NASA SMD Bridge Program: Workshop and 2023 Plan

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SMD Bridge Program Director
NASA Science Mission Directorate
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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
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.

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

**SOUN丁G ROCKETS**
- 11 Science Missions Launched
- 43 In Development

**SMALLSATS/CUBESATS**
- 57 Science Missions
- 10 Technology Demos

**MISSIONS**
- 134 Missions from formulation through extended operations
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
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)
SCIENCE MISSION DIRECTORATE

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: 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: Kim Barnette  
**Institution:** LMI/NASA SMD

Name: Tiffany Kelly  
**Institution:** LMI/NASA SMD

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

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: 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: Jamie Shumbera  
**Institution:** Lunar and Planetary Institute (LPI)
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
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.
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<tr>
<th>Name</th>
<th>Center or Organization</th>
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<tr>
<td>Michael New, PhD, DAA Research</td>
<td>Science Mission Directorate (SMD), NASA HQ</td>
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<td>Eric Holmes, Joint Agency Satellite Division</td>
<td>SMD, NASA HQ</td>
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<td>Rod Chappell, OSTEM/MUREP</td>
<td>Langley Research Center</td>
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<td>Marilyn Tolliver</td>
<td>Goddard Space Flight Center (GSFC)</td>
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<td>Aprille Ericsson, PhD, Aerospace Flight Systems</td>
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<td>Trena Ferrell, PhD, Earth Science Division</td>
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<td>James Harrington, Computer and Research Development</td>
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<td>LaJuan Moore, Planetary Science Division</td>
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<td>David J. Smith, PhD, Space Biosciences Division</td>
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<td>Tiffany Kataria, PhD, Exoplanet Discovery and Science</td>
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<td>Melissa Kirven-Brooks, PhD, Astrobiology Program</td>
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<tr>
<td>Lisa Carnell, PhD, Biological and Physical Sciences Division</td>
<td>SMD, NASA HQ</td>
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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
SCIENCE MISSION DIRECTORATE

>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 Cucciara

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
- mentorship training
- Joint/Co Mentoring
- multiple mentors
- Effective mentoring Virtual mentor platform
- near-peer mentors
- student-focused methods
- student leadership ops
- mentoring cohorts
- Resources for the mentors

Community Colleges
- Guidance for mentoring
- High school recruitment
- Broad Eligibility
- less focus on GPA

HBCU
- Corporate incubator prog
- Productive Partnerships
- local engagement
- cc student internships
- Eligibility Flexibility Simplified application
- Black STEM organizations
- Planning for Inclusion
- Funding for DEIA work
- Faculty student cohorts

Accessibility
- easy/easier onboarding
- part-time possibilities
- simplified proposals
- work/life balance
- wide recruiting net
- promotion and outreach
- flexibility

NASA Existing Programs
- Methods of engagement
- Proposal Buddies
- Coordination/cooperation
- hand offs from K-12

Collaboration
- Feedback between programs

AANAPISI
- Means of engagement
- listening reciprocity
- relationship building
- sustainable nonextractive
- respect
- go slow
- relationship
- hybrid/remote research

Hispanic Serving Institutions
- Comprehensive mentoring
- More publicity about HSI
- accessibility
- needs of HSIs
- needs of Hispanic student

Financial support
- DACA Opportunities
- Best practices: advising
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)
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

TAKEAWAY 1
Traditional ROSES call for Bridge Partnerships will work for some, but not all, potential partners.

TAKEAWAY 2
Some potential partners require **seed funding** to develop a plan and relationship with NASA partners.

TAKEAWAY 3
NASA needs to be **intentional** w/r/t cultivating new partnerships and increasing capacity at URIs.
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/