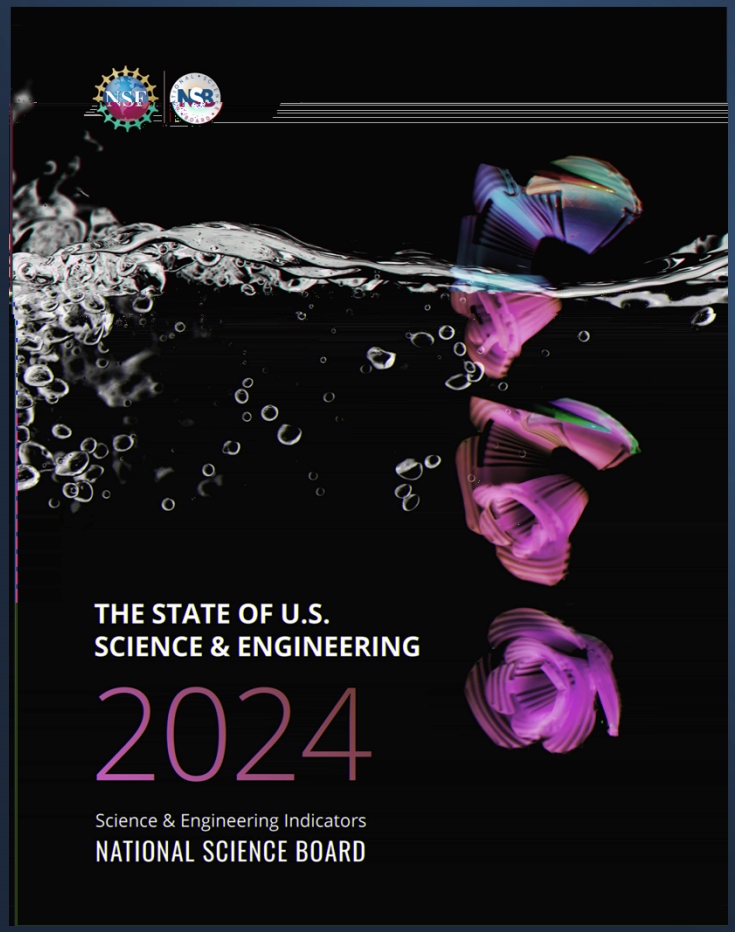
National Science Board

The State of U.S. Science & Engineering

***Science & Engineering Indicators* 2024**

Thursday, April 11, 2024



Speakers:

Daniel Reed
Chair, National Science Board (NSB)
Presidential Professor of Computational Science and Professor of Computer Science and Electrical & Computer Engineering
University of Utah

Sylvia Butterfield
Acting Assistant Director
Directorate for Social, Behavioral and Economic Science
U.S. National Science Foundation

Emilda Rivers
Director
National Center for Science and Engineering Statistics

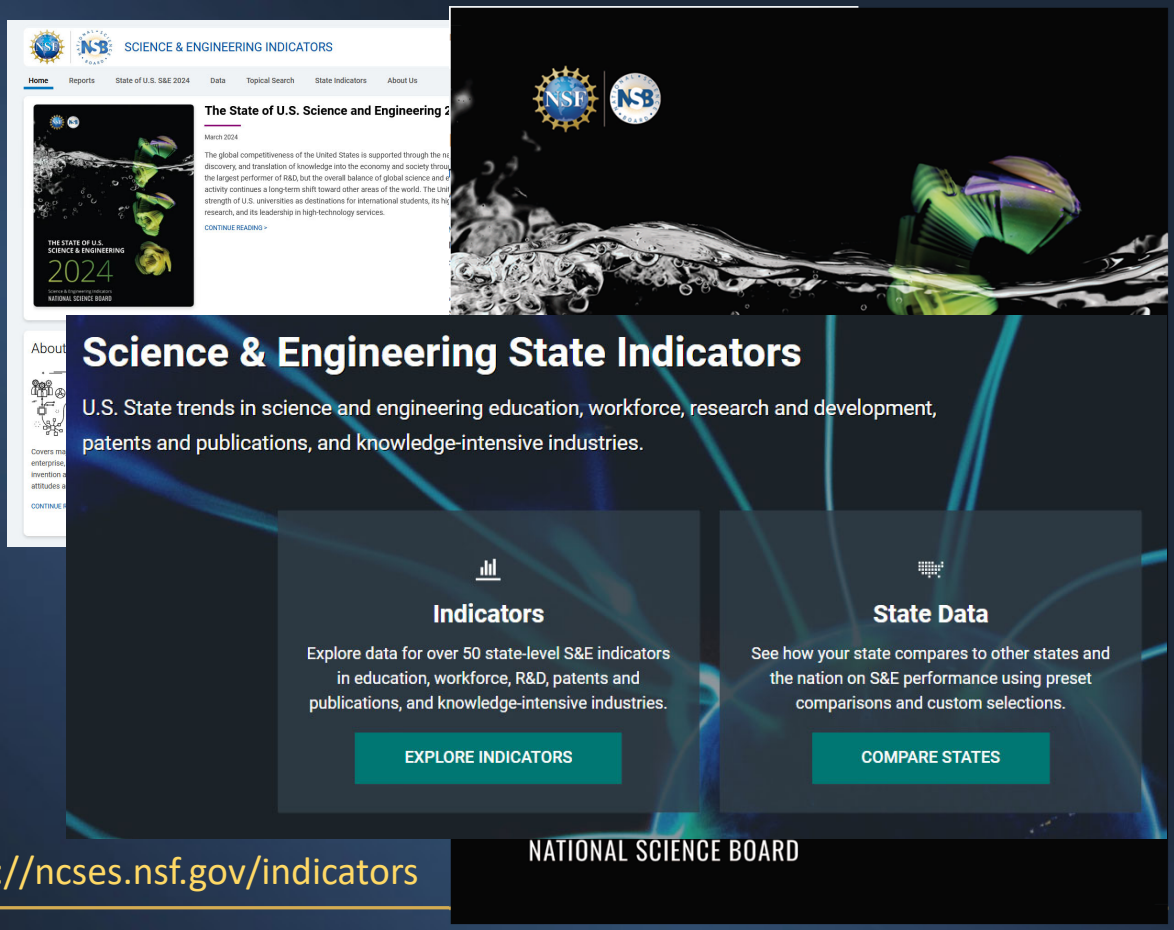
Christina Freyman
Deputy Director
National Center for Science and Engineering Statistics

Maureen Condic
Chair, NSB Committee on National S&E Policy
Associate Professor of Neurobiology and Anatomy
University of Utah, School of Medicine

The National Science Board

Science and Engineering Indicators

- ***The State of U.S. Science and Engineering*: Talent, Discovery, and Translation**
- **Thematic reports** on key topics
- **State Indicators** tool



https://ncses.nsf.gov/indicators

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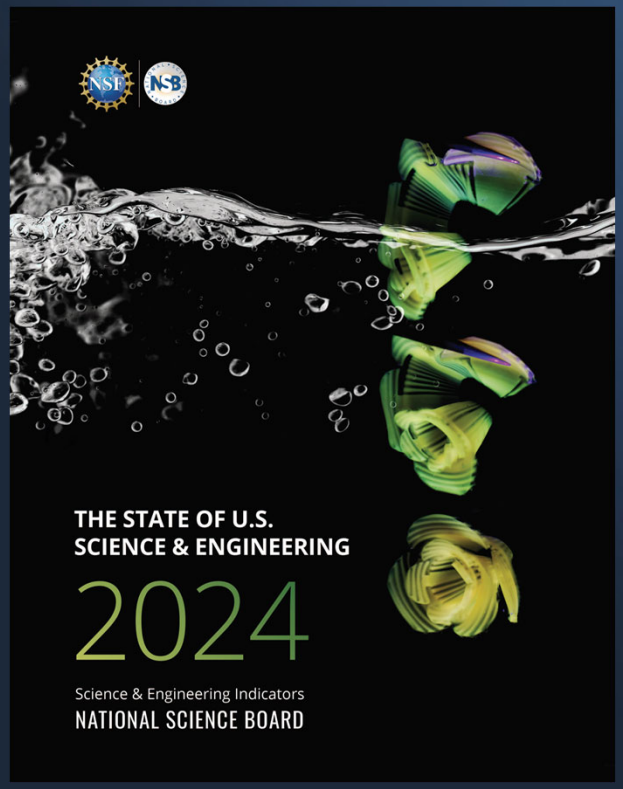
The State of U.S. Science & Engineering



- The U.S. performs more total R&D than any other country
- But the nation's global position is slipping, as countries in East and Southeast Asia, particularly China, increase their activities.
- The nation's ability to compete in S&E depends on robust and sustained national investments in STEM talent, R&D-driven discovery, knowledge translation, and innovation.

