National Aeronautics and Space Administration

NASA SMD Bridge Program: Workshop and 2023 Plan

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SMD Bridge Program Director
NASA Science Mission Directorate
@PadiBoyd

Topics

01 **THE LANDSCAPE**
Why we need a Bridge

02 **BUILDING BRIDGES**
How did we get here, and where are we going?

03 **THE WORKSHOP**
Co-creating the program with potential partners

04 **MAJOR THEMES**
What did we learn by listening to potential partners?

05 **LOOKING AHEAD**
Taking what we learned and applying it to initiate the Bridge program

1. The Landscape

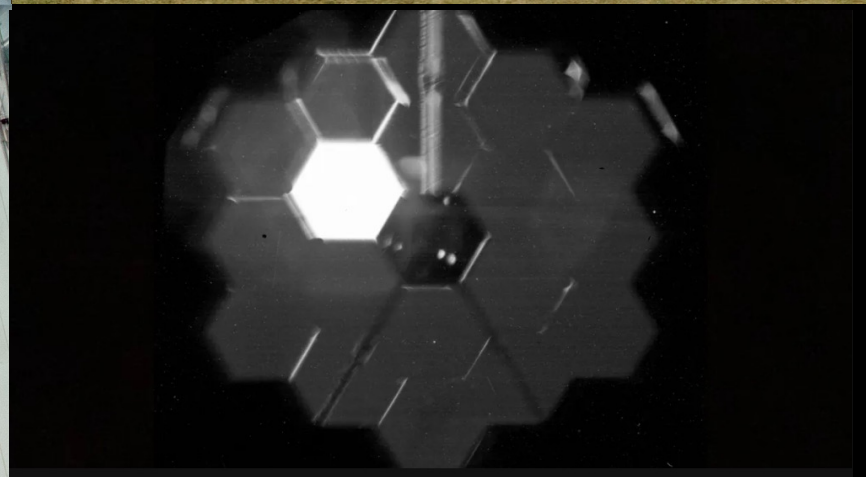
EOS

Reimagining STEM Workforce Development as a Braided River

A contemporary approach to today's science careers looks less like a structured pipeline and more like a collection of paths that change and adapt to the needs of the individual.

By R. L. Batchelor, H. Ali, K. G. Gardner-Vandy, A. U. Gold, J. A. MacKinnon, and P. M. Asher 19 April 2021


