

The State of U.S. Science & Engineering

Science & Engineering Indicators 2022

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Monday, March 21, 2022



National Science Board

NATIONAL SCIENCE BOARD: TWO ROLES



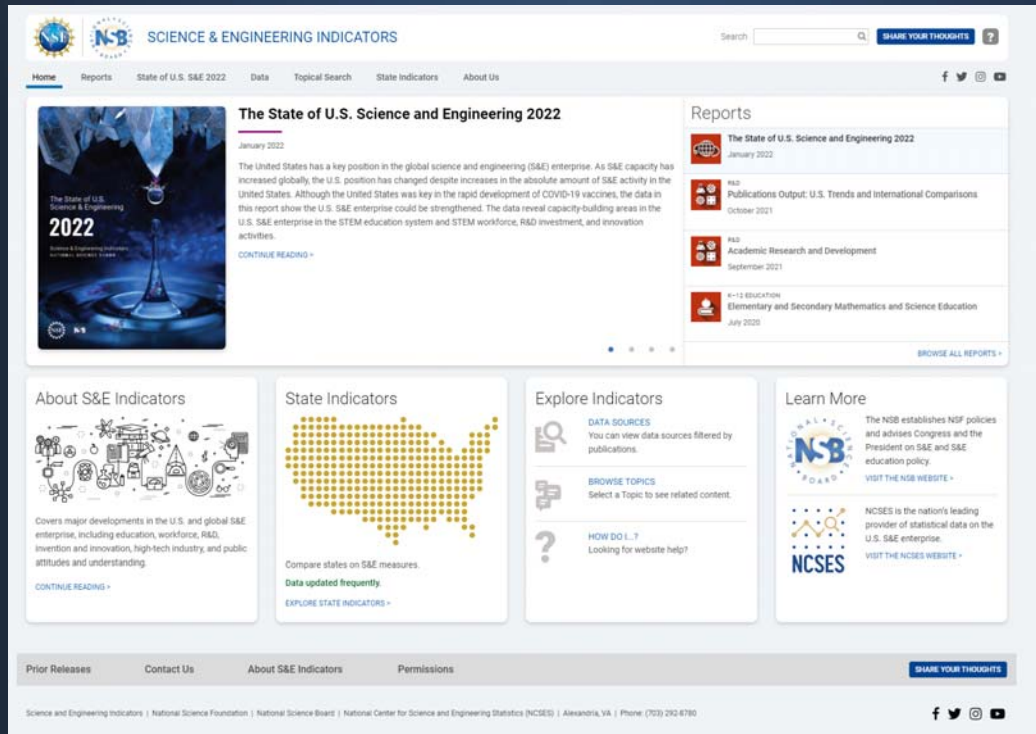
Policy making body for NSF

- Establishes policies
- Identifies issues critical to NSF's future
- Approves strategic budget direction and major programs and awards

Advisors to the President and Congress

- Publishes *Science and Engineering Indicators*
- Issues policy reports on S&E, STEM education, and workforce

Science and Engineering Indicators



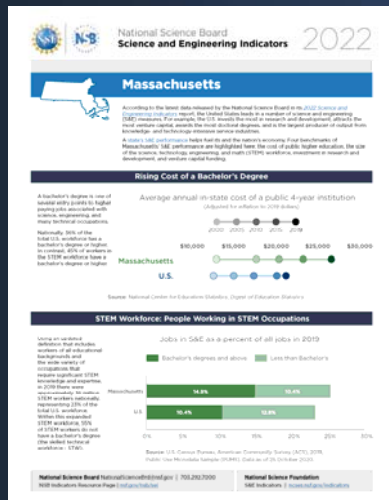
<https://ncses.nsf.gov/indicators>



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- Elementary and Secondary STEM Education
- Academic Research & Development
- The STEM Labor Force of Today: Scientists, Engineers, and Skilled Technical Workers
- Invention, Knowledge Transfer and Innovation
- Publications Output
- Higher Education
- R&D: U.S. Trends and International Comparisons
- Production and Trade of Knowledge- and Technology-Intensive Industries
- Science and Technology: Public Perceptions, Awareness, and Information Sources
- State Indicators

Resources from the National Science Board



<https://www.nsf.gov/nsb/sei/>



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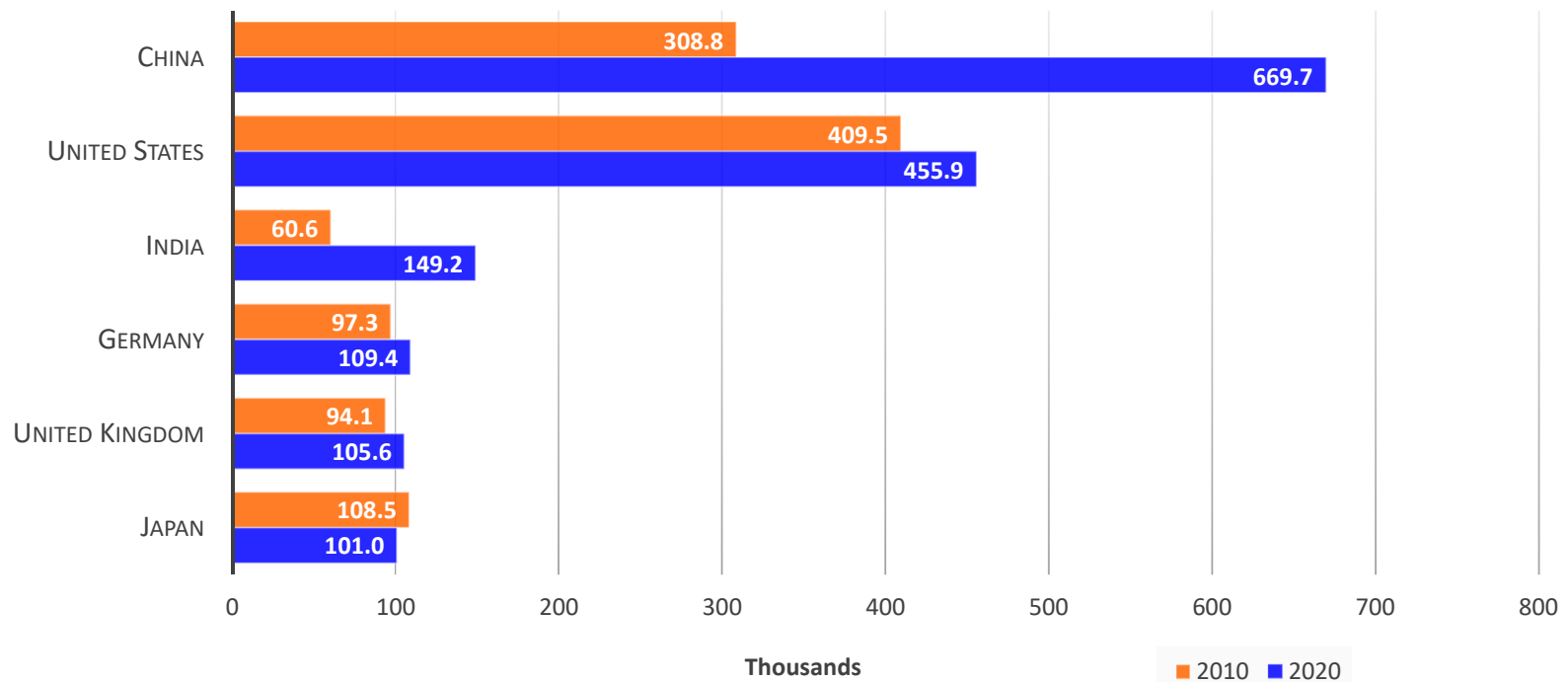
The data show the United States is in a strong leadership position and plays a central role as educator and collaborator.

But that role has evolved as other countries outpace our growth in S&T investments and capabilities.



