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THE CHIPS AND SCIENCE ACT WILL EXPAND EQUITY AND OPPORTUNITY FOR AMERICANS UNDERREPRESENTED IN SCIENCE AND TECHNOLOGY

After more than a year of bipartisan, bicameral negotiations to craft comprehensive innovation legislation, Congress passed and the President signed the \$280 billion [CHIPS and Science Act](#) into law. The new law represents a historic investment in domestic semiconductor manufacturing and the nation's pursuit of science and technology leadership. Importantly, the bill expands equity and opportunity for Americans who have been underrepresented in science and technology.

The CHIPS and Science Act is the most comprehensive effort in history to create opportunities in science and technology for women, people of color, and other underrepresented groups. The bill will enhance equity and opportunity by:

- Creating new research, invention, and entrepreneurial opportunities;
- Expanding access to the skills and education needed to join the scientific workforce;
- Ensuring that people of color and other underrepresented groups have information about these opportunities;
- Funding research on diversity and inclusion in the tech sector and sexual harassment in STEM fields;
- Authorizing \$13 billion for STEM and invention education and providing teachers with the necessary resources to expand STEM;
- Making Federal agency policy and personnel changes related to diversity, equity, and inclusion, including developing caregiver policies for all science agencies and creating a position for a Chief Diversity Officer at the National Science Foundation (NSF)—the nation's chief science agency; and
- Recognizing the importance of diversity and inclusion in national science and technology strategies.

These provisions will go a long way to advance equity and opportunity in science and technology, but there is more work to do. Stakeholders must lobby for appropriations, monitor the law's implementation, and promote awareness of the opportunities it creates.

CALL TO ACTION

We invite you to share this summary with your organization and your broader network to promote awareness of the meaningful opportunities in the CHIPS and Science Act. Although these new programs and policies have been authorized, the Congress has not yet funded these opportunities through the appropriations process. We encourage you to consider advocating for full funding so we can realize the potential of the new law.



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SUMMARY OF KEY EQUITY & OPPORTUNITY PROVISIONS

Grants and Policy Changes to Support New Research, Invention, and Entrepreneurial Opportunities for Underrepresented Populations

The CHIPS and Science Act creates new research, invention, and entrepreneurial opportunities for women, people of color, and other underrepresented groups in science and technology.

NSF

- Authorizes \$81 billion to the NSF for research and related activities, including \$20 billion for a new Directorate for Technology, Innovation, and Partnerships with a mission to broaden participation in technology fields (Sec. 10303)
- Requires the new NSF Directorate to avoid undue geographic concentration of funding and broaden participation by populations historically underrepresented in STEM (Sec. 10384)
- Requires organizations seeking a cooperative agreement for the management of an NSF project to demonstrate experience and capabilities in employing best practices in broadening participation in science and engineering and directing the Foundation to consider implementation of such practices in oversight of grants (Sec. 10324)
- Authorizes \$500 million for NSF to create a two-year pilot program to make grants to highly qualified early-career investigators to carry out an independent research program at an institution of higher education or participating Federal research facility, and requires the Director to conduct outreach and give “special consideration” to applicants from Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities, Minority-Serving Institutions (MSIs), institutions of higher education that are not among the top 50 institutions in annual Federal funding for research, and EPSCoR institutions (Sec. 10601)
- Establishes a four-year pilot program and authorizes the Director to make grants to institutions of higher education and nonprofit organizations, in collaboration with other stakeholders, to create Centers to develop and scale up models for providing undergraduate students with hands-on course-based research experiences, and identify opportunities and challenges in facilitating implementation at HBCUs, Tribal Colleges and Universities, MSIs, and community colleges (Sec. 10312(e))
- Authorizes \$750 million for grants to institutions of higher education that are not among the top 100 institutions in Federal research to study and implement innovative approaches for building research capacity, including support for developing and expanding research programs, faculty recruitment and professional development, stipends for students



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participating in research, acquisition of research instrumentation, and administrative research support (Sec. 10325(b))