DESIGN AIRFLOW
REDUCED AIRFLOW
NO / LITTLE AIRFLOW
LOW RH



Science By The Numbers

TECHNOLOGY DEVELOPMENT

~$397M Invested Annually

BALLOONS

2 Missions Launched
52 Missions in Development

RESEARCH

~10,000 U.S. Scientists Funded
~$600M Awarded Annually

EARTH-BASED OBSERVATIONS

24 Operating Missions
23 Upcoming Missions

SOUNDING ROCKETS

11 Science Missions Launched
43 In Development

SMALLSATS/CUBESATS

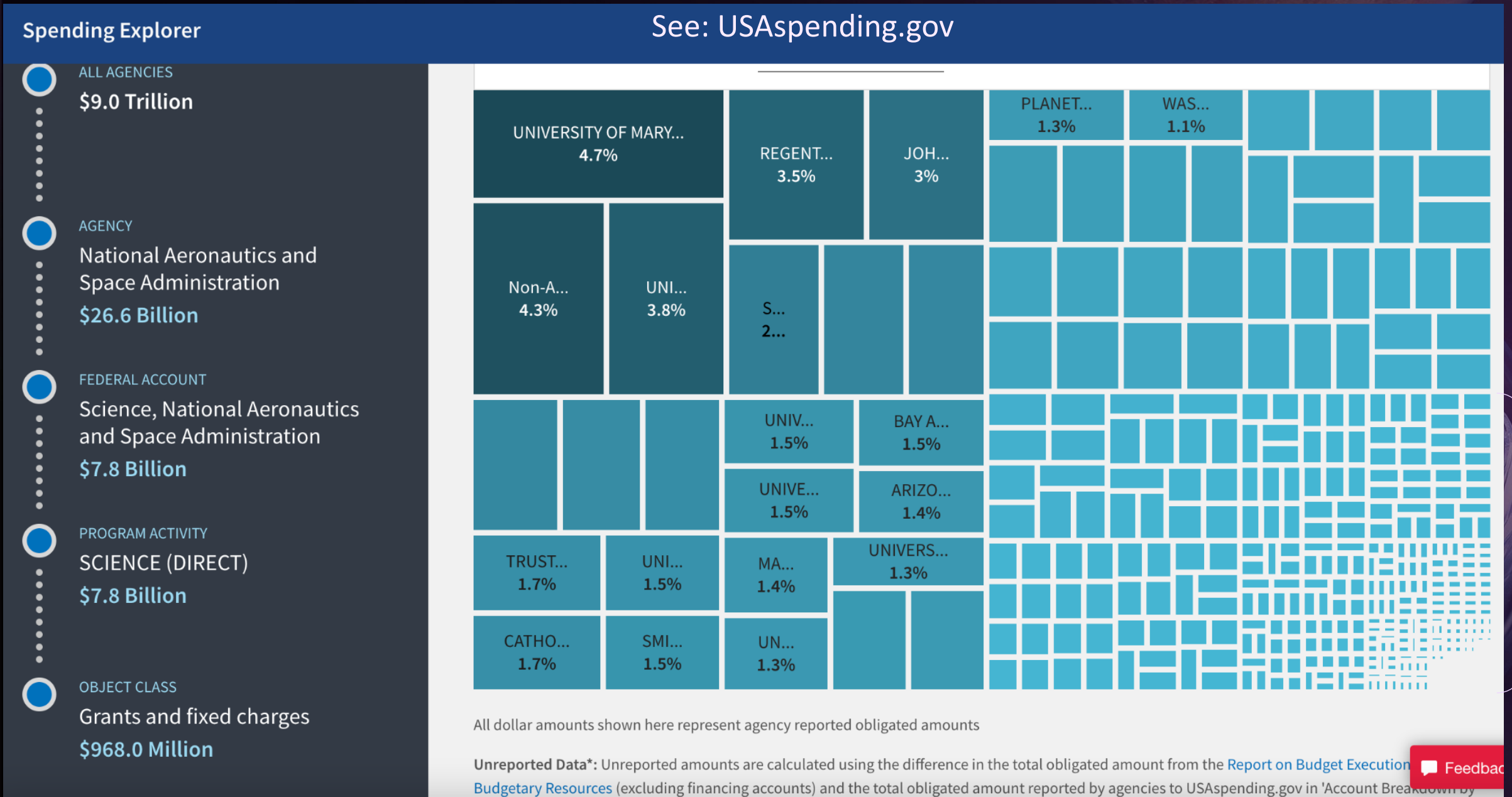
57 Science Missions
10 Technology Demos

MISSIONS

134 Missions from formulation through extended operations

Distribution of NASA Science Resources (FY22)

See: USAspending.gov



2. Building Bridges

Astro2020
State of the Profession and Societal Impacts
Guiding Principle:
The pursuit of science, and scientific excellence, is inseparable from the humans who animate it.

How Did We Get Here?

STEM exists in the larger environment

- ❑ Enduring pandemic impacts, disparate along gender, class, race and generational lines
- ❑ Increasing incidence of hate crimes targeting Black, LatinX and Asian communities
- ❑ Racial injustice, police brutality, Black Lives Matter

Federal Executive Orders and Presidential Mandates
NASA's Agency Equity Action Plan
Decadal Surveys and other NASEM reports
American Institute of Physics TEAM-UP Report, Recommendations
Inclusive Astronomy Meetings I & II; Nashville Recommendations

How to build a bridge?

A NASA Bridge can take advantage of connections we are already building:

- Science, Engineering, DEIA, Educational Program Expertise
- Astrophysics, Planetary, Heliophysics, Earth Science, Biological and Physical Sciences
- Multiple NASA Centers, facilities and partners
- Institution type (educational institutions, professional societies)

SMD Bridge Program (est. 2022) Goals

Develop sustainable **partnerships** among **institutions** historically under-resourced by NASA, e.g., Minority-Serving Institutions (MSIs) such as Historically Black Colleges and Universities (HBCUs**),** and Tribal Colleges and Universities (TCUs), Primarily Undergraduate Institutions (PUIs), Primarily Black Institutions (PBIs), Hispanic Serving Institutions (HSIs) and Community Colleges; and very highly research-intensive universities, and NASA Centers or Facilities.

These partnerships are expected to focus on paid research and engineering **student positions** at participating institutions with the goal of transitioning science and engineering students from undergraduate studies into **STEM graduate schools and/or employment** by NASA or related institutions.

The student experiences may focus on science, engineering, technology development or computational methods/modeling projects in **any science area** of relevance to SMD.

3. The Workshop

SMD Bridge Program Workshop

Purpose: Bring all stakeholders together to **co-create** program.

