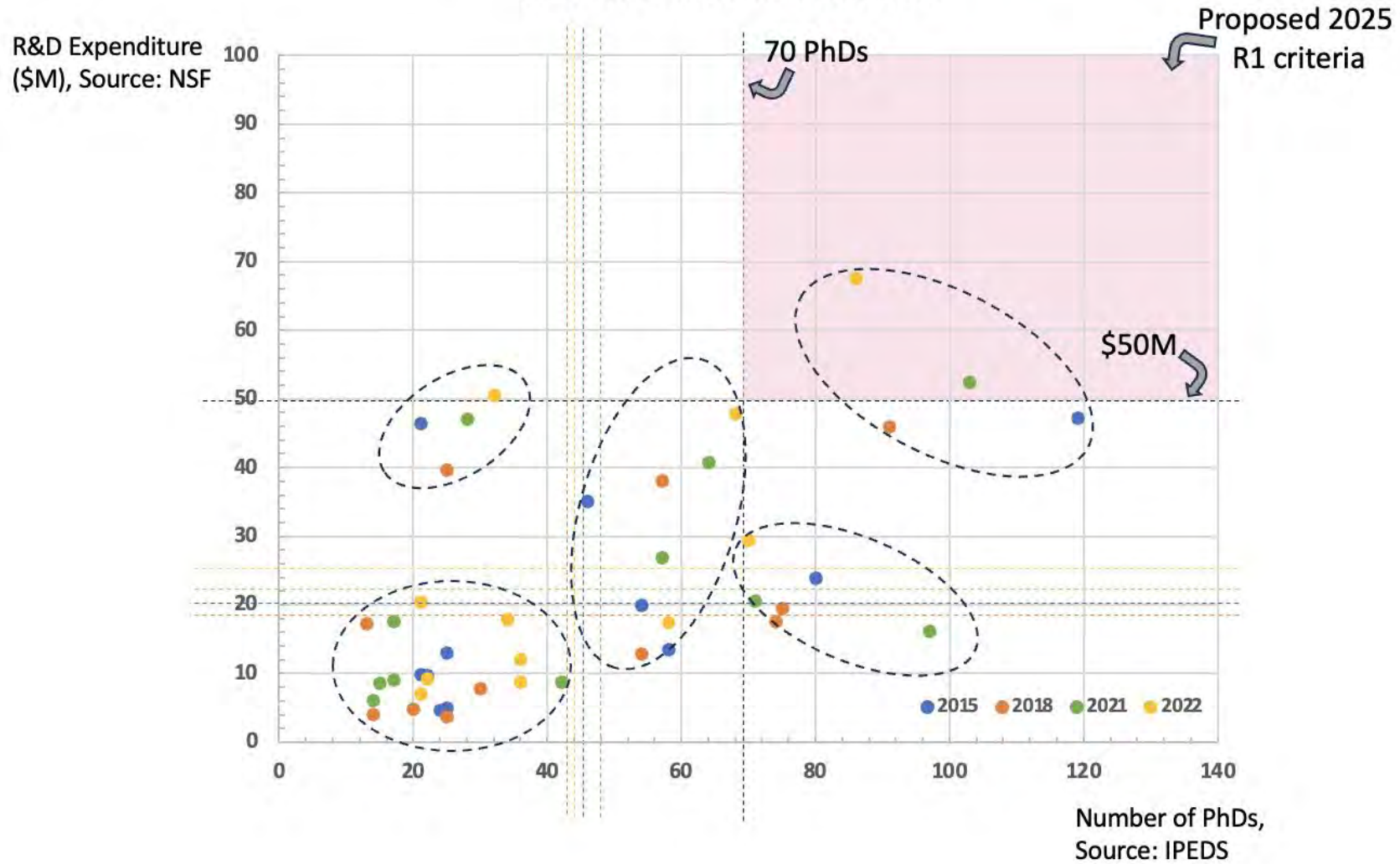
# Conclusions

- Revisiting Sec. 223
  - Seeing as Sec. 223 is based on the 2015 Carnegie classification criteria, the aims should be revised to better address the 2025 criteria.
- STEM Research PhDs
  - Among the data for best-performing institutions examined here, a high proportion of STEM PhDs is a significant characteristic.
  - For both the key objectives of achieving and sustaining R1 status, strategies should focus on increasing the proportion of STEM degrees to greater than 33%.