- Authorizes grants and partnerships with emerging research institutions to broaden participation in research and innovation (Sec. 10325(c))
- Amends the America COMPETES Reauthorization Act of 2010 to direct Federal agencies to consider modifying EPSCoR grant structures, and directs NSF to allocate an increased percentage of funds in STEM accounts to institutions and local researchers in EPSCoR jurisdictions (Sec. 10325(a))
- Authorizes \$6.5 billion for grants to support Regional Innovation Engines that support entities working with HBCUs, Tribal Colleges and Universities, MSIs, EPSCoR institutions, emerging research institutions, or community colleges to develop and deploy critical technologies including to reimburse the cost of instrumentation, technology transfer, and commercialization activities, including patenting and licensing (Sec. 10388)
- Authorizes \$3.1 billion for grants to higher education institutions, nonprofit organizations, and consortia with an industry organization or firm in a relevant technology or innovation sector to advance the development, adoption, and commercialization of technologies, including to help offset the costs of patenting and licensing research products (Sec. 10391)

Department of Commerce

- Establishes a program for the Secretary of Commerce to create at least twenty geographically and demographically diverse regional technology and innovation hubs and authorizes \$11 billion for grants to consortia composed of one or more institutions of higher education, political subdivisions, state governments, and “industry or firms in relevant technology, innovation, or manufacturing sectors,” to develop and deploy critical technologies (Sec. 10621)

National Institute of Standards and Technology (NIST)

- Requires NIST to develop research collaborations with HBCUs, Tribal Colleges and Universities, MSIs, community colleges, and nontraditional educational organizations (Sec. 10241)

Department of Energy (DOE)

- Authorizes \$15 million for the Secretary of Energy to support the coordination of relevant technology transfer programs that advance the commercial application of clean energy technologies and to facilitate the development of metrics to measure the impact of



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clean energy technology transfer programs on commercial applications of clean energy technologies being developed by entrepreneurs from underrepresented backgrounds (Sec. 10715)

Scientific Workforce Development

The bill expands opportunities for groups historically underrepresented in science and technology to gain the skills and education needed to join the scientific workforce.

Scholarships, fellowships, and traineeships

- Authorizes \$125 million to establish entrepreneurial fellowships for scientists and engineers “to help develop leaders capable of maturing promising ideas and technologies from lab to market,” and requires the Director to broaden participation by recruiting applicants from diverse research institutions, groups historically underrepresented in STEM, and all regions of the country (Sec. 10392)
- Authorizes \$100 million to support scholarships, fellowships, traineeships, and postdoctoral awards in key technology focus areas, including a scholarship to enable individuals from lower incomes to pursue degrees in STEM fields and traineeships at HBCUs, Tribal Colleges and Universities, and MSIs (Sec. 10393)
- Authorizes NSF to issue undergraduate scholarships, including at community colleges, graduate fellowships and traineeships, and postdoctoral awards to address STEM workforce gaps, and requires the Director to encourage innovation in postdoctoral professional development, support the development and diversity of the STEM workforce, and study the impacts of such innovation and support (Sec. 10321)
- Requires NSF to increase the number of Robert Noyce Teacher Scholarships awarded to institutions of higher education to recruit and prepare undergraduate students majoring in STEM to become math and science teachers, and increase the diversity of program participants by expanding outreach to HBCUs, MSIs, Tribal Colleges and Universities, emerging research institutions, higher education programs that serve veterans and rural communities, and labor organizations (Sec. 10322)
- Authorizes the Secretary of Energy to establish university-led Traineeship Programs to address workforce development needs in STEM fields and increase recruitment at HBCUs, Tribal Colleges and Universities, MSIs, emerging research institutions, and community colleges (Sec. 10111(c))



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Grants for research, development, and implementation of best practices and programs related to workforce development

- Authorizes \$200 million and requires the DOE Director of the Office of Science to support the development of a scientific workforce through programs to facilitate collaboration between K-12 teachers, university students, early-career researchers, faculty, and the National Laboratories through use of proven techniques to expand the number of individuals from underrepresented groups pursuing and attaining skills or undergraduate and graduate degrees relevant to the mission of the Office of Science (Sec. 10111(a))
- Authorizes \$40 million to support and incentivize innovative reform efforts to expand opportunities for underrepresented minorities in STEM, including data analyses into faculty recruitment and retention efforts, R&D for training courses for administrators and search committee members, and activities to connect students from underrepresented groups to STEM opportunities (Sec. 10329(a))
- Authorizes \$25 million to support R&D efforts at institutions of higher education and nonprofit organizations to increase the participation of women and underrepresented minorities in STEM studies and careers, including research studies, mentoring programs, research experiences, and outreach to elementary and secondary school students (Sec. 10328)
- Authorizes grants to four-year institutions to support R&D to promote collaboration between industry and institutions of higher education, understand and diversify the STEM workforce, and increase dissemination of effective practices in undergraduate education and workforce development (Sec. 10312(a))
- Creates the “Eddie Bernice Johnson Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) Initiative,” requiring NSF to make grants to institutions of higher education or nonprofit organizations to facilitate the development of networks and partnerships to build on and scale up effective practices in broadening participation in STEM studies and careers of groups historically underrepresented in STEM (Sec. 10323)
- Authorizes grants to institutions of higher education and nonprofit organizations to develop innovative approaches to facilitating career exploration, increases the number of new graduate fellows supported annually, and requires the Director to recruit applicants from historically underrepresented populations in STEM (Sec. 10313)
- Authorizes NSF to award microelectronics workforce development grants to institutions of higher education, nonprofit organizations, or consortia of such institutions to support innovative industry pathway programs and expand evidence-based education and