Goals: Considering the landscape of current Bridge programs and similar programs that impact the community of potential NASA Bridge partners:

- Communicate to all stakeholders what the NASA SMD Bridge Program is, and why it is important to NASA.
- Engage participants with a variety of experiences in STEM higher education, mentoring, organizational change.
- Set some measurable goals and objectives common to stakeholders at educational institutions, especially HBCUs, HSIs, TCUs, Community Colleges, PUIs.
- Set some measurable goals and objectives common to stakeholders at NASA, including science and engineering, higher education programs, employee resource groups.
- Hear about models for potential Bridge partnerships.
- Discuss planning information in SMD Bridge, including its elements, scope, schedule and processes to apply.

SMD Bridge Program Workshop Organizing Committee

(out of 80+ applicants)

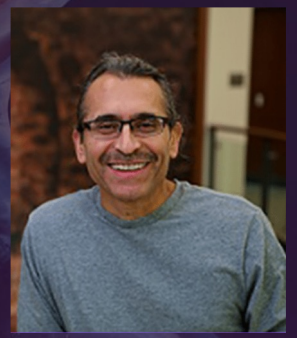
Bri Hart
Diversity Program Manager
American Physical Society

Edward Gonzales
DEIA lead for Heliophysics
NASA Goddard

Clayton Clark
Associate Dean
for Academic Affairs
NC A&T

Vemitra White-Alexander
STEM Education Specialist
NASA Marshall & Stennis

Regina Jorgenson
Observatory Director
Maria Mitchell Observatory



Jesus Pando
Chair of Physics & Astrophysics
Department
DePaul University

Carl A. Moore Jr.
Associate Professor
of Engineering
FAMU-FSU

Marianne Smith
Senior Education Faculty
Oak Crest Institute of Science

Noel Gardner
Director of THEE Aristocrats STEM
Jackson State University

Ronald S. Gamble
Assistant Research Scientist
NASA Goddard SFC

Alvin Smith
Manager for Planetary
Protection
NASA Jet Propulsion
Laboratory

Carol Hood
Professor of Physics
Associate Director,
Cal-Bridge
CSUSB

SMD Bridge Workshop Support Team, incl. LPI & LMI

Name: Padi Boyd
Institution: NASA Goddard and NASA Headquarters
Bio: Padi is a passionate ally and advocate for diversity, equity, accessibility and inclusion with over 25 years of scientific, technical and managerial experience at NASA, including work in the Hubble Space Telescope, Swift, Kepler and TESS.

Name: Nicolle Zellner
Institution: Albion College & NASA's Planetary Science Division
Bio: Dr. Nicolle Zellner is the Herbert and Grace Dow Endowed Professor of Science at Albion College in Albion, MI, where she teaches introductory and advanced astronomy and physics courses. She is currently working as a NASA Program Scientist in NASA's Planetary Science Division.

Name: Lalitha Balachandran
Institution: University of California, Santa Cruz
Bio: Lalitha Balachandran is entering her fourth year as a PhD student in the Linguistics department at University of California, Santa Cruz (UCSC). She is a co-founder and organizer of Equity in Linguistics at UCSC.

Name: Jeremias Nunez
Institution: UT-Austin
Bio: Jeremias Nunez is a second-year anthropology student at American University in Washington DC He is involved in several roles, such as being the Treasurer of Latinos En Acción, a student-led Latinx Activist Group.

Name: Kim Barnette
Institution: LMI/NASA SMD

Name: Tiffany Kelly
Institution: LMI/NASA SMD

Name: Carly Olliff
Institution: Lunar and Planetary Institute (LPI)

Name: Jamie Shumbera
Institution: Lunar and Planetary Institute (LPI

Working Groups

- The BPWOC identified topics and leads to engage in Working Groups.
- Working Groups compiled findings, perspectives, and resources for their topic, drafted an executive summary for workshop report.

Working Groups met and discussed their focused topic since ~August 2022.

Working Group leads facilitated breakout sessions, led the “report-outs” for their topic, and provided the organizing committee relevant inputs to the workshop report.

- **Early Career Perspectives:** Jenna Cann & Aurturo Martinez
- **Community Colleges:** Teresa Ciardi
- **STEM Mentoring:** Rodolfo Montez & Lynn Cominsky
- **Capacity Building & Professional Societies:** Ron Gamble, Vemitra White-Alexander, Carol Hood
- **NASA’s Existing Programs:** Shawn Domagal-Goldman

Architecting the NASA side of the Bridge

Identified NASA stakeholder working group (HQ + Centers + missions)