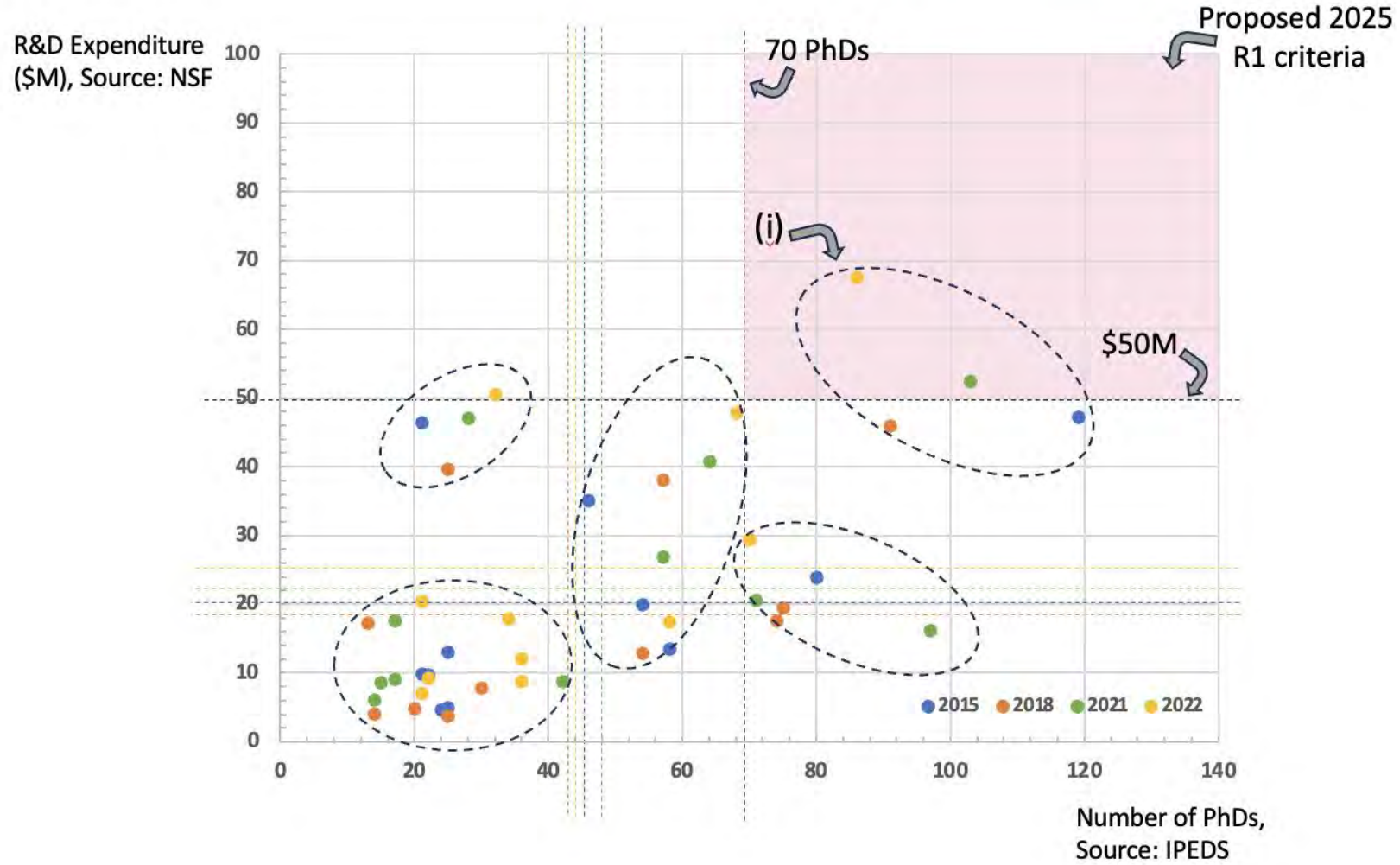
# Conclusions

- Institution Funds
  - Although HBCUs generally have lower R&D funding across all relevant categories (e.g., federal, state and local, non-profit), the biggest disparity is in expenditures from institution funds.
  - Building endowments of HBCUs would help to address one of the most significant gaps in research funding between R2 HBCUs and other R2 institutions.
- State and Local Funds
  - Increases in federal and institutional funds are long-term solutions to underfunding, but state and local funding can offer short-term stimulus.
  - The state of North Dakota is an excellent example: UND and NDSU.

## Yearly HBCU R2 R&D Expenditure and Research PhD Production



# Yearly HBCU R2 R&D Expenditure and Research PhD Production





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# Research & Data Computing and CI Professionals

- **Lauren Michael**, Consultant, Research Engagement, Internet2
- **Kevin Brandt**, Cyberinfrastructure Community-wide Mentorship Network, Assistant Vice President for Research Cyberinfrastructure, South Dakota State University
- **Dr. Raziq Yaqub**, Associate professor in the Department of Electrical Engineering and Computer Science, Alabama A&M University
- **Terry Haygood**, CI Facilitator, Jackson State University





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**Lunch & Networking  
Until 1:00 PM**





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# Cybersecurity Education Programs at HBCUs/Cybersecurity Support and Workforce Requirements Panel

- **Maria Laurent-Rice**, Director, Cybersecurity Program, Assistant Professor of Computer Information Systems, Stillman College
- **Dr. Ed Pearson, III**, Assistant Professor, Computer Science, Alabama A&M University



# Resources

- TBD

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## Breakout Exercise: Cybersecurity

At tables of 4-5 ... (feel free to rearrange)

- Introduce yourselves
- Identify a note-taker/reporter
- Discuss:



- **In what ways would you like to collaborate with other HBCU campuses around campus cybersecurity?**



# Cybersecurity Quick Poll

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WiFi:  
pass:

# Feedback

Going around the room please provide one of the following:

- Something you **liked** or **learned** today
- Something you wanted **more** of
- Something that could have been **better**



**Learned / Liked**

**More / Better**

Empty text area for notes under 'Learned / Liked'.

Empty text area for notes under 'More / Better'.

## Workshop Resources:



Workshop attendees who completed the MS-CC **travel support acceptance** form will receive additional instructions for submitting their expenses for reimbursement by **Friday, Nov. 1**. Thank you for your patience and understanding as we implement a new reimbursement process.



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# Post-Workshop Feedback



# You Don't Have to Do it ALONE

## MS-CC's Programming Can Help You

- Connect with other campuses.
- Learn from each other's endeavors.
- Identify opportunities for shared resources and advocacy.
- Develop CI capabilities in your students, faculty, and staff.
- Develop a CI strategic plan.



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<https://bit.ly/JoinMS-CC>

