Envisioning the Future of NSF EPSCoR

FINDINGS, RECOMMENDATIONS, AND SUGGESTIONS OF THE SUBCOMMITTEE ON THE FUTURE OF NSF EPSCOR

The Committee on Equal Opportunities in Science and Engineering (CEOSE)

NSF
National Science Foundation
WHERE DISCOVERIES BEGIN

DCL NSF 21-088

Initiated visioning process to "better understand the impacts of its investment strategies and identify new opportunities for increased success"

https://www.nsf.gov/pubs/2021/nsf21088/nsf21088.jsp

Subcommittee on the Future of NSF EPSCoR

- Charged to guide the visioning process by
  - reviewing materials provided by NSF EPSCoR staff
  - considering written community input
  - conducting listening sessions with key stakeholders
  - synthesizing the collected input into a summary report

- Four working groups
  - Research and Infrastructure Capacity and Competitiveness
  - Education and Workforce Development
  - Broadening Participation
  - Economic Development

https://nsf-gov-resources.nsf.gov/2022-08/Envisioning-The-Future-of-EPSCoR-Report.pdf

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The Subcommittee's work is organized around **two major motivating questions:**

1 What does the **available evidence** tell us about the effectiveness of NSF EPSCoR's current investment strategies, both individually and collectively, in advancing scalable, jurisdiction-wide solutions and best practices to achieve the program's goals?
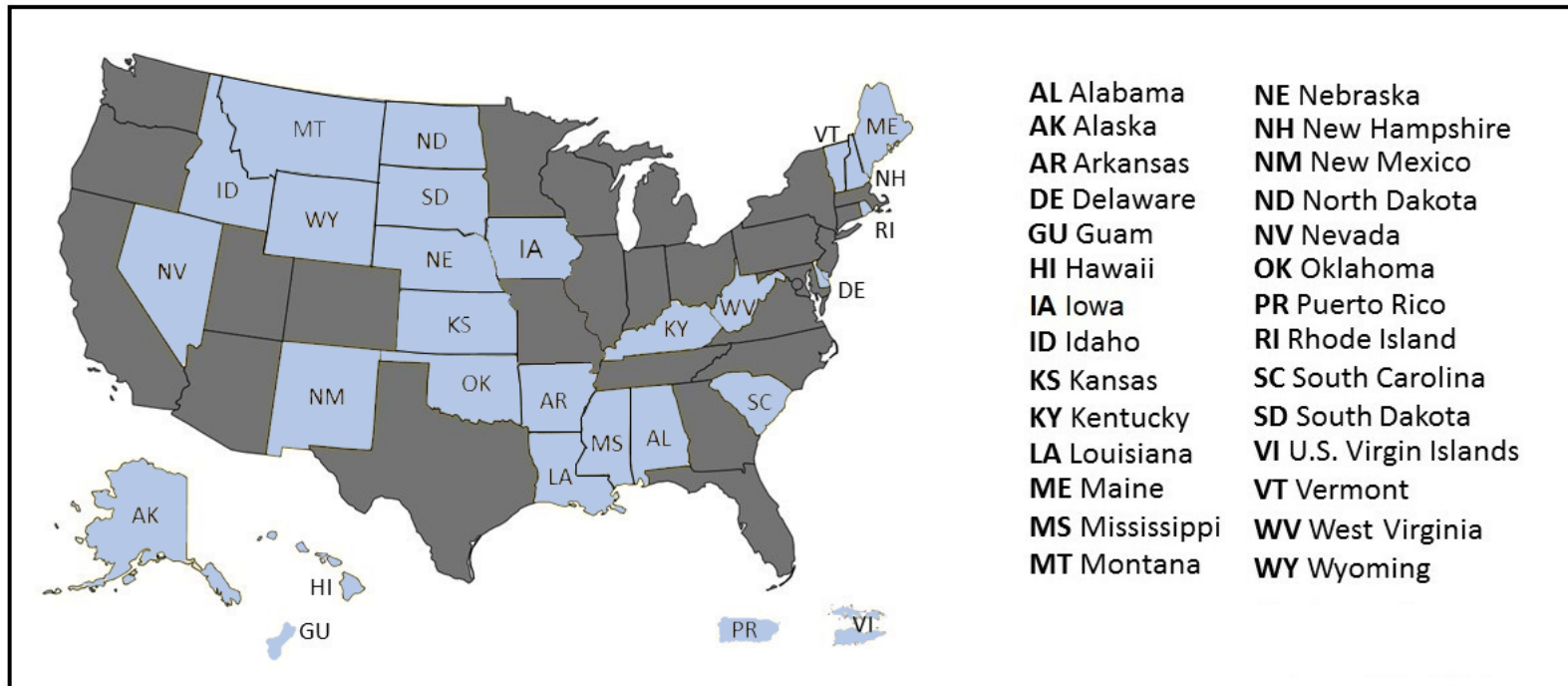
2 Based on the answers to the question above, are there **novel strategies** or changes to the current strategies that would enable NSF EPSCoR and its jurisdictional partners to more effectively achieve its mission?