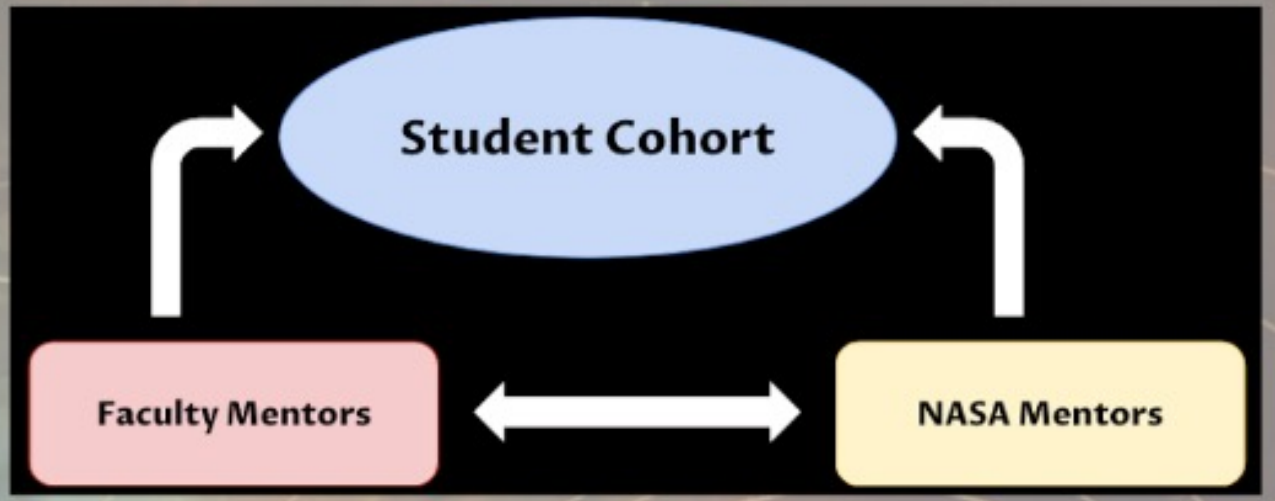
Purpose: Develop coordinated internal group with broad representation to serve as the counterpart/POCs to the BPWOC, providing internal expertise.

- Participate in the Bridge Workshops
- Provide feedback on draft workshop report
- Communicate status, plans and collect information from Division, Center and Mission representatives.
- Help facilitate and support development of new partnerships,
  - Identify NASA leads, mentors, other resources
  - Advocate for the success of the SMD Bridge Program from the NASA side of the Bridge.

NASA SMD Bridge Program Architects (as of 10-14-22)

Name	Center or Organization
Michael New, PhD, DAA Research	Science Mission Directorate (SMD), NASA HQ
Eric Holmes, Joint Agency Satellite Division	SMD, NASA HQ
Rod Chappell, OSTEM/MUREP	Langley Research Center
Marilyn Tolliver	Goddard Space Flight Center (GSFC)
Aprille Ericsson, PhD, Aerospace Flight Systems	GSFC
Trena Ferrell, PhD, Earth Science Division	GSFC
James Harrington, Computer and Research Development	GSFC
LaJuan Moore, Planetary Science Division	PSD, NASA HQ
Shawn Domagal-Goldman, PhD, Planetary Systems Laboratory	GSFC
David J. Smith, PhD, Space Biosciences Division	Ames Research Center
Daniella Scalice, Astrobiology Program	PSD, NASA HQ
Lou Strolger, PhD	Space Telescope Science Institute (STScI)
Antonio Cucchiara, PhD, Astrophysics Division	ApD, NASA HQ
Tiffany Kataria, PhD, Exoplanet Discovery and Science	Jet Propulsion Laboratory
Lynnae C. Quick, PhD, Planetary Geology, Geophysics, and Geochemistry Laboratory,	GSFC
Melissa Kirven-Brooks, PhD, Astrobiology Program	Ames Research Center
Lisa Carnell, PhD, Biological and Physical Sciences Division	SMD, NASA HQ

Planning Information: Mentoring Expectations



A mentoring plan describing overarching goals for the students, and roles and responsibilities of mentors at the partner institutions, is required.

Mentoring models that involve collaboration between faculty and NASA scientists and engineers that engage faculty, as well as students, in current or future Science Mission Directorate (SMD)-funded research are encouraged.

Proposals also may include capacity-building efforts at those partner institutions historically under-resourced in the NASA research and engineering enterprise.

https://science.nasa.gov/smd-bridge-program

Planning Information: Funding

SMD expects to award ~$5M per year to successful Bridge teams.

- Proposals can be submitted in four broad funding categories (Small, Medium, Large or Key program), with Small proposal budgets requesting <$70K per year; Medium <$150K per year; and Large < $500K per year.
- "Key Program" proposals must propose to build a consortium of partner institutions whose goals include increasing the research capacity across multiple participating institutions, with a higher funding level (<$2M per year).
- For all cost categories, funding duration can range from one to five years.

https://science.nasa.gov/smd-bridge-program

Meeting Location and Dates

We are happy to announce the virtual SMD Bridge Program Workshop scheduled for October 17–21, 2022.