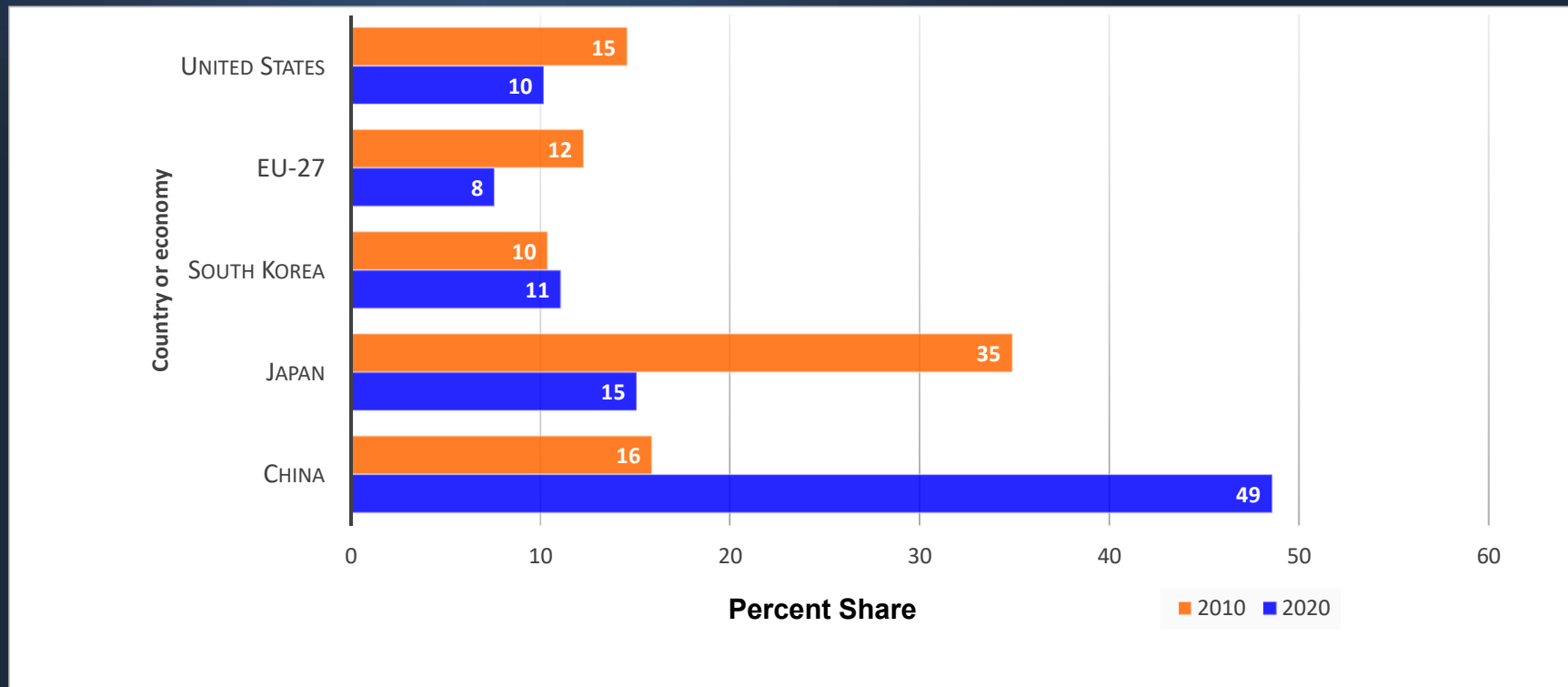
Global S&E Publications

S&E articles, by selected region or country: 2010 and 2020



Global S&E Patents

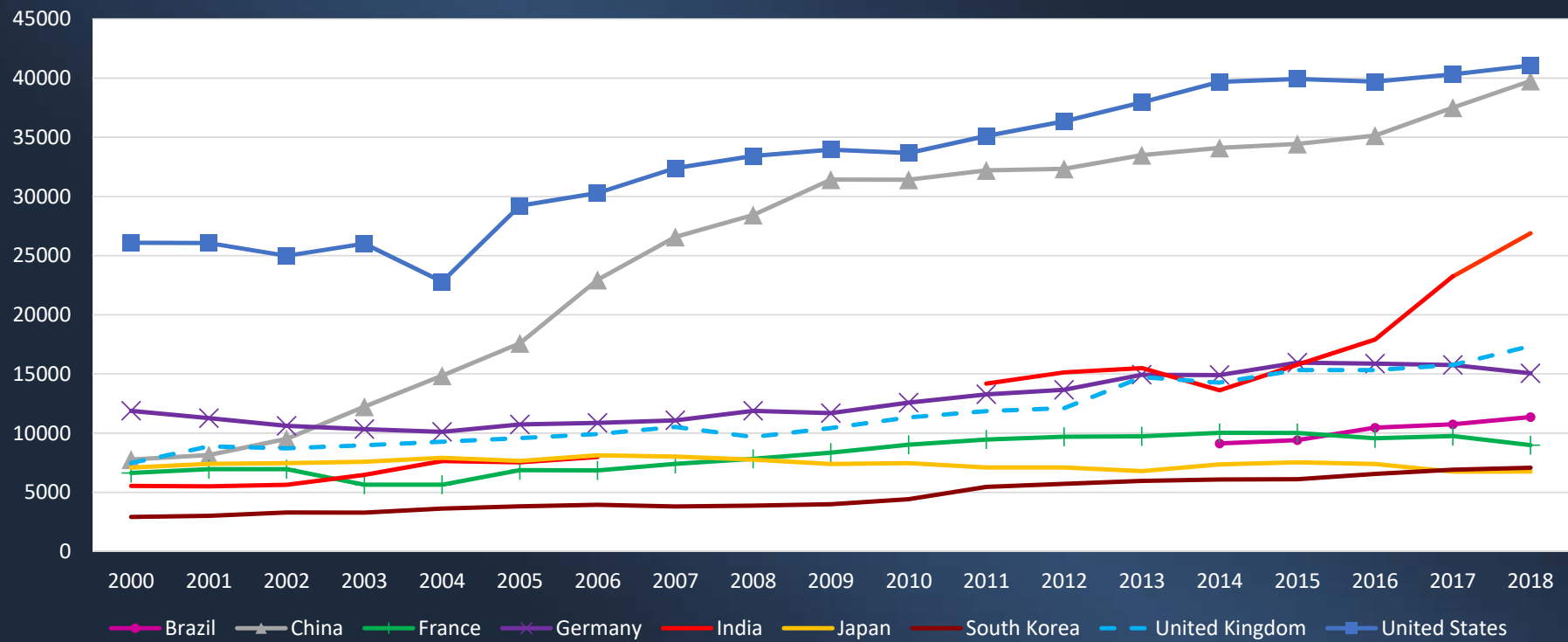
Shares of worldwide patents granted to inventors, by selected region, country, or economy: 2010 and 2020



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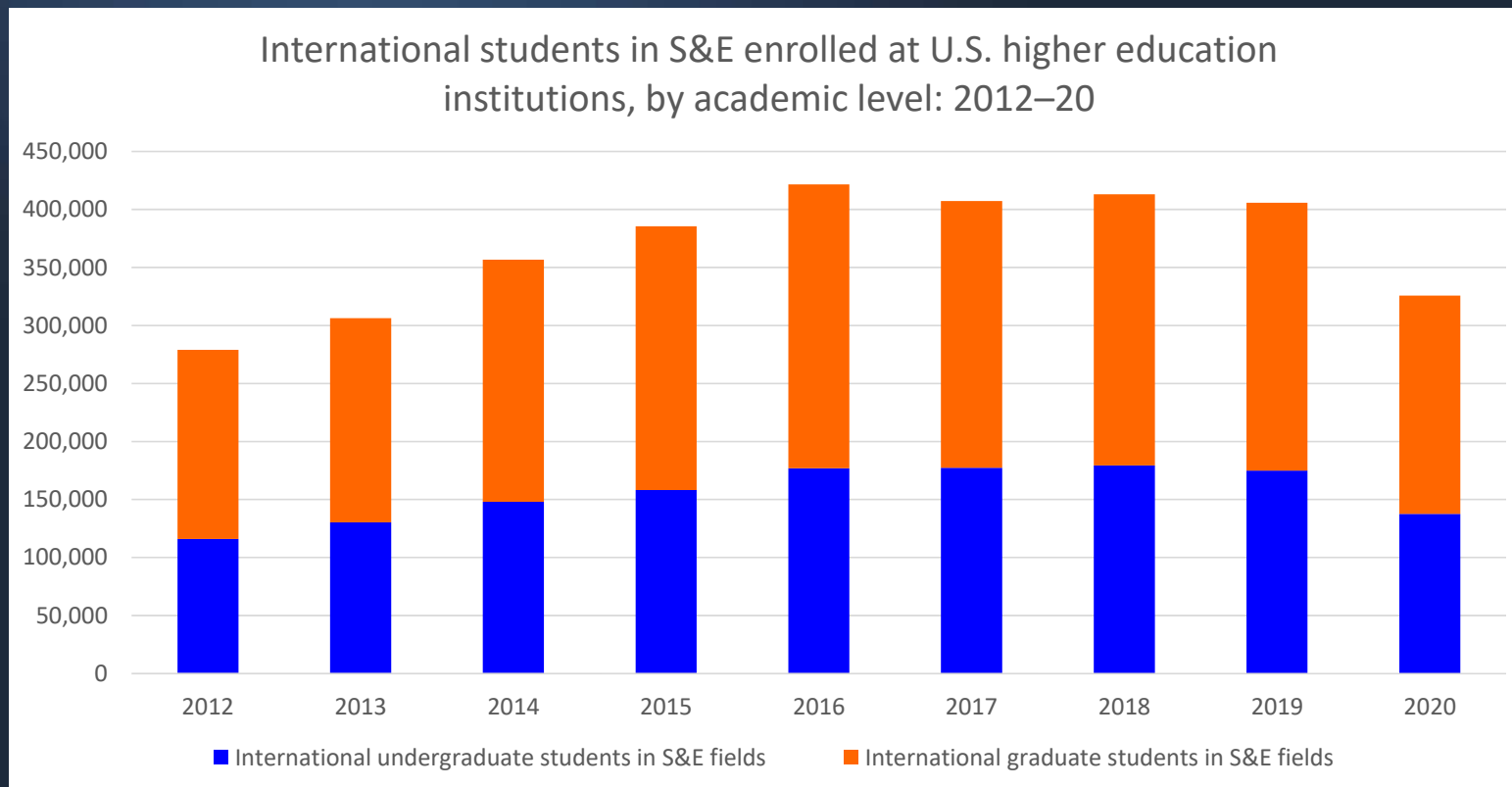
Global S&E Doctoral Degrees Awarded

S&E doctoral degrees, selected countries: 2000–18



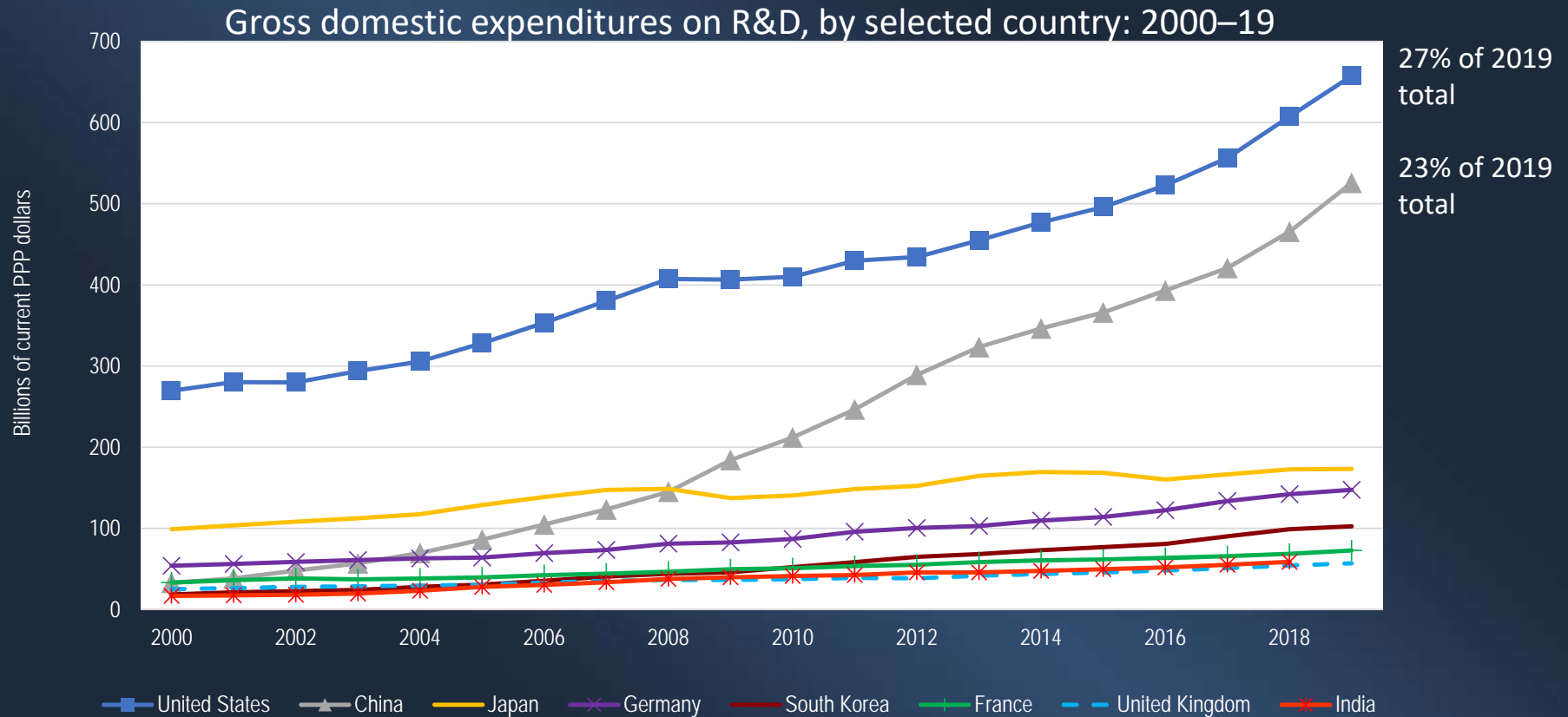
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International Students in S&E



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Global R&D Spending



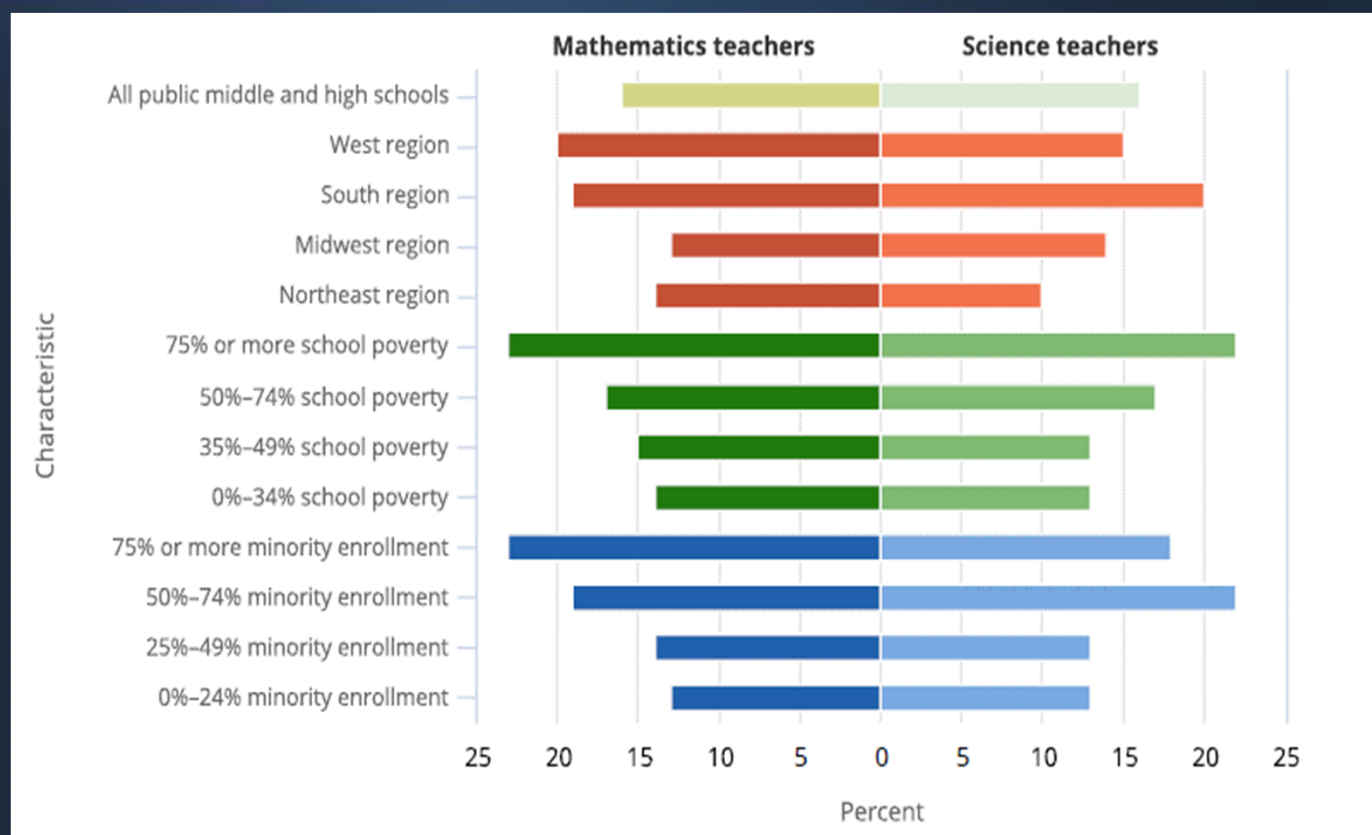
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*Building, broadening, and diversifying S&E capacity
could strengthen the U.S. S&E enterprise and bolster its
ability to meet future challenges.*



K-12 Education: Public School STEM Teacher Experience



Public middle and high school mathematics and science teachers with 3 years or less of teaching experience, by selected school characteristics: 2017–18



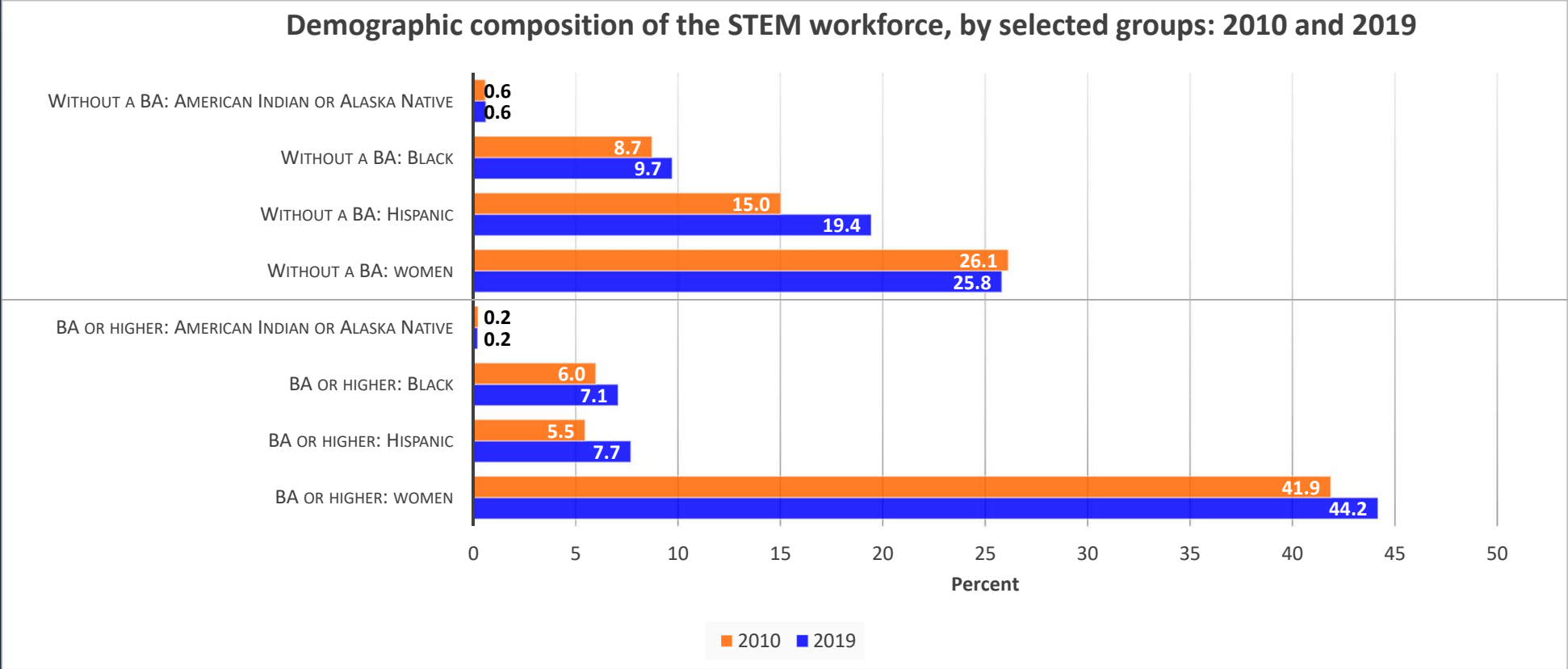
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U.S. STEM Workforce

- New definition of the STEM workforce: workers at *all* education levels working in occupations that use significant levels of S&E expertise and skills.
- There are 36 million STEM workers, comprising 23% of the total U.S. workforce.
 - 16 million with a bachelor's degree or higher
 - 20 million without a bachelor's degree – the Skilled Technical Workforce (STW)
- They work in a variety of occupations ranging from scientists and engineers to workers in health care to those in production and construction.



U.S. STEM Workforce: Women and Underrepresented Racial/Ethnic Groups



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Stagnant performance by U.S. STEM K–12 students and demographic differences in achievement highlight areas for potential strengthening. And geographical analysis of the U.S. S&E enterprise reveals an uneven distribution of S&E activities and STEM career opportunities.



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Deliver Benefits From Research



Develop STEM Talent for America

NSB Vision 2030 Roadmap



Expand the Geography of Innovation



Foster a Global S&E Community

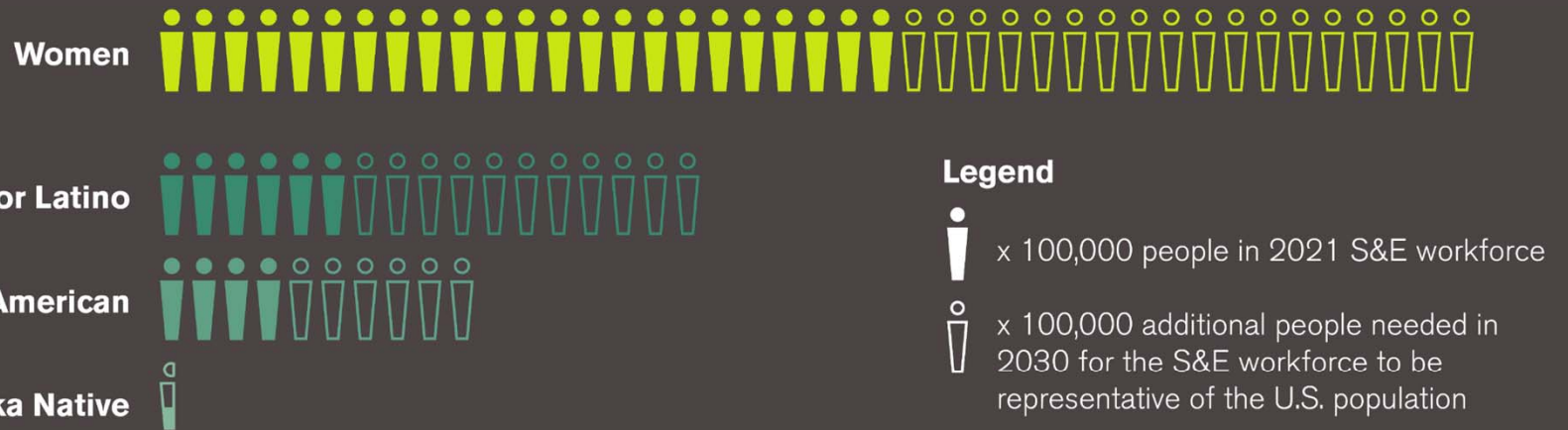
The U.S. is a Keystone of Global Science & Engineering



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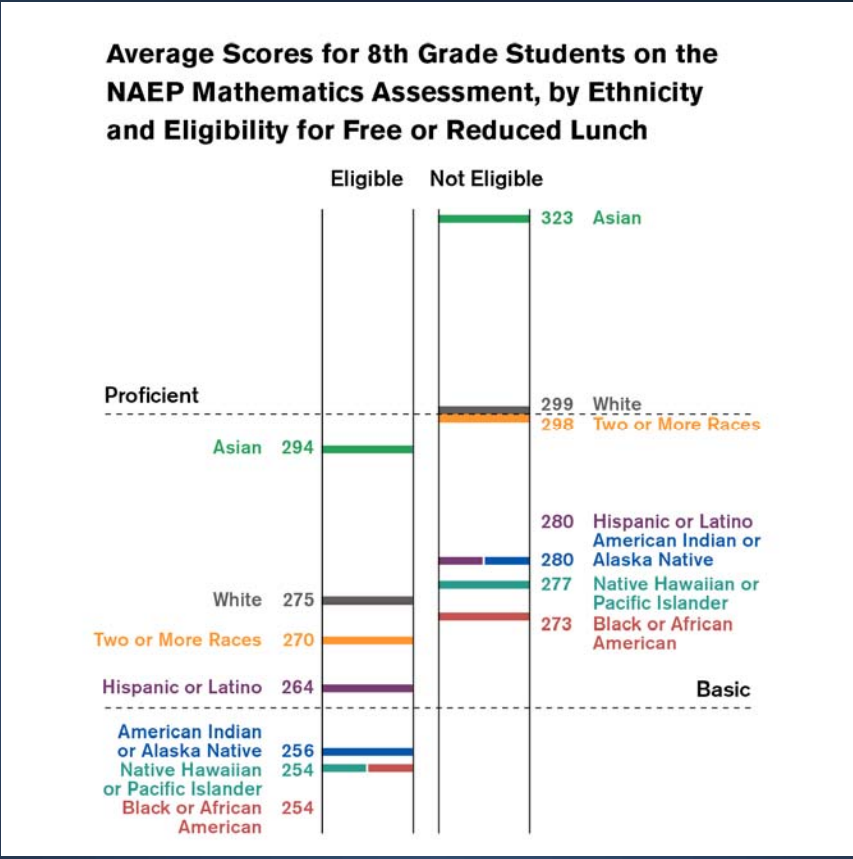
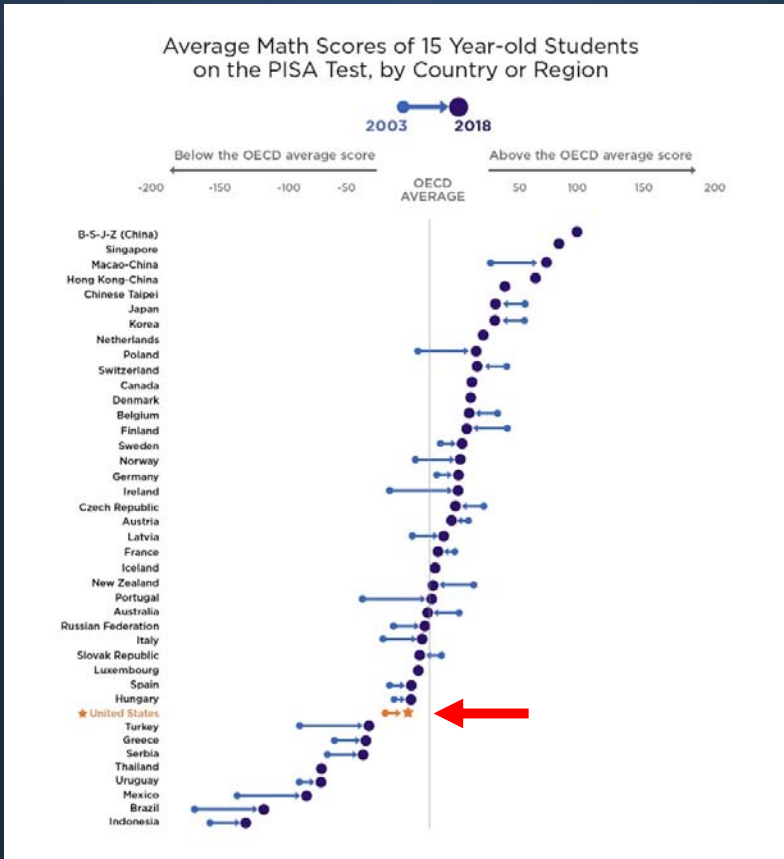


Missing Millions: Faster Progress in Increasing Diversity Needed to Reduce Significant Talent Gap



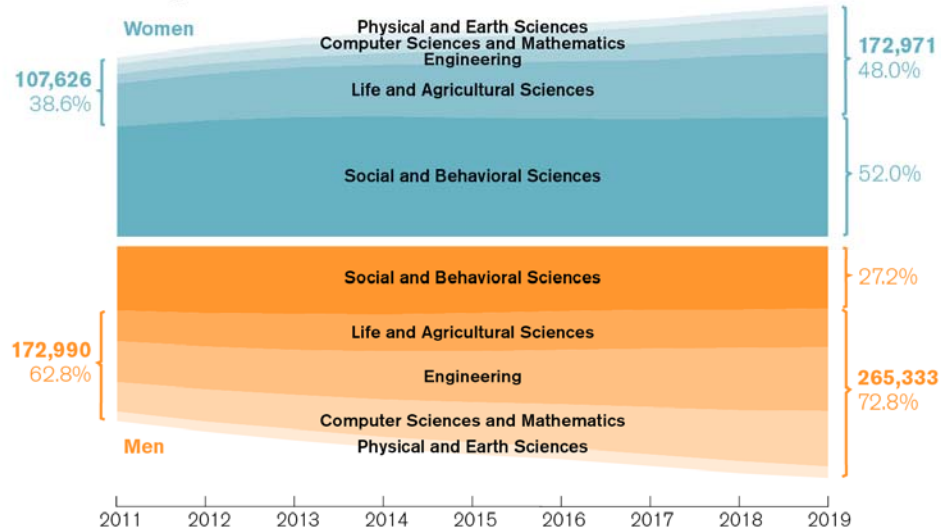
<https://www.nsf.gov/nsb/NSBAactivities/vision-2030.jsp>

Lagging Right Out of the Gate: U.S. K-12 STEM Education

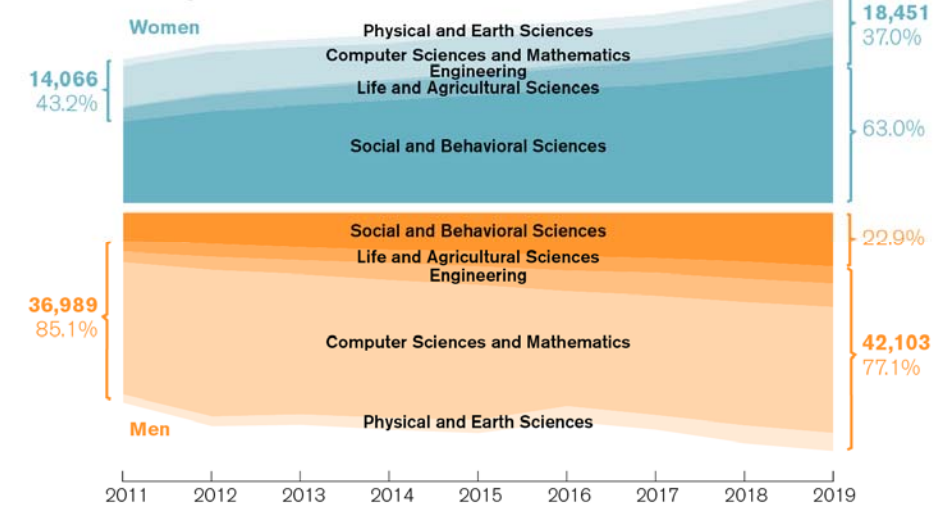


Gender Differences in STEM Higher Education

Bachelor's Degrees

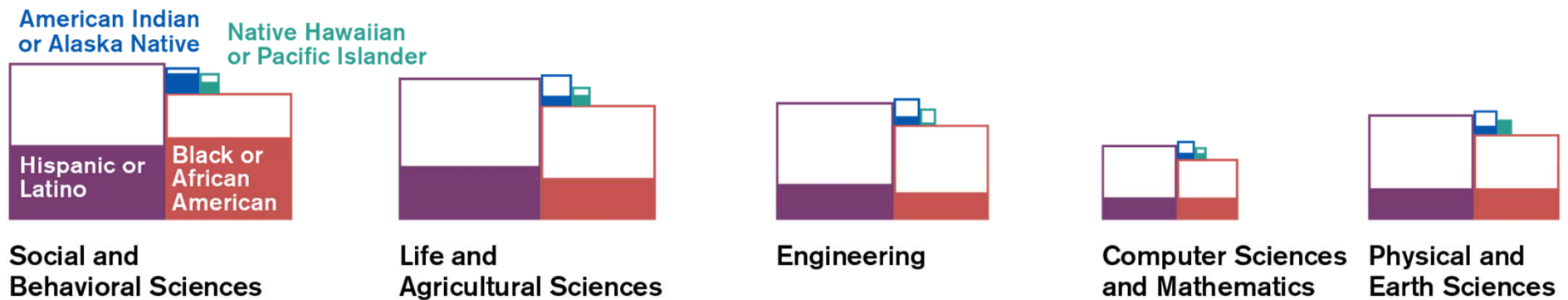


Associate's Degrees



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The Missing PhDs: Gaps by Race or Ethnicity



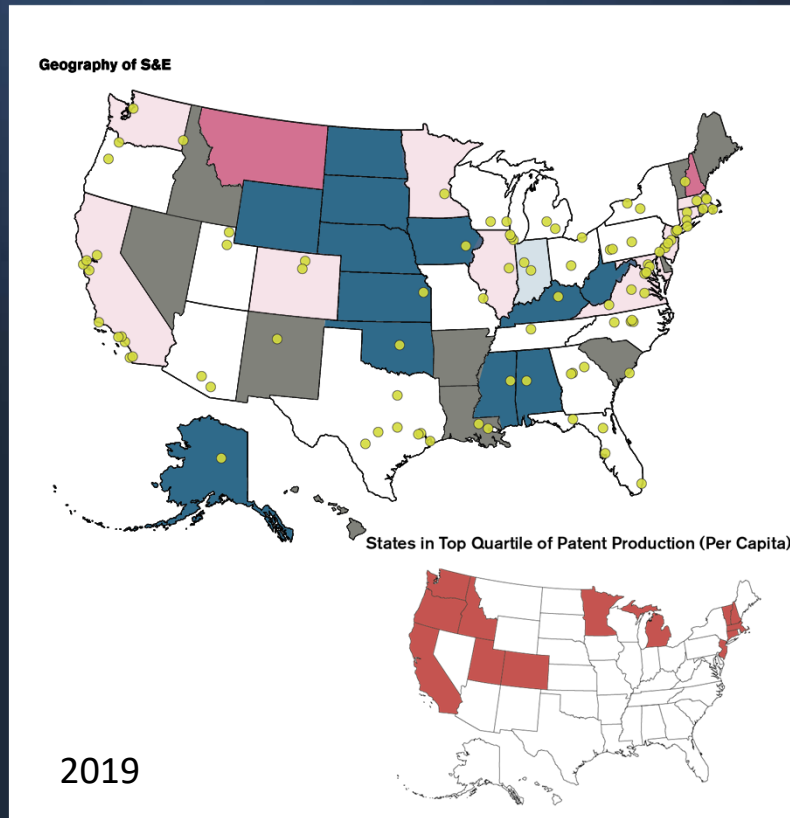
2018 data from *Women, Minorities, and Persons with Disabilities in Science and Engineering 2021*

<https://ncses.nsf.gov/wmpd>



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Geography of S&E: Leveraging Local Strengths



Legend

NSF-EPSCoR Not NSF-EPSCoR



States in top quartile of concentration of STEM workers, as a percentage of total employment per state without a bachelor's degree (STW)



States in the top quartile of concentration of STEM workers, as a percentage of total employment per state with a bachelor's degree or higher



States not in the top quartile of either category of STEM workers

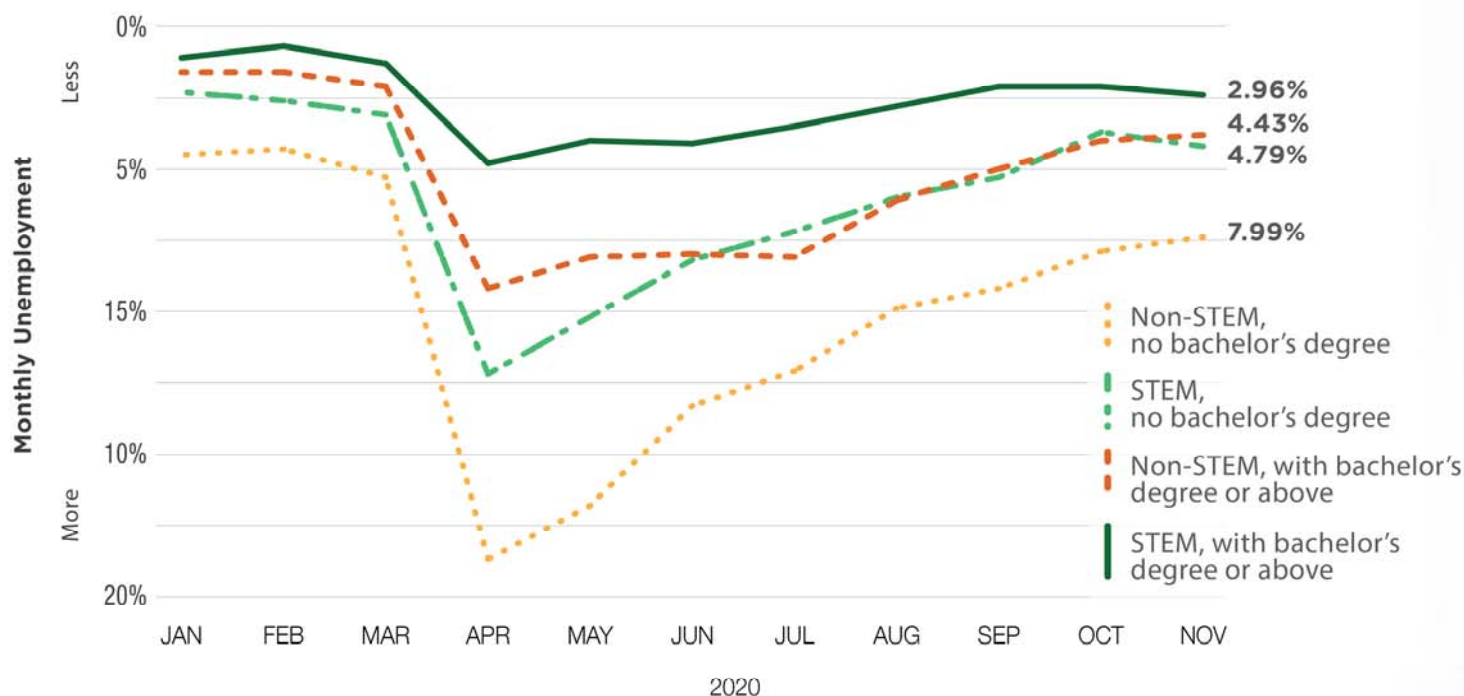
● The 100 institutions receiving the most federal R&D money



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THE STEM WORKFORCE IS RESILIENT, EVEN DURING A GLOBAL PANDEMIC



STEM jobs are resilient. During the pandemic, STEM workers were employed at a higher rate than their non-STEM peers at all education levels. Skilled technical workers who use S&E skills in their jobs but do not have a bachelor's degree were employed on par with non-STEM workers who do have a bachelor's degree or above, even after large initial increases in unemployment. These data illustrate the value of STEM education and skills to all U.S. workers.



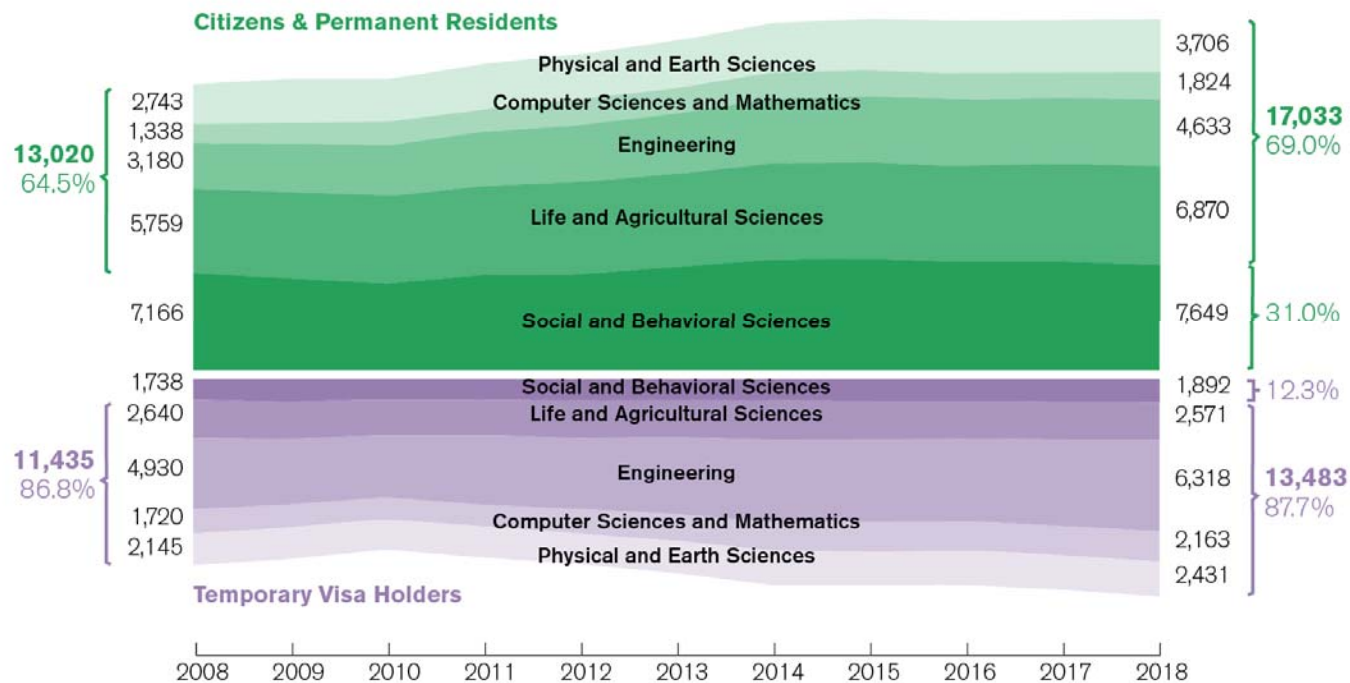
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Doctorates Awarded: Domestic and International Students

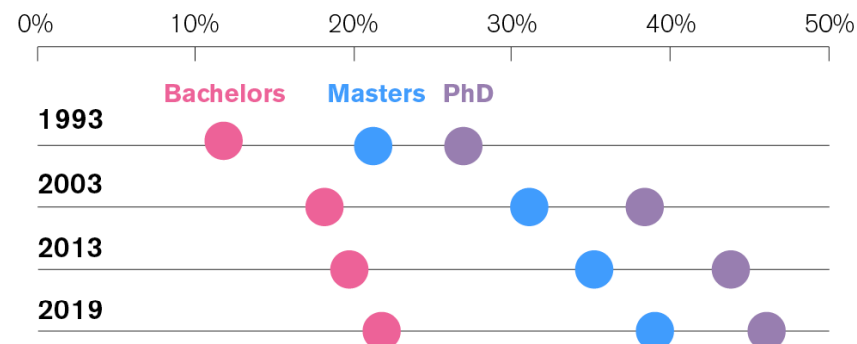
S&E Doctorates by Citizenship and Field



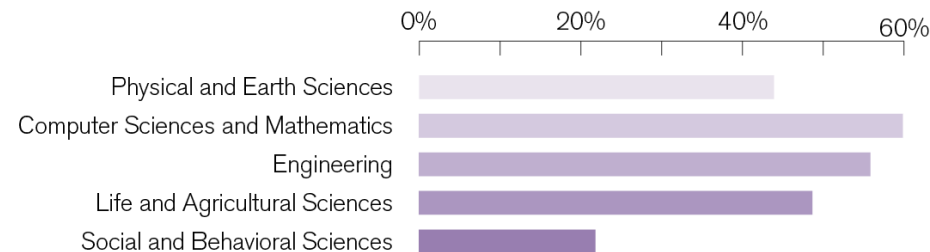
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International STEM Talent in the U.S. Workforce

Foreign-Born Individuals Are Major Contributors to U.S. S&E



Foreign-Born PhDs Across S&E Fields, 2019



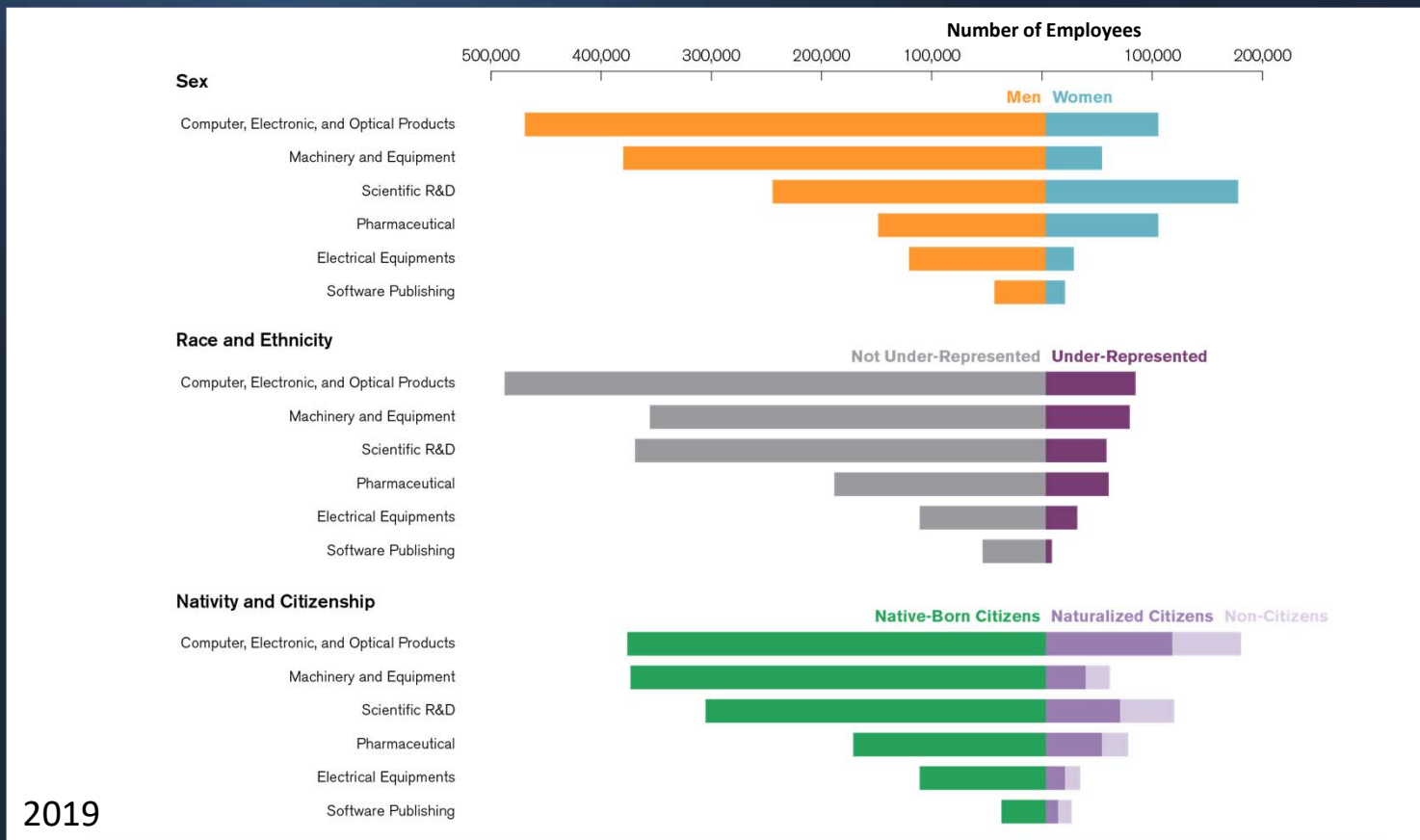
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Demographics of S&E Workers in Selected KTI Industries



2019



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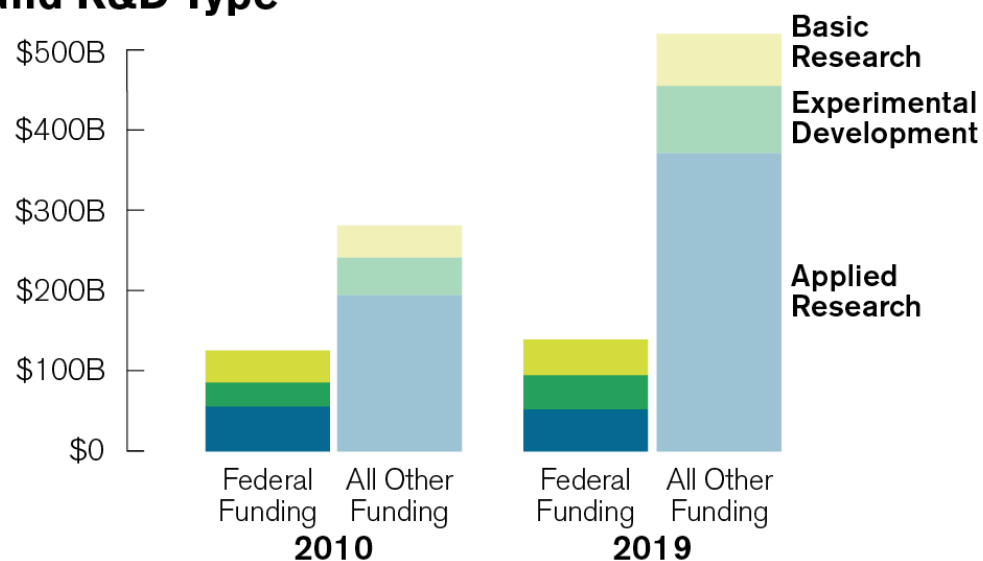
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Federal Funding: Decreasing Share, Declining in Real Dollars

U.S. Funding of R&D Performance by Source and R&D Type

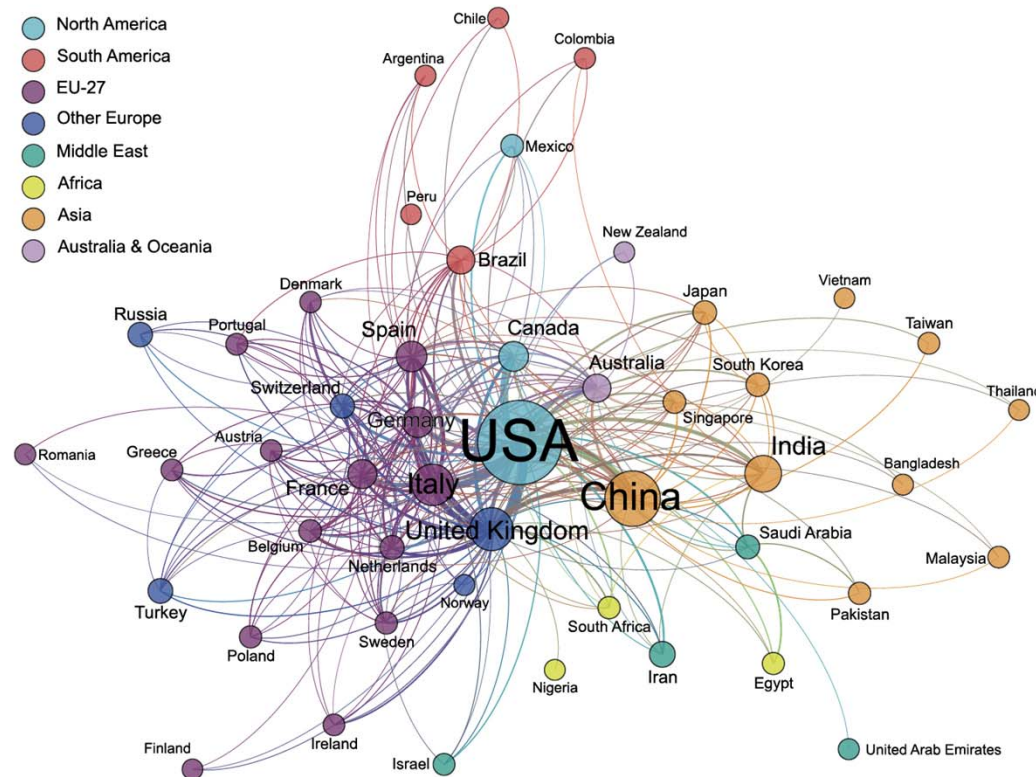


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COVID-19 Publication Collaborations: 2020



What Does It Mean to Be a Keystone?



<https://www.nsf.gov/nsb/sei/keystone2022.pdf>



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