NSF EPSCoR Jurisdictions

AL Alabama	**NE** Nebraska
AK Alaska	**NH** New Hampshire
AR Arkansas	**NM** New Mexico
DE Delaware	**ND** North Dakota
GU Guam	**NV** Nevada
HI Hawaii	**OK** Oklahoma
IA Iowa	**PR** Puerto Rico
ID Idaho	**RI** Rhode Island
KS Kansas	**SC** South Carolina
KY Kentucky	**SD** South Dakota
LA Louisiana	**VI** U.S. Virgin Islands
ME Maine	**VT** Vermont
MS Mississippi	**WV** West Virginia
MT Montana	**WY** Wyoming

EPSCoR states and other U.S. jurisdictions eligible for EPSCoR co-funding during FY 2022
This includes twenty-five states, Guam, Puerto Rico, and the U.S. Virgin Islands.

1 What does the **available evidence** tell us about the effectiveness of NSF EPSCoR's current investment strategies, both individually and collectively, in advancing scalable, jurisdiction-wide solutions and best practices to achieve the program's goals?

➢ NSF funding to universities and colleges in NSF EPSCoR jurisdictions increased from approximately 10 percent of total NSF R&D funding in 1980 to more than 15 percent in 2014 (31 EPSCoR jurisdictions).

➢ As of 2013, 78 percent (1,049 of 1,346) of NSF EPSCoR-funded faculty remained on staff at a university or college in their original jurisdiction.

➢ Research facilities and S&E education programs in NSF EPSCoR jurisdictions grew substantially by 2014, at times reaching parity with non-NSF EPSCoR states.

- 66 new research centers and 83 new or upgraded laboratory facilities by 2014
- More than 100 degree programs created, including 64 Ph.D. programs

J. Watson III, Elaine A. Sedenberg et al. 2014. *Evaluation of the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR)*. (IDA Paper P-5221). Washington, D.C.: IDA Science and Technology Policy Institute.

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➢ Although these data provide evidence for the types of advances NSF EPSCoR has made toward its program goals, there is still room for progress.

- An unpublished study by 2M Research in 2020 found that on average, NSF EPSCoR jurisdictions ranked lower than non-NSF EPSCoR jurisdictions on 26 outcome variables related to human capital production, reputation in knowledge production, and economic development of high-tech industry.

- These findings suggest the need for new ideas for how to reduce the gaps between NSF EPSCoR and non-NSF EPSCoR jurisdictions in research infrastructure competitiveness and capacity.

2M Research. *Study of the Established Program to Stimulated Competitive Research (EPSCoR): Base Period Report.* May 1st, 2020. Unpublished Report.

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Selected NSF EPSCoR Key Accomplishments, Overall, Jurisdictional and Grantee Level, RII Track-1 (2017 – 2021)	
EPSCoR Goal 1: Catalyze research capability across and among jurisdictions	>7,000 researchers supported
	16,800 students supported
EPSCoR Goal 2: Broaden the participation of diverse groups/institutions in STEM	486 underrepresented graduate and undergraduate EPSCoR students attained degrees
EPSCoR Goal 3: Establish sustainable STEM education, training, and professional development pathways	Co-funded 210 CAREER awards
EPSCoR Goal 4: Affect engagement in STEM at the national and global levels	Engaged >9,800 faculty
	Included >18,000 K-12 teachers
	Worked with >309,000 K-12 students
EPSCoR Goal 5: Impact jurisdictional economic development	64 new patents
	Leveraged over $1.4B in new awards

2 Based on the answers to the question above, are there **novel strategies** or changes to the current strategies that would enable NSF EPSCoR and its jurisdictional partners to more effectively achieve its mission?

➢ The Subcommittee strongly agrees that NSF EPSCoR jurisdictions could serve as the backbone of American innovation; therefore, further expansion of research and development activities within NSF EPSCoR states, if properly scaled, resourced, and coupled with capacity building programs, could promote longer-term research success at every level.

   ▪ The Subcommittee developed **eight recommendations and nineteen suggestions** to help elevate EPSCoR jurisdictions to function as the backbone of American Innovation. We discuss the recommendations in this presentation. The suggestions are available in the full report.

ECONOMIC DEVELOPMENT

Recommendation 1.
Ecosystem Approach to Investments

NSF should partner with other federal agencies to create new programs for coordinated and long-term strategic investment that will ensure capacity and support from the basic science questions through commercialization, job creation, and workforce support , while also expanding and using the internal EPSCoR co-funding mechanism and considering programs to encourage collaboration between NSF EPSCoR jurisdictions and non-NSF EPSCoR jurisdictions.

Recommendation 2.
Increased Integration of NSF EPSCoR

NSF should adopt a more holistic view of NSF EPSCoR with a greater integration of NSF EPSCoR across the Foundation and more cross-fertilization between the NSF EPSCoR Office and the breadth of the directorates and focus on developing internal programs that are more inclusive of the strengths and scientific priorities of NSF EPSCoR jurisdictions.