Workshop Format: Plenary talks, guided discussions*, parallel sessions, repeated opportunities to engage, Slido, Slack
+ 12 reports on Friday (Day 5)

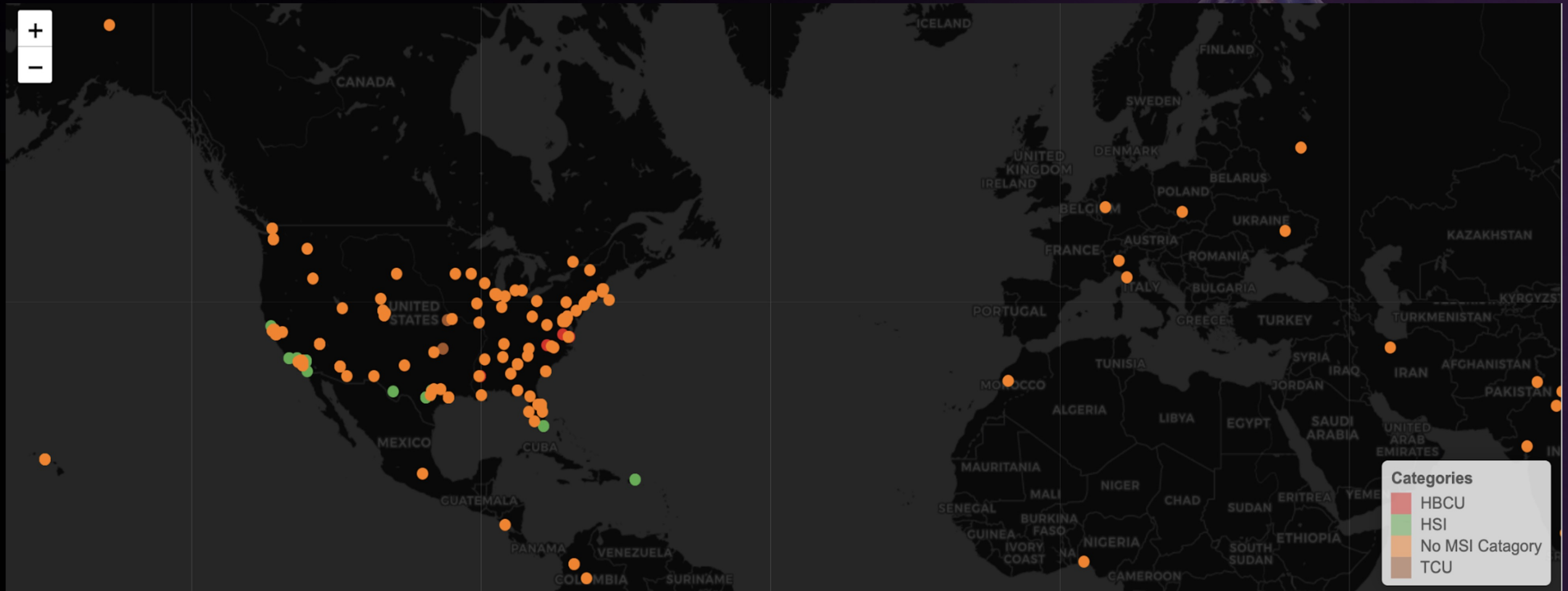
Setting the Stage: Evidence based program design: Beyond the Metrics
Early Career Perspectives
Community Colleges
STEM Mentoring
Capacity Building & Professional Societies
AANAPI, Native Hawaiian, TCUs, and Native American Nontribal - Serving Institutions

- Hispanic-serving Institutions
- HBCUs and Primarily Black Institutions
- Primarily Undergraduate Institutions
- California Programs and Institutions
- Accessibility
- Existing NASA Programs

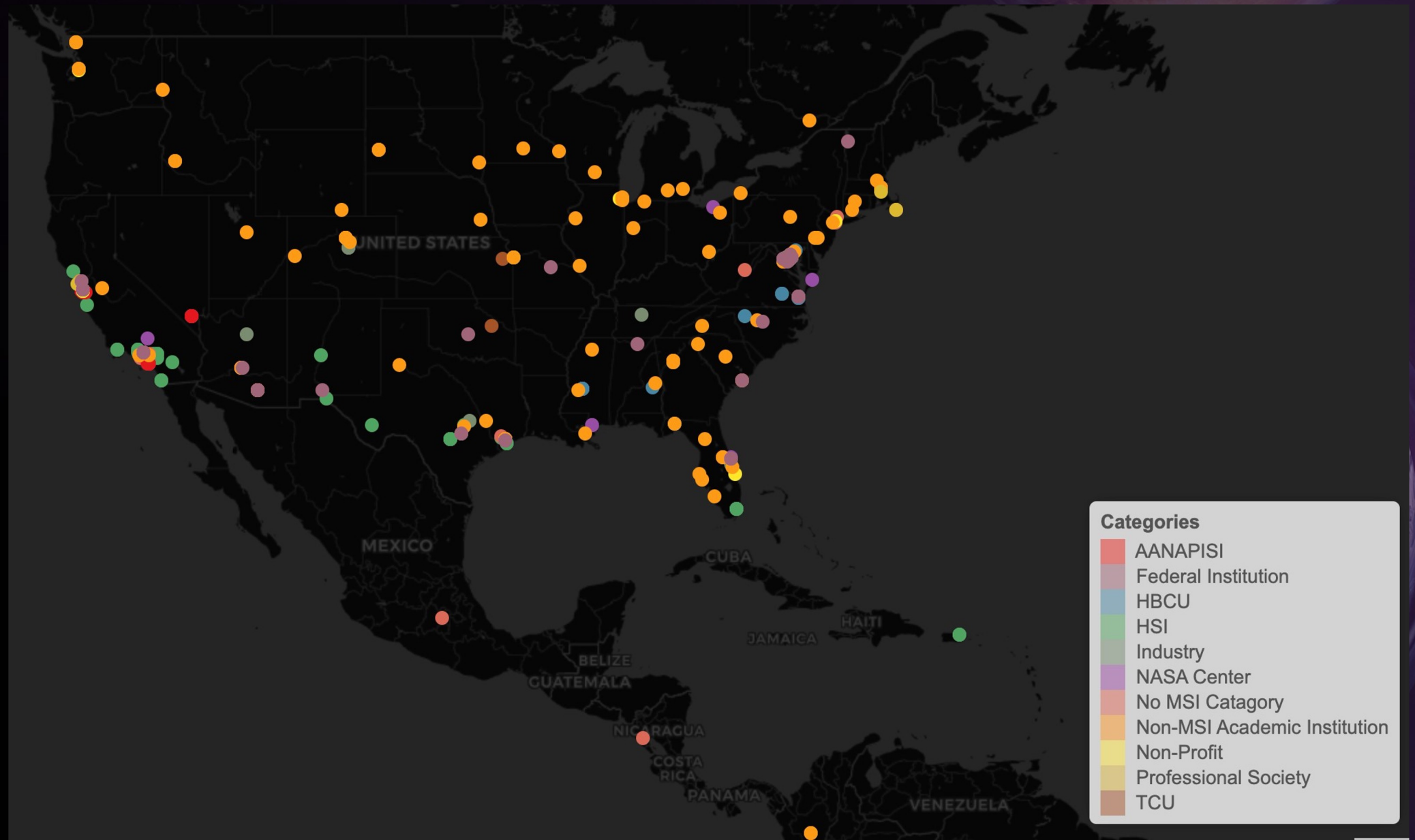
**each break-out room was run by a Facilitator and a Note-taker trained by the BPWOC and LMI*

Snapshot of the Week

- Total number of registrants: 421 from 41 countries, states, and territories
- Total number of breakout rooms: 48; Total pages of notes generated: 120+



Institution-specific Workshop Registration



>50 Facilitators and Notetakers

- Rick Gilmore
- Tara Strang
- Tremaine Brittian
- Carol Hood
- Michael Davis
- Marianne Smith
- Vemitra White-Alexander
- Carl Moore, Jr
- Alvin Smith
- Maggie Potter
- LaChel House
- Sara Doan
- Ilana White
- Meagan Thompson
- Nicolle Zellner
- Katy Rodriguez
- Wimberly
- Jenna Cann
- Arturo Martinez
- Shawn Domagal-Goldman
- Nicole Cabrera Salazar
- Rudy Montez
- Lynn Cominsky
- Amethyst Barnes
- Jeremias Nunez
- Regina Jorgenson
- Michael Wangler
- Teresa Ciardi
- Alyssa Whitcraft
- Lalitha Balachandran
- Breanna Binder
- Amy Steele
- Clayton Clark
- Kim Barnette
- Tiffany Kelly
- Sara Callori
- Joshua Valcarce
- Antonino Cucchiara
- Daniella Scalise
- Becks Prescott
- Willie Rockward
- Ron Gamble
- Raquel Martinez
- Natasha Latouf
- Kavita Mittapalli
- Andrew Grillo-Hill
- Jesus Pando
- Claudia Bolanos
- Lakiesha Cooper
- Ruth Starr
- Noel Gardner
- Bri Hart
- Eddie Gonzales