NCSES: Trusted Source of Objective Data on the S&E Enterprise

A Variety of Data Sources

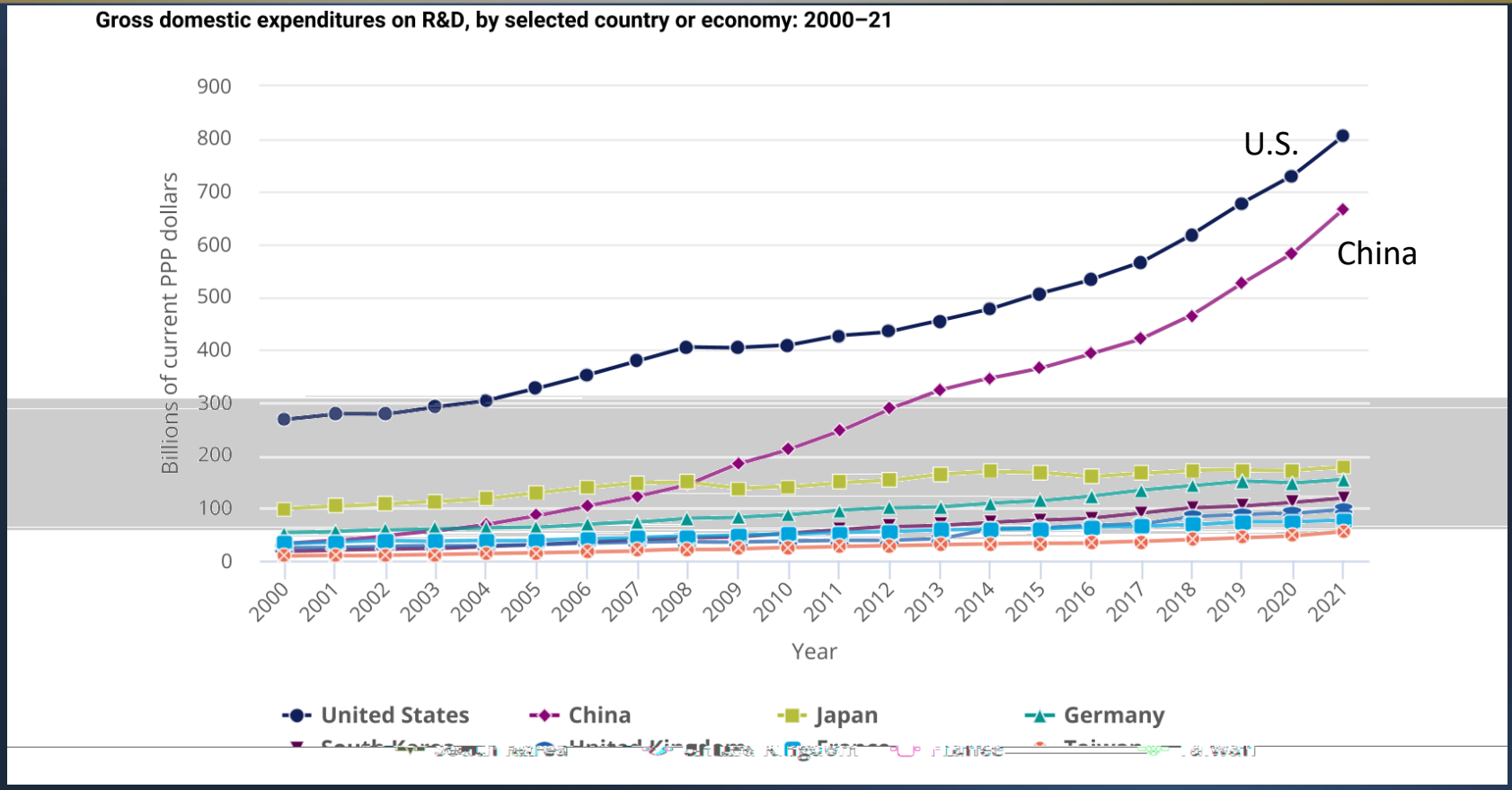
- NCSES official government statistics
  - University
  - Government
  - Business
  - Individuals
- Census, BLS, NCES, etc.
- International, OECD data
- Bibliometric data
- Patent data information

Data From Across the Globe

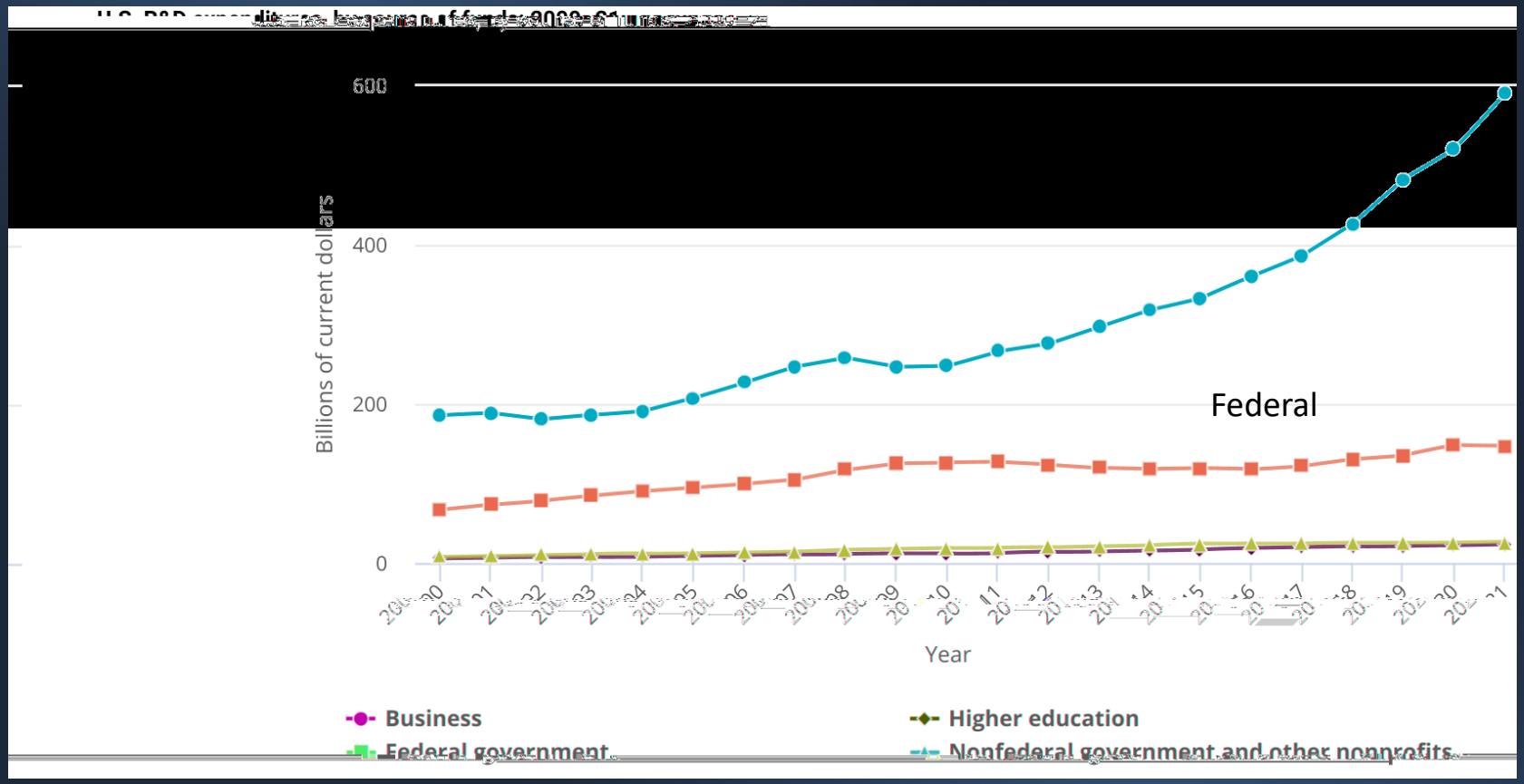
Securely Liberating Data for You

Standard Application Process

Discovery: Gross Domestic Expenditures on R&D



Discovery: U.S. R&D Expenditures



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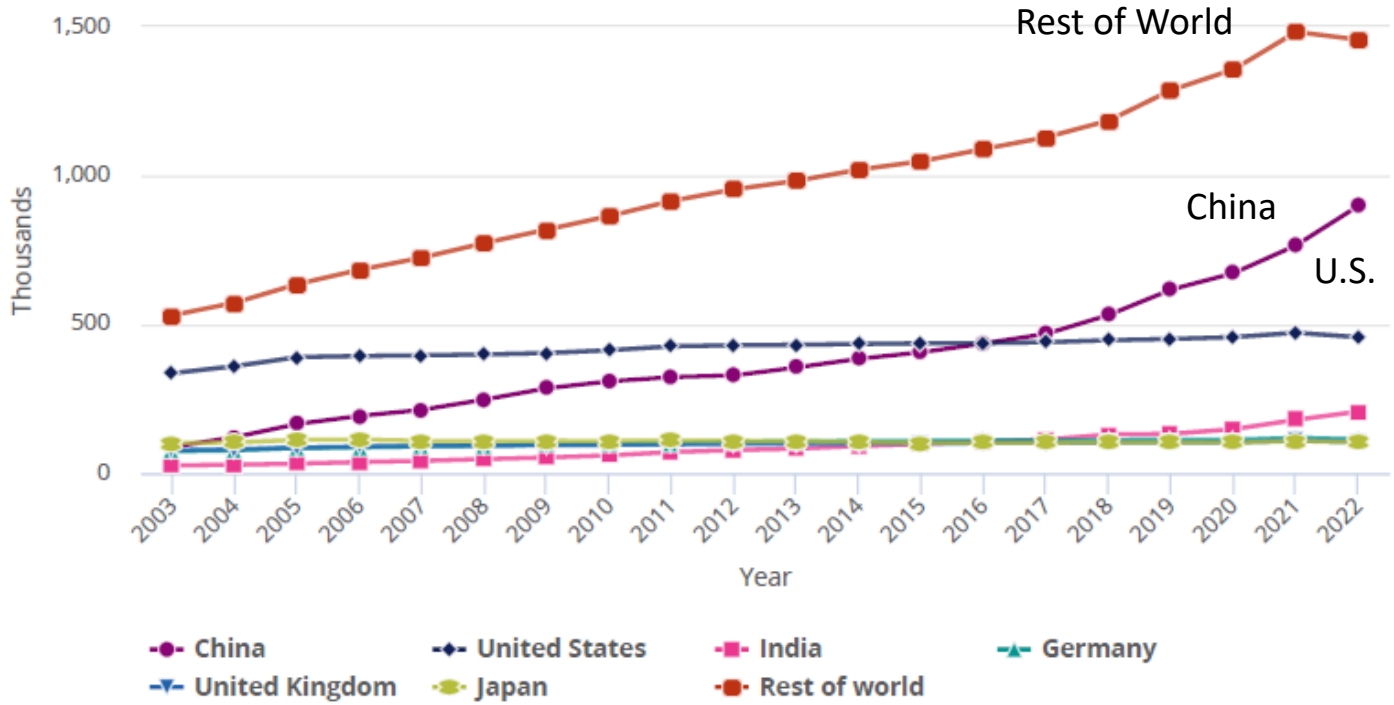
Translation: Publications, Patents, and Industry

S&E research publications, patents, and knowledge- and technology-intensive industry output are concentrated in the United States, East and Southeast Asia, and Europe.

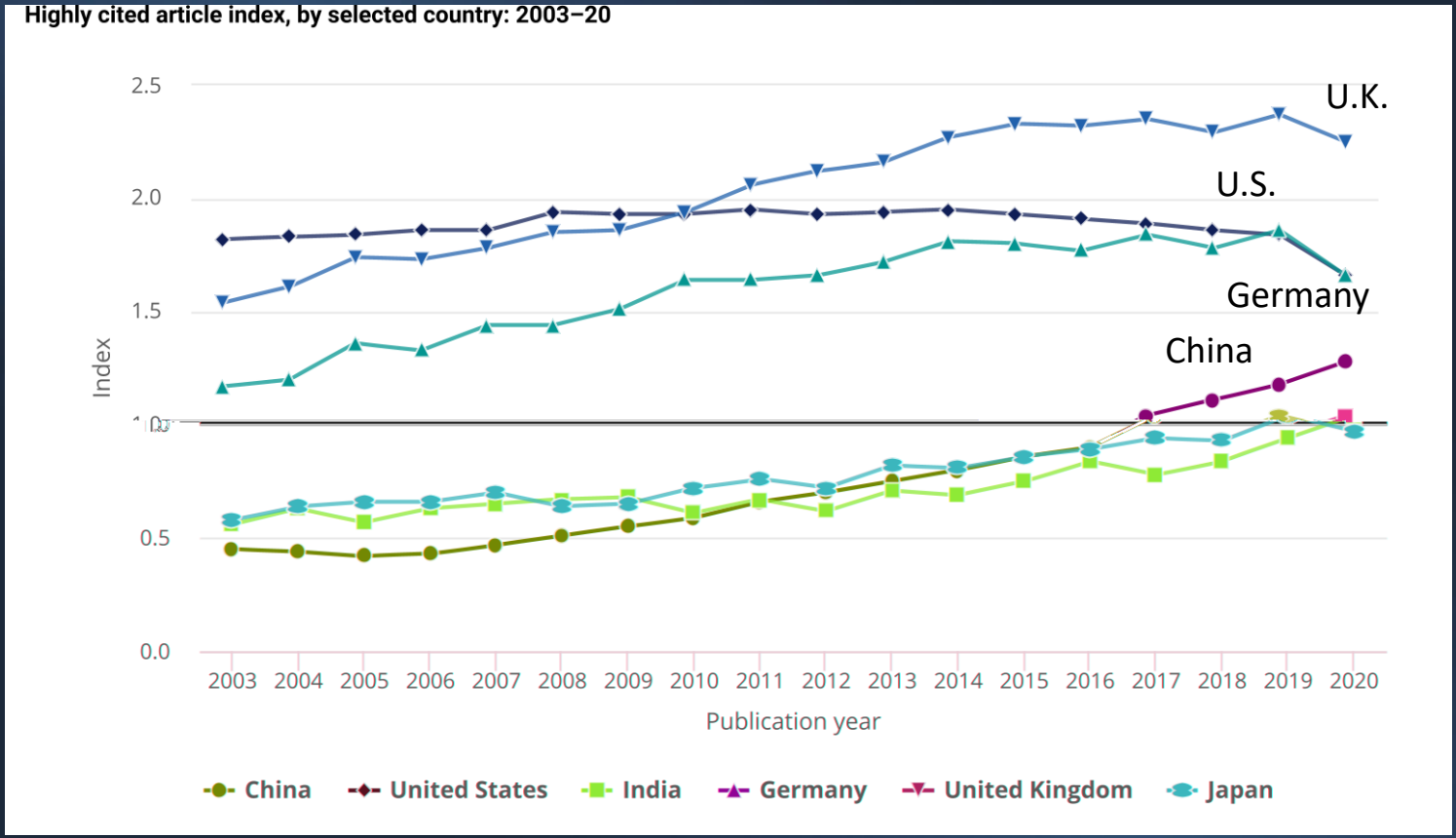
China has significantly increased its share of global science, technology, and innovation capabilities over the last decade.

Translation: Publications

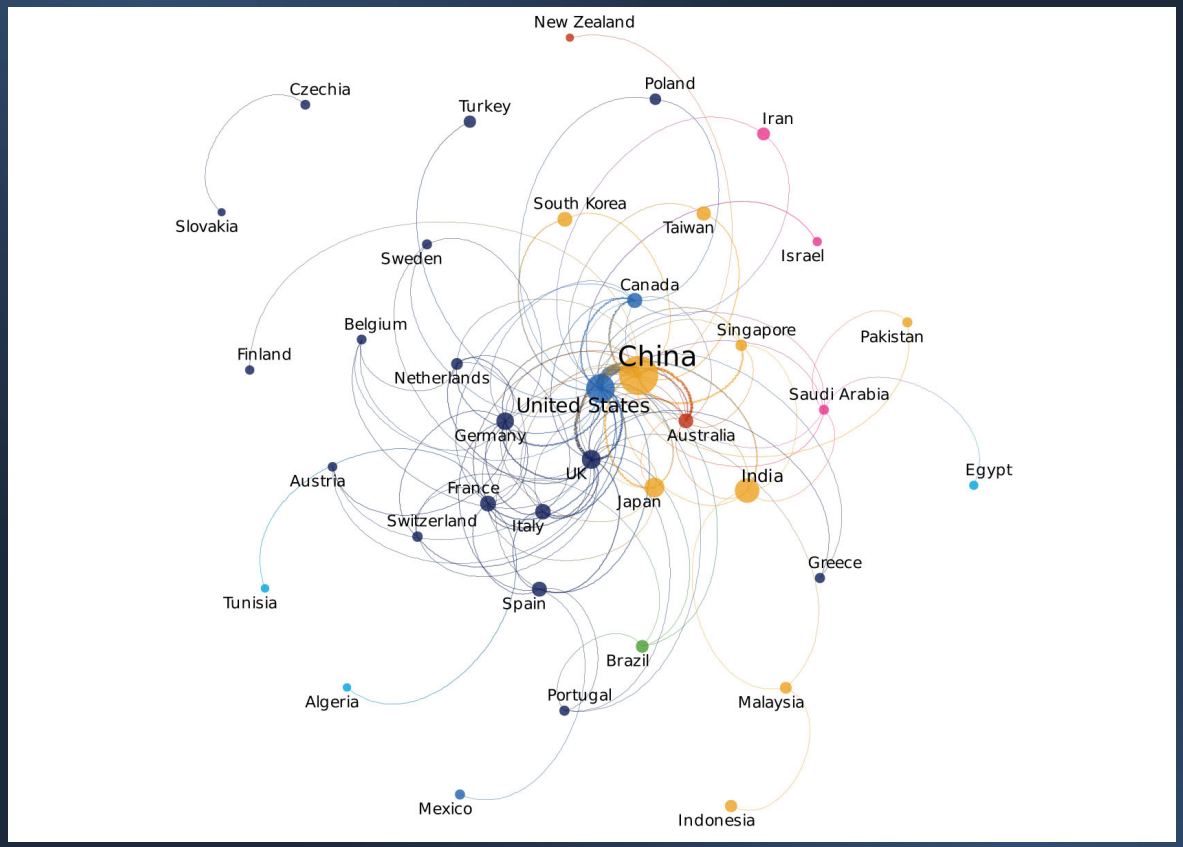
Figure 18. S&E articles, by selected region, country, or economy: 2003–22



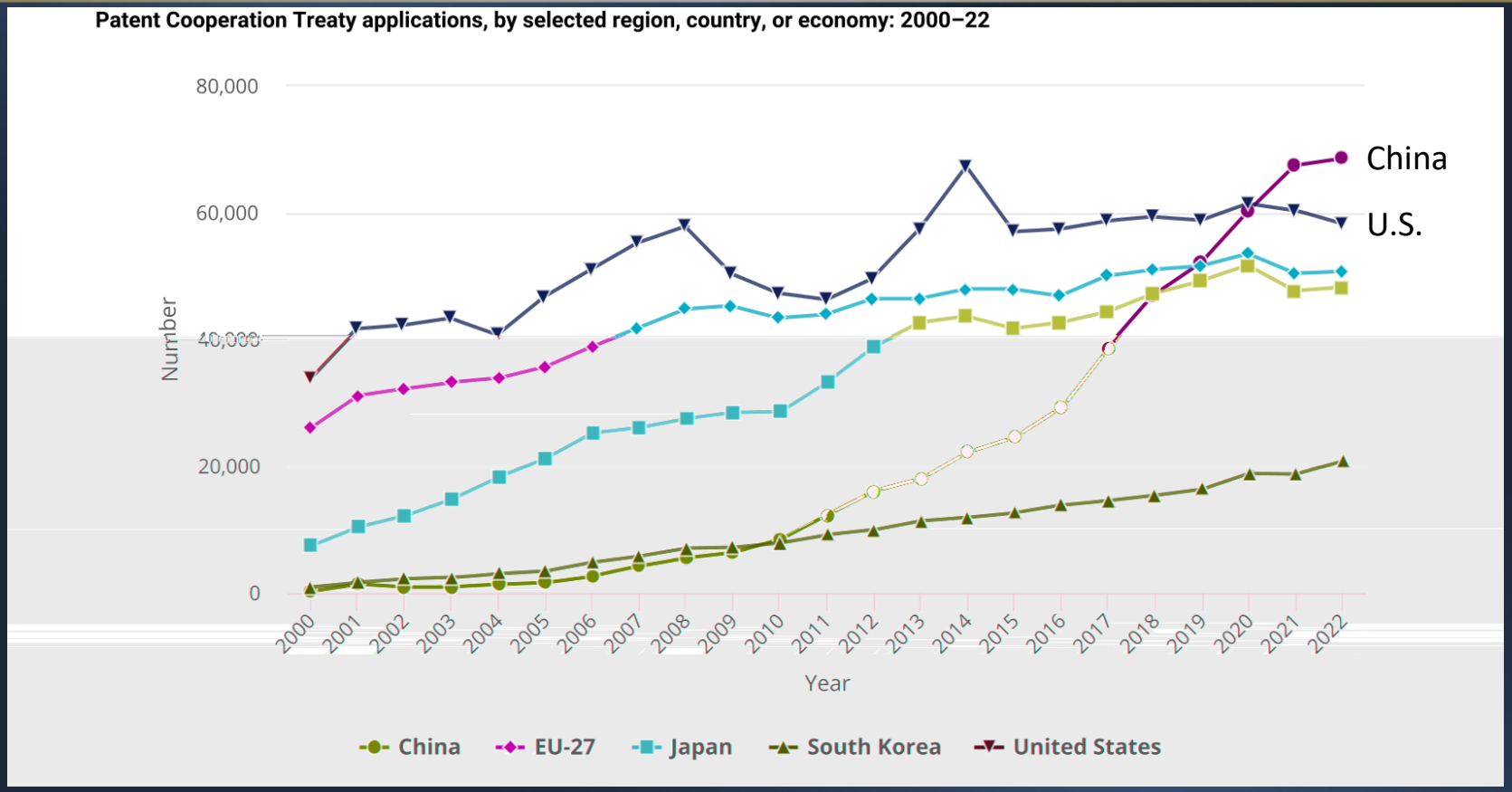
Translation: Highly Cited Publications



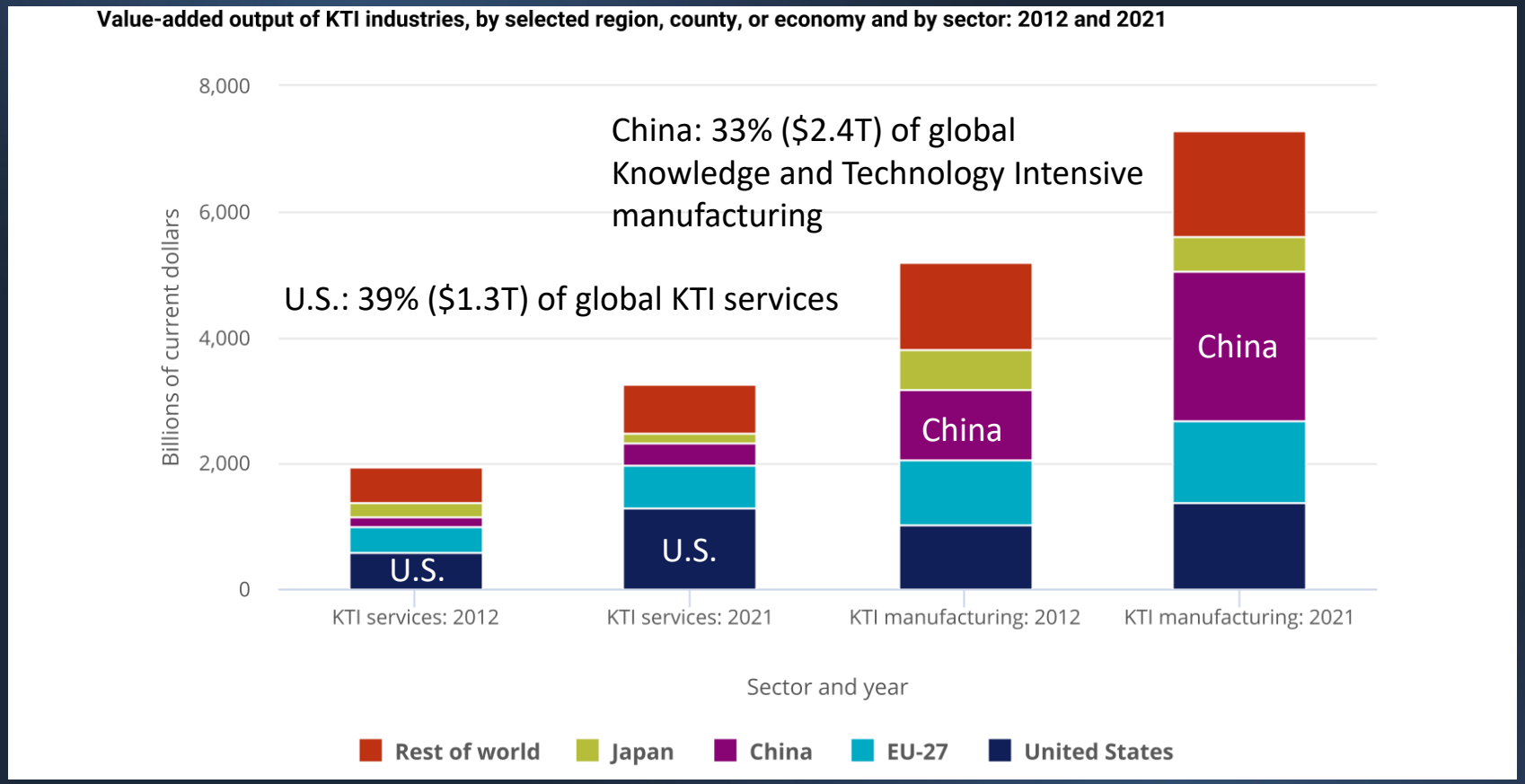
Translation: Global Network of AI Research Publishing



Translation: Patents

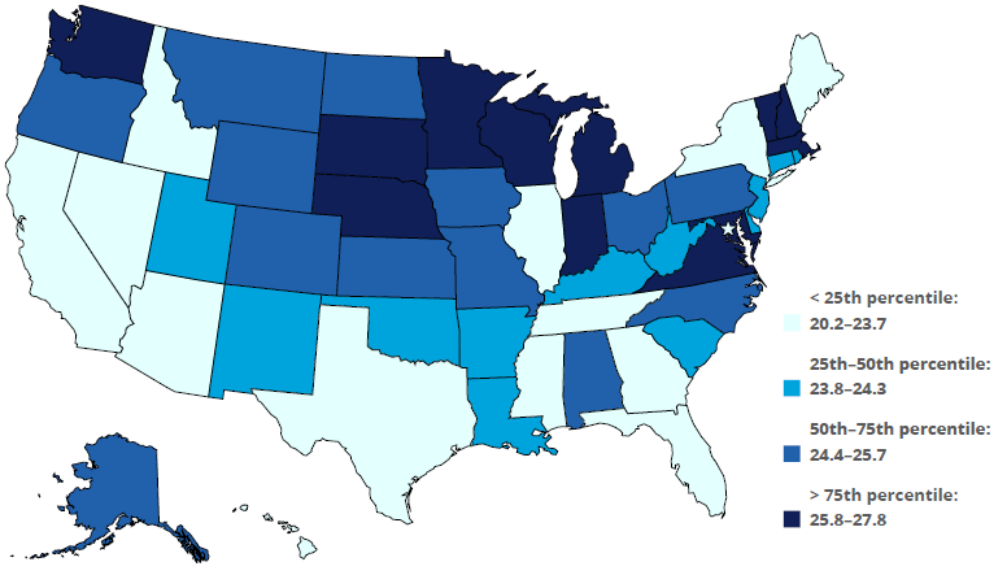


Translation: Knowledge- and Technology-Intensive Industries



The State of U.S. S&E: **STEM Talent**

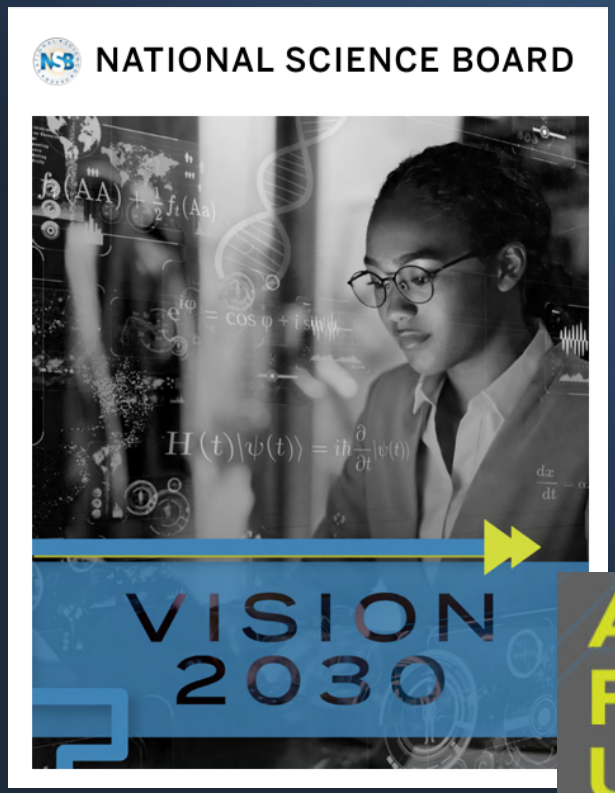
Figure 8. Employment in the STEM workforce, by state: 2021



Note(s): STEM is science, technology, engineering, and mathematics. Quartiles are based on point estimates and do not account for sampling variability.
Source(s): Census Bureau, ACS, 2021. *Indicators 2024: Labor Force*

- *A globally competitive STEM education system equips Americans with the skills and knowledge needed to participate in the STEM workforce.*
- *STEM workers with a broad range of educational credentials sustain the U.S. research enterprise and drive innovation in critical and emerging technologies, supporting the nation's competitiveness in the global economy.*

National Science Board: **Vision for the Future**



- **Deliver Benefits From Research**
- **Expand the Geography of Innovation**
- **Foster a Global S&E Community**
- **Develop STEM Talent for America**

A CASE FOR URGENCY

https://www.nsf.gov/nsb/NSBActivities/vision-2030.jsp

NSB Policy Messages: Talent is the Treasure

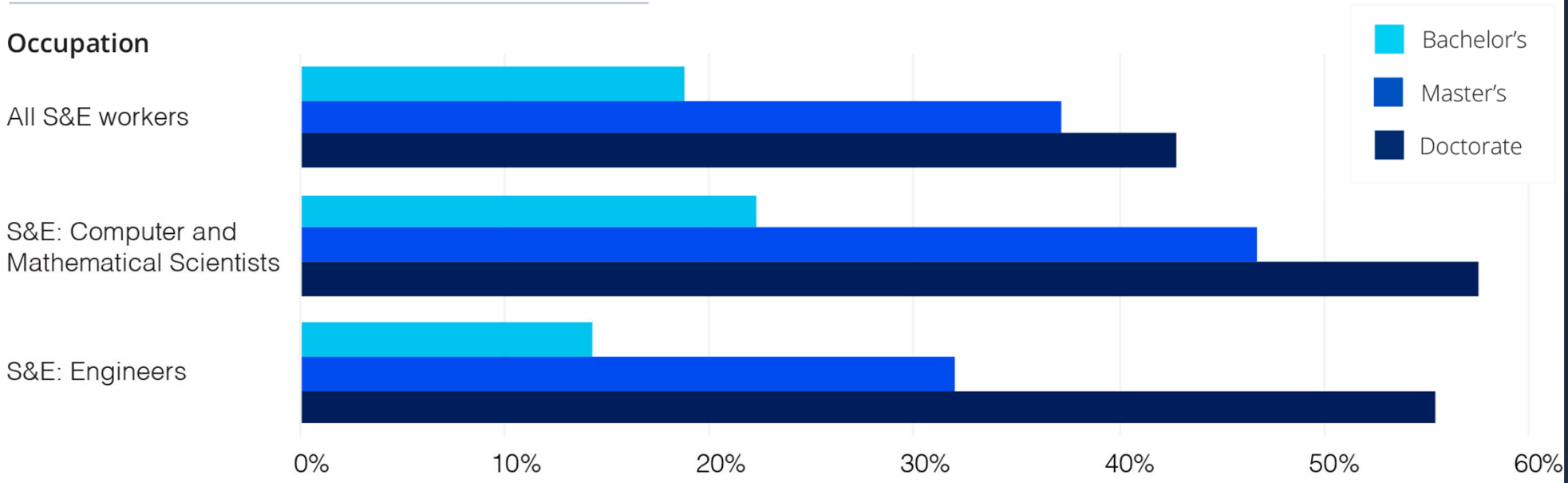
- The U.S. needs a robust, resilient STEM workforce for a strong economy and national security
- But the nation is facing a STEM talent crisis
- Strategic action is sorely needed across educational and workforce levels

Need for Robust, Resilient STEM Workforce

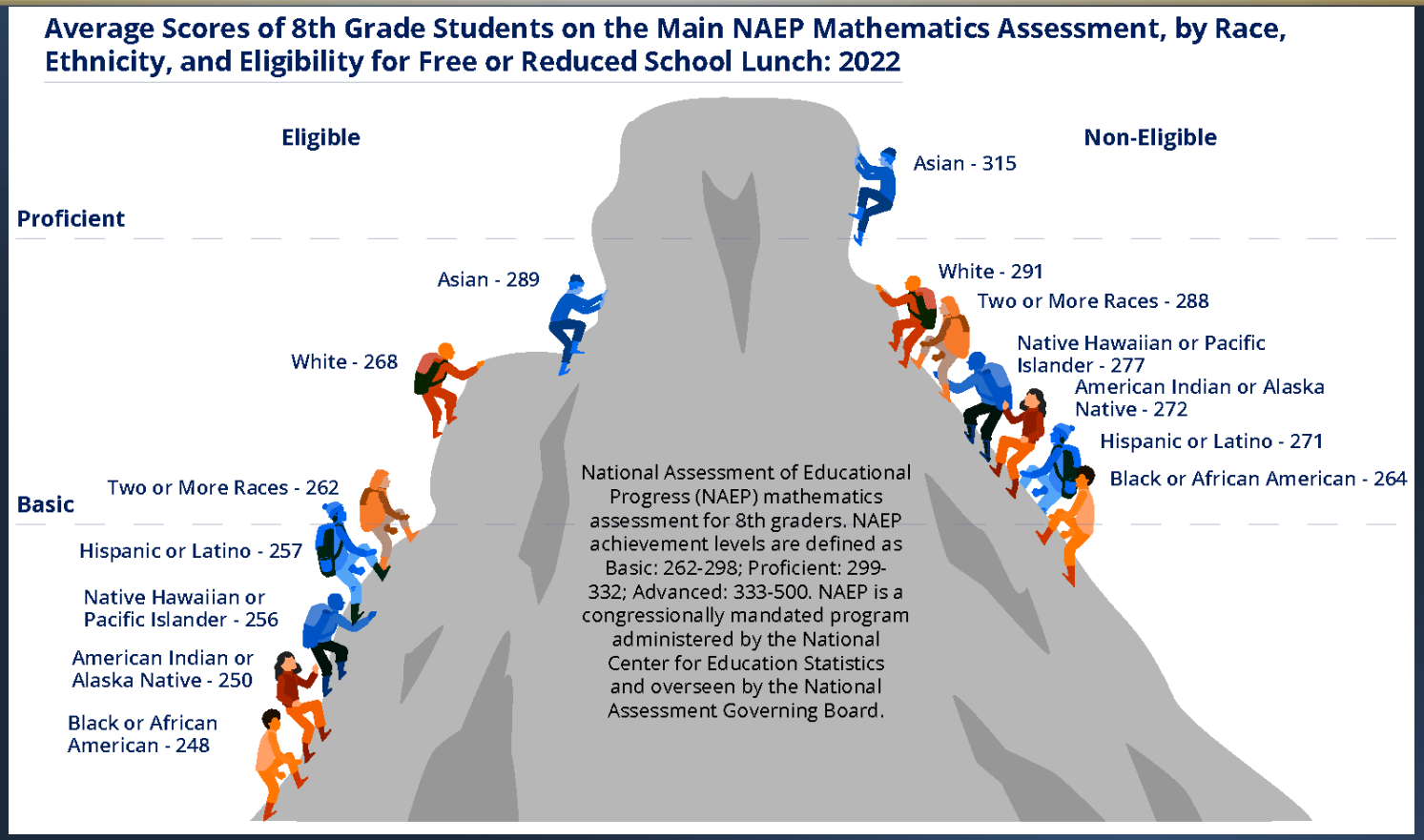
- STEM workforce: 37 million people
- With bachelor's degree: 18 million
- Without bachelor's degree (Skilled Technical Workforce): 19 million

Leadership Risk: Talent Supply Chain

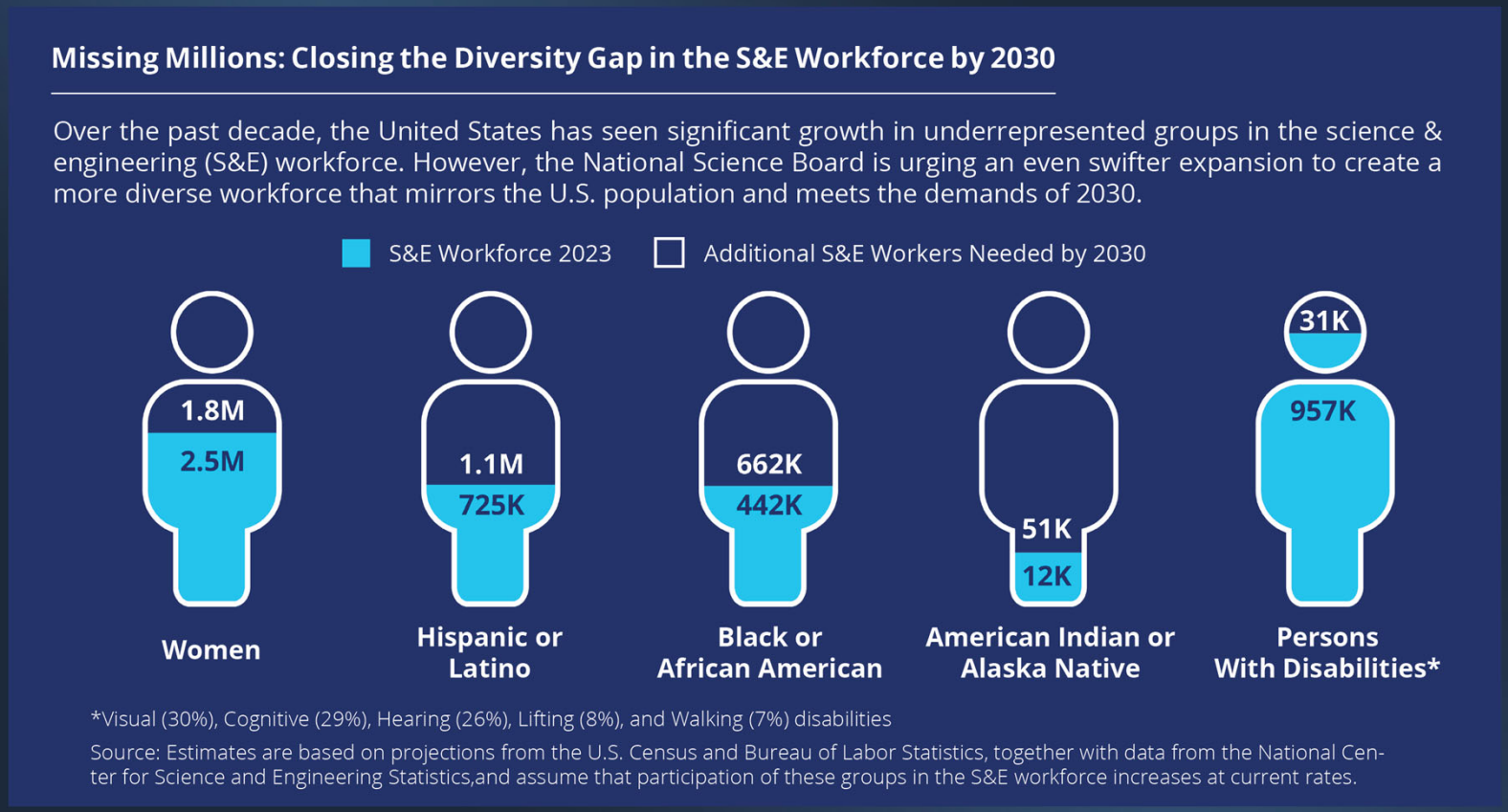
Foreign-born Share of Workers with a Bachelor's Degree or Higher, by Highest Degree Level and Major Occupation: 2021



Leadership Risk: PreK-12 STEM Education

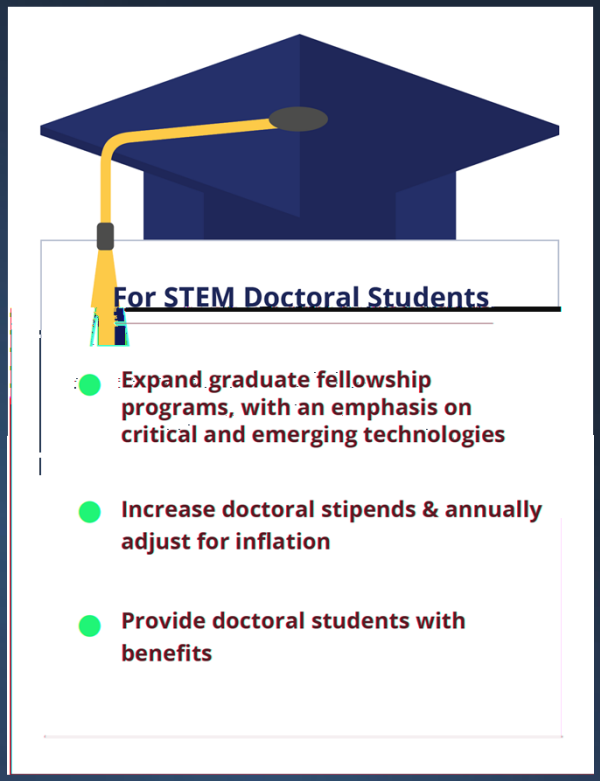


Leadership Risk: the Missing Millions



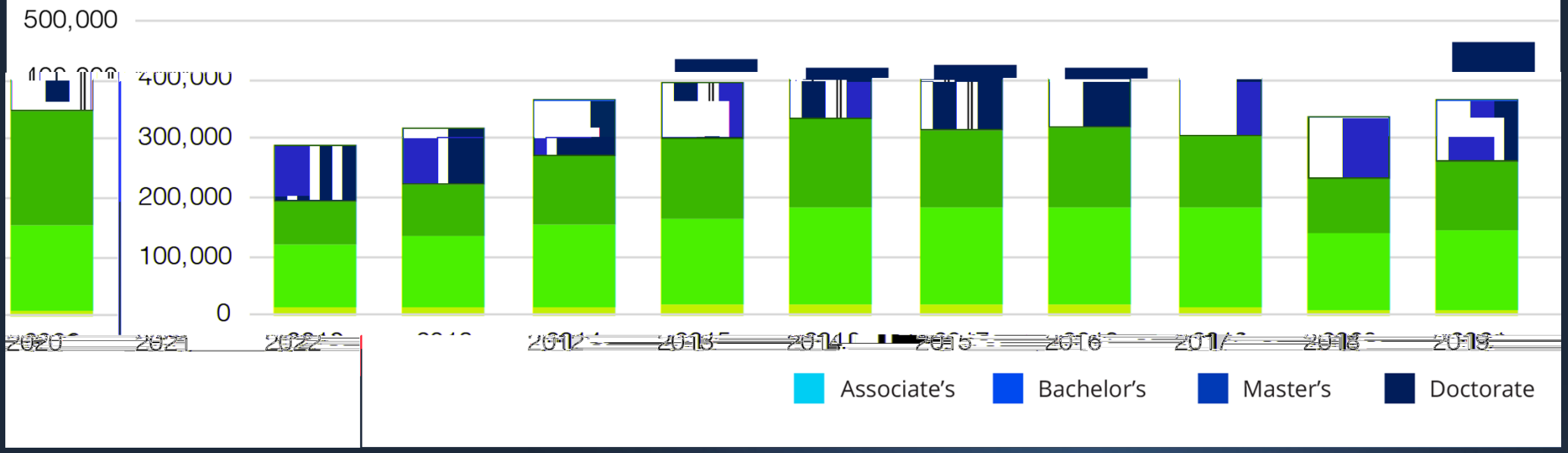
Opportunities for Action

Strategic Action: Access to Higher Education

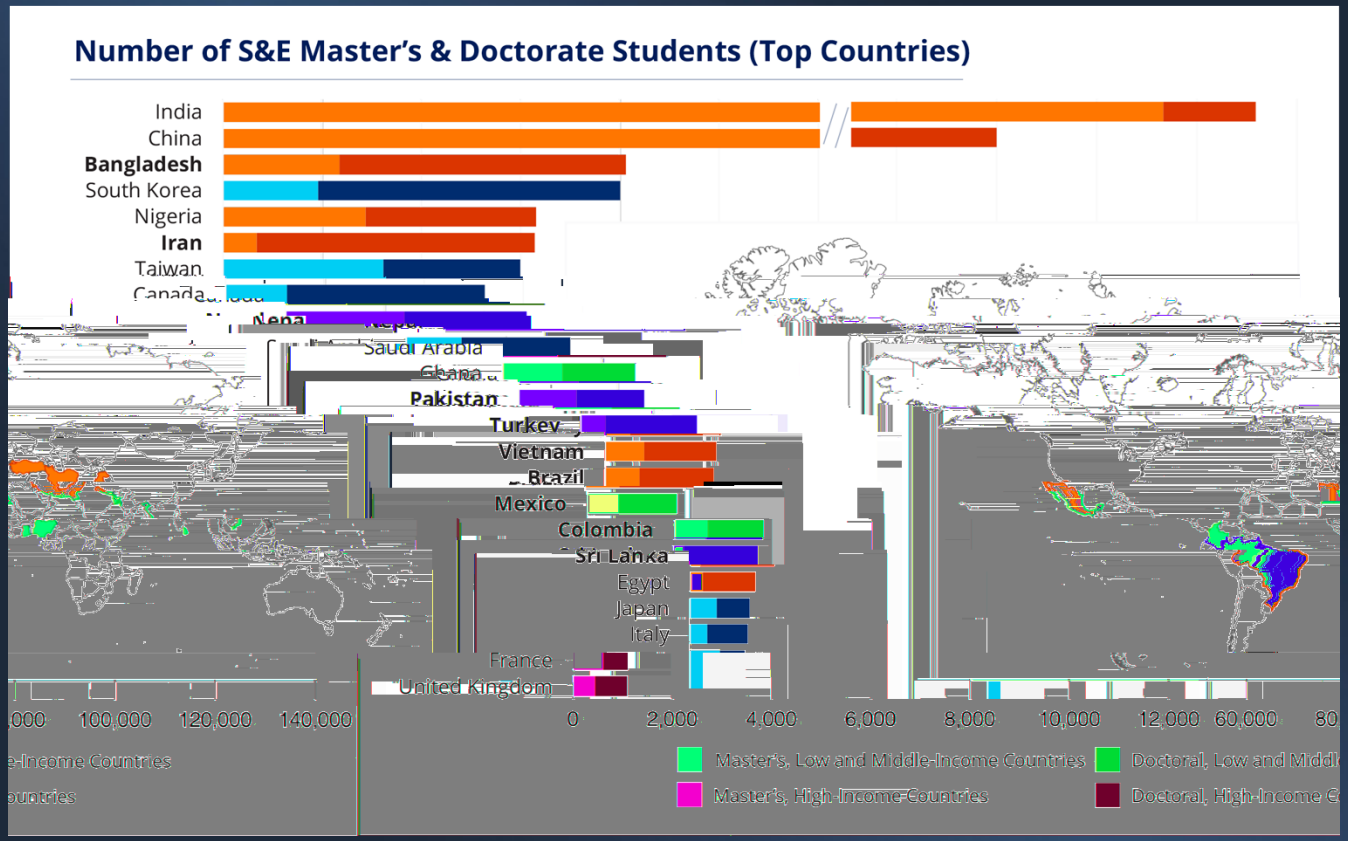


Strategic Action: Emerging Science Partners

International S&E Students on Visas Enrolled in U.S. Higher Education Institutions, by Level of Enrollment: 2012–22



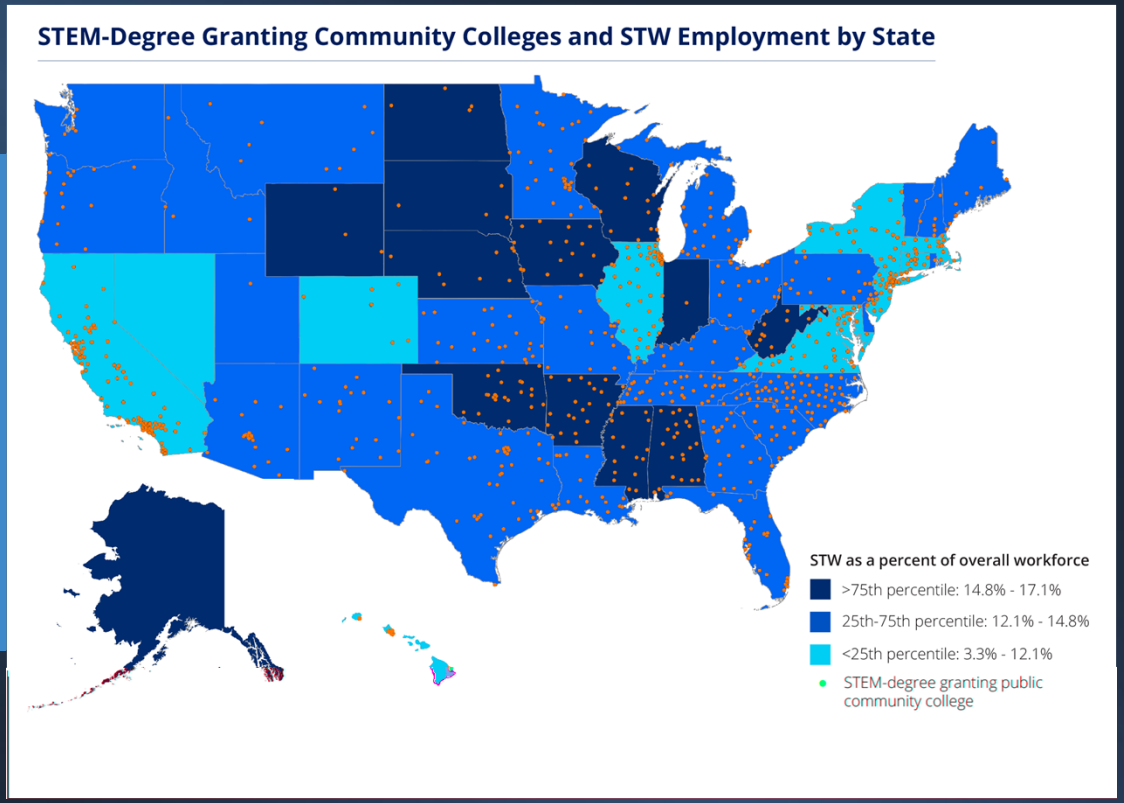
Strategic Action: Emerging Science Partners



Strategic Action: Skilled Technical Workforce

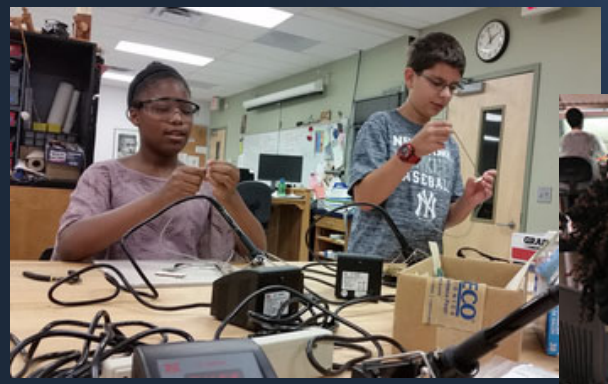
THE SKILLED TECHNICAL WORKFORCE:

Crafting America's Science & Engineering Enterprise



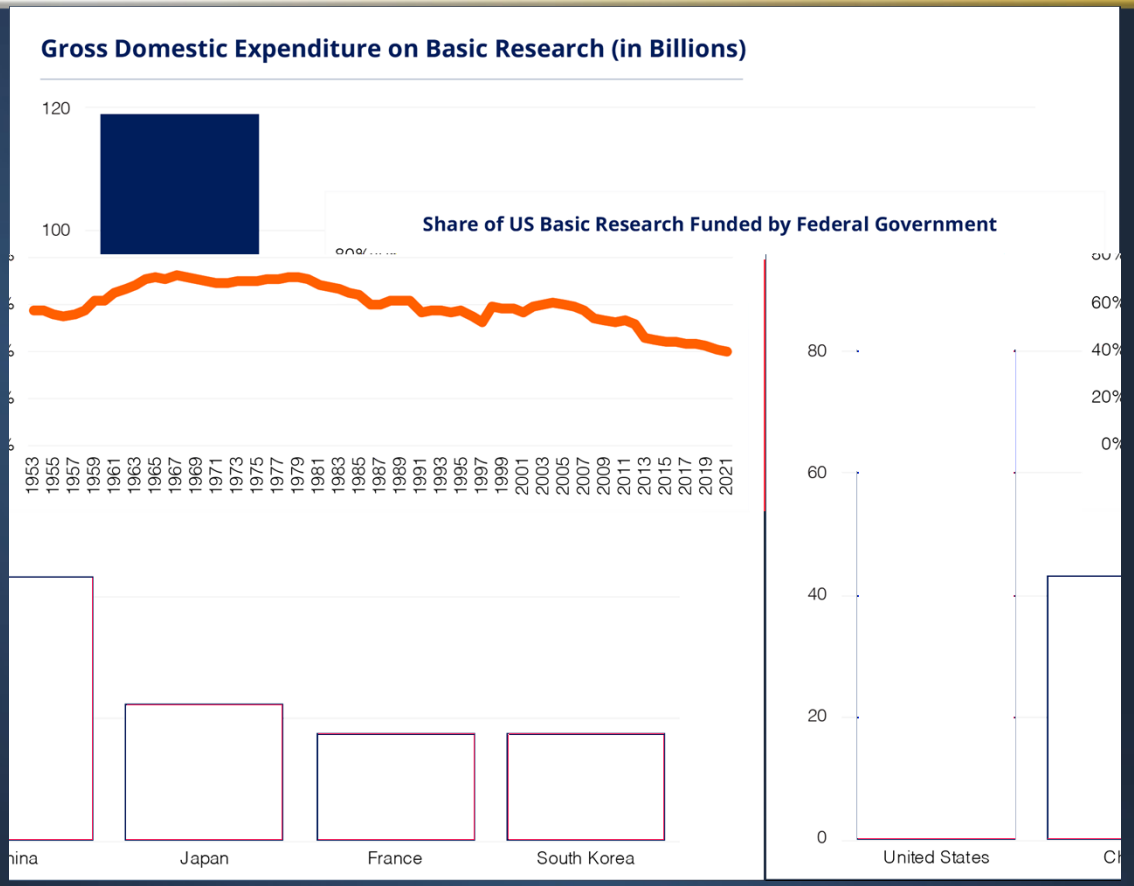
A Bedrock for the Nation's R&D Enterprise

With a robust and concerted effort to close the STEM talent gap - preK-12, higher education, the Skilled Technical Workforce, international talent - the U.S. can fully lean into longstanding, strategic approaches to ensure it remains a global S&E discovery powerhouse



A Bedrock for the Nation's R&D Enterprise

- Invest in basic research
- Identify "under the radar" discoveries and opportunities
- Invest in critical and emerging technologies



Talent is the Treasure

Keep in Touch

https://www.nsf.gov/nsb/

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