RESEARCH AND INFRASTRUCTURE CAPACITY AND COMPETITIVENESS
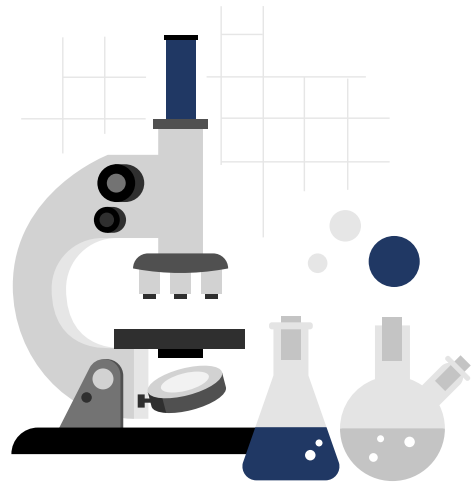
Recommendation 3.
Diverse Talent Recruitment and Retention
NSF should expand investments to grow the critical mass of highly competitive and capable faculty, technical staff and students in NSF EPSCoR jurisdictions and develop new grant programs that build nationally competitive, sustainable research and promote collaborations within and across NSF EPSCoR jurisdictions and beyond.

Recommendation 4.
Physical and Administrative Infrastructure
NSF should invest in physical and administrative infrastructure in EPSCoR jurisdictions that supports research and economic development. This includes construction or modernization of research facilities and infrastructure, research instrumentation, and staff to support intellectual property development, commercialization, and corporate engagement—all of which are essential for building the research infrastructure for sustainable research and economic competitiveness in NSF EPSCoR jurisdictions.

EDUCATION AND WORKFORCE DEVELOPMENT

Recommendation 5.
Programs to Promote Intra- and Interjurisdictional Research, Education and Workforce Development

➢ NSF should explore opportunities to fund collaborative proposals across multiple jurisdictions. Interjurisdictional opportunities could support topics of shared interest that are identified by the proposing project team that would leverage existing expertise and resources with the goals of promoting synergistic research, workforce development, and educational activities that can broaden impacts well beyond what single jurisdictions (particularly smaller ones) can accomplish.

➢ Providing such opportunities for collaboration also enables brain circulation and network development across multiple jurisdictions. Large intra- and interjurisdictional grants could have provisions to enable funding requests for recruitment and retention of young faculty, thereby building a sustainable workforce.

EDUCATION AND WORKFORCE DEVELOPMENT

Recommendation 6.
**Support for Workforce, including those with Diverse Career Pathways**

➢ NSF should expand research and collaboration opportunities and related career support and mentoring for individuals at different career stages (particularly early and mid-career) and pathways within NSF EPSCoR funding programs.

➢ Specific attention to these two critical career stages would create a deliberate and parallel effort to other NSF programs that prioritize opportunities for pre-tenure as well as pre-promotion mid-career faculty.

BROADENING PARTICIPATION
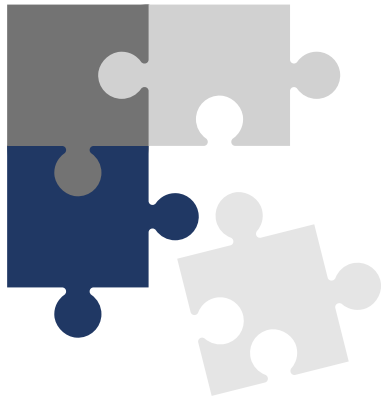
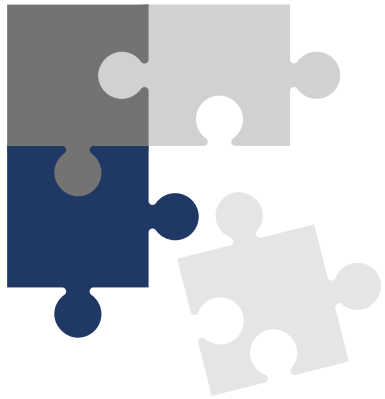**Recommendation 7.**
Proactive Inclusion Strategies
NSF should be accountable for the formation of diverse teams of researchers via partnerships between EPSCoR jurisdictions and researchers from underrepresented groups in all pre- and post-award facets of the EPSCoR program, such as inclusion in panels, committees, commissions, and review boards. EPSCoR researchers, especially those from underrepresented groups, need greater inclusion on NSF panels and advisory committees.

BROADENING PARTICIPATION

Recommendation 8.
Access and Opportunity

NSF should enhance geographic diversity by providing greater infrastructure support for TCUs, HBCUs, HSIs, and other MSIs and PUIs, including TYCs to engage in research efforts and enhance collaborations with external partners. Support must also include technical assistance to address gaps in research administration, funding of brick-and-mortar research facilities, institutional and interinstitutional research collaborations, and establishment of innovative mentoring partnerships. In addition to providing support, EPSCoR must shift to tracking impactful outcomes to inform subsequent support.

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Thank you