+ 16 Session Openers & Closers, incl. T. Zurbuchen

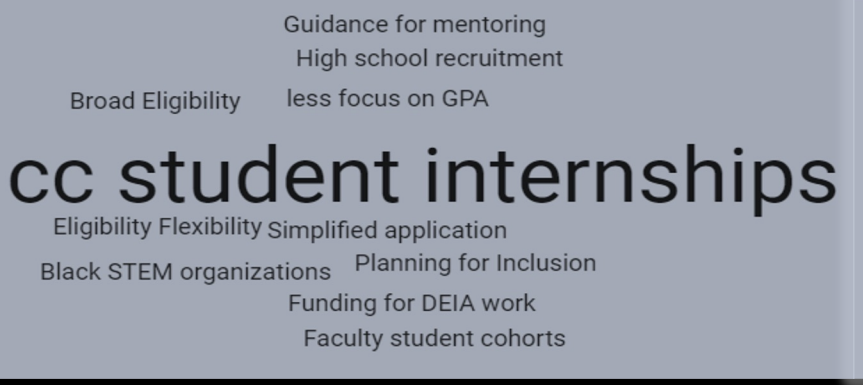
4. Major Themes

What one element would you like to see in NASA's SMD Bridge Program as it relates to…

STEM Mentoring

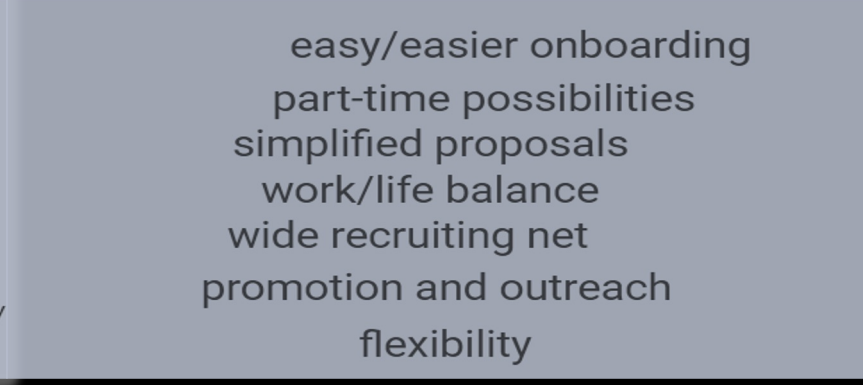
Early Career Perspectives

Community Colleges



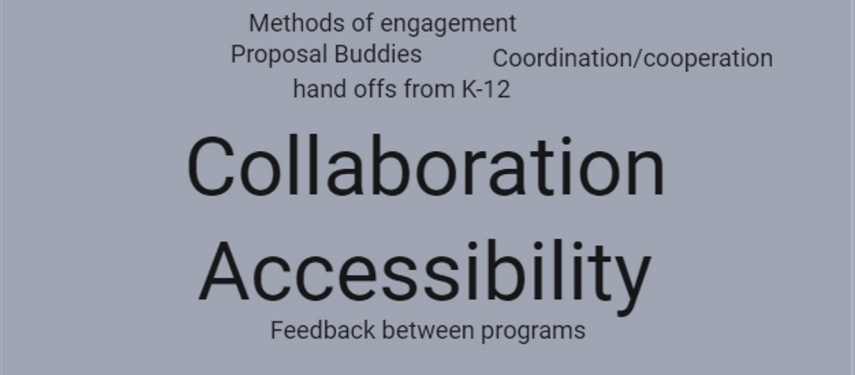
HBCU

Accessibility



Hispanic Serving Institutions

NASA Existing Programs



AANAPISI

Bridge Program Workshop Report

A workshop report will be delivered to NASA SMD and made public. It is being drafted by the workshop organizing committee and includes:

- NASA goals
- Faculty/institutional goals
- Student/early career goals
- Other stakeholder goals
- Shared goals
- Any other findings

Inputs to the workshop report include:

- Background information on workshop development
- Working group structure, process, themes
- Break-out room notes
- Report-out information

The SMD Bridge Program should…

Center the needs

of students and faculty at institutions that are under-resourced as recipients of NASA funding. Often, these students and faculty have been historically and systematically marginalized.

Create and lead a paradigm shift

such that NASA SMD assumes primary responsibility for building impactful relationships/partnerships with marginalized and underserved communities to diversify its workforce and the STEM community.

The SMD Bridge Program needs to…

1) intentionally **remove systemic barriers**, esp. at under-resourced institutions

2) have dedicated qualified NASA mentors that can provide sustained long-term projects for faculty, students at under-resourced institutions

→ **capacity building**

→ **long-term** relationship, long-term funding (>5 years)

The SMD Bridge Program needs to…

3) reduce barriers for PIs at under-resourced institutions (and their support staff) to propose, submit, manage, and report

→ better **advertise** existing opportunities

→ readily **provide resources and training**

→ proposal writing AND grants management

→ help to **build infrastructure and knowledge base** at the under-resourced institutions

Theme 1

Focus on under-resourced institutions, their faculty and students

→ In proposals for partnerships between under-resourced and better-resourced institutions, ensure that the under-resourced partner retains the majority of the funding. They are also expected to be the PI.

→ Reimagine the proposal process as a co-developed, two-phased opportunity in which Phase 1 consists of the submission of an initial idea, and Phase 2 involves NASA working with and providing resources to the interested communities to develop the plan, budget, pathway, etc.

→ Leverage existing resources (e.g., ISFM, missions)

Theme 2

NASA should be responsible for cultivating relationships (Architects)

NASA needs to give due care and regard to these relationships

→ Require training for NASA mentors/partners

→ Match between institutions and NASA projects (i.e., networking events)

→ Create flexibility in the "title" of students (e.g., student research collaborator/associate) badged to NASA through their institution and funded through the Bridge Program

→ Provide a point person/people for the proposing PI and their support staff

→ member of the same community as the PI (e.g., tribal, CC, PUI) who understands the challenges and barriers of that community

→ employed at NASA

5. Looking Ahead

The plans need modifications to be responsive to the workshop themes

Traditional ROSES call for Bridge Partnerships will work for some, but not all, potential partners.

TAKEAWAY 1

Some potential partners require **seed funding** to develop a plan and relationship with NASA partners

TAKEAWAY 2

NASA needs to be **intentional** w/r/t cultivating new partnerships and increasing capacity at URIs

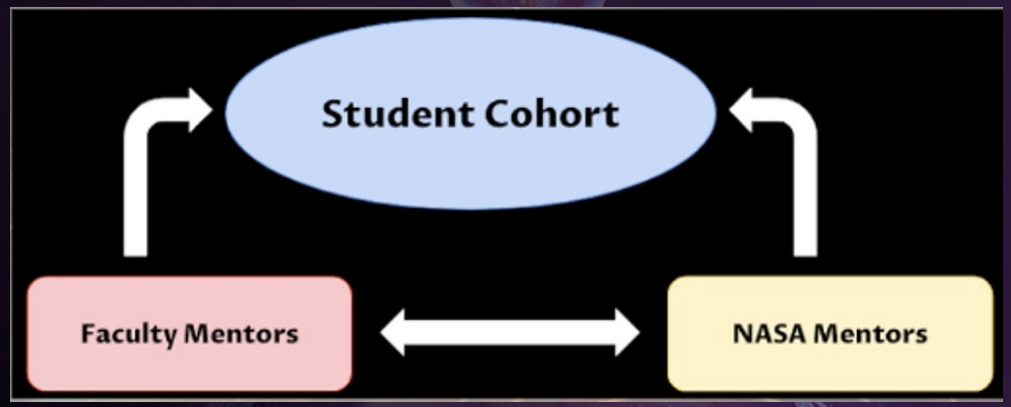
TAKEAWAY 3

Course of Action

Issue ROSES Call for Bridge Program Seed Funding Proposals

Issue ROSES Call for Bridge Partnership Pilot Proposals

- Require Defined Mentoring Component in Proposals



Consider Augmentations to Existing Programs

Develop Communications Plan

Organize Networking Event(s) to Foster New Partnerships

Organize Symposia to Bring Selected Bridge Teams Together

Leverage Internal and External Partnering

- Internal Examples: NASA OSTEM, Science Activation, SMD IDEA WG
- External Examples: NSF, AIP, APS, AAS, AGU, NSBE, NSBP, SACNAS, AISES

Bridge Timeline

Incorporate Workshop themes and data into first calls

learn as we go: second workshop to adjust plan after first round

Basic Structure: Planning Info

2022 May - December

Workshop: Plenaries Break-out rooms, findings, themes, perspectives

2022 October

Workshop Report

Draft calls

Strategic Plan

Finalizing now

First Bridge Call Appendix F.23* ROSES-23

March/April

Final workshop report will be made public at the same time as our response, incl. strategic plan for incorporating the highest priority themes into the Bridge Program.

Thank you!

Questions or comments:
Padi.Boyd@nasa.gov

Bridge planning information:
https://science.nasa.gov/smd-bridge-program

Workshop portal:
https://www.hou.usra.edu/meetings/smdfall2022/