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workforce development activities at all levels of education in microelectronics (Sec. 10318(a))

- Requires the Director to conduct a full portfolio analysis of the Foundation’s skilled technical workforce investments, and requires an assessment of the feasibility and benefits of adding questions or topic modules to existing National Center for Science and Engineering Statistics (NCSES) surveys that would vary from cycle to cycle, in addition to an assessment of the feasibility and benefits of incorporating new STEM workforce-related questions to existing NCSES surveys (Sec. 10314)

Outreach

The bill ensures that people of color and other underrepresented groups in science and technology know about opportunities in science and technology by conducting outreach and meeting them where they are.

NSF

- Authorizes NSF to develop pilot programs to increase the number of institutions able to compete for Foundation R&D grants, including through mentorship programs, grant application assistance, and targeted outreach to HBCUs, Tribal Colleges and Universities, and MSIs (Sec. 10330)
- Requires NSF to increase the diversity of participants in the Robert Noyce Teacher Scholarship program by supporting symposia, forums, conferences, and other activities to expand and enhance outreach to HBCUs, MSIs, Tribal Colleges and Universities, emerging research institutions, higher education programs that serve veterans and rural communities, and labor organizations (Sec. 10322)

NIST

- Requires NIST to increase outreach and recruit students and faculty at HBCUs, Tribal Colleges and Universities, MSIs, community colleges, and nontraditional educational organizations to participate in graduate student internships and visiting faculty research programs (Sec. 10241)

DOE

- Authorizes the Secretary of Energy to expand opportunities and increase the number of highly skilled STEM professionals working in disciplines relevant to the mission of the Department, including by broadening the recruitment pool to increase participation from HBCUs, Tribal Colleges and Universities, MSIs, emerging research institutions, and



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community colleges, and requires the Secretary to report to Congress on the Department's plan and outreach strategy (Sec. 10111(c))

Grants for Research Related to Diversity, Equity, and Inclusion

The bill supports research on diversity, equity, and inclusion in the technology sector and sexual harassment in STEM fields.

- Authorizes NSF grants to institutions of higher education and nonprofit organizations (or consortia) to support basic, applied, and use-inspired research related to diversity and inclusion in the technology sector (Sec. 10326)
- Authorizes \$32.5 million for grants to institutions of higher education and nonprofit organizations to expand research efforts to advance the understanding of sexual harassment in the STEM workforce and approaches to reduce the negative consequences of harassment, including through research on the sex-based and sexual harassment experiences of individuals, including in racial and ethnic minority groups, disabled individuals, foreign nationals, and sexual-minority individuals (Secs. 10531–10539)

Grants for STEM and Invention Education

The bill expands educational opportunities for groups historically underrepresented in STEM fields and provides teachers, institutions of higher education, and nonprofit organizations with the necessary resources to expand access to STEM and invention education.

- Authorizes \$13 billion for STEM and invention education and providing teachers with the necessary resources to expand STEM (Sec. 10303)
- Authorizes \$3.1 billion for grants to higher education institutions, nonprofit organizations, and consortia with an industry organization or firm in a relevant technology or innovation sector to develop educational opportunities for students, researchers, faculty, and staff at institutions of higher education to increase awareness and understanding of entrepreneurship and patenting, and connect students and researchers to relevant resources, including mentors in the private sector (Sec. 10391)
- Authorizes \$75 million to support efforts at institutions of higher education or consortia of such institutions to broaden participation in undergraduate STEM education, including through the implementation of outreach programs, faculty development and award programs, student research opportunities, and support for graduate students and postdoctoral fellows (Sec. 10329(b))
- Requires the Director to issue grants through existing programs to institutions of higher education, nonprofit organizations, or consortia of such institutions engaged in research



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on innovative and effective approaches for engaging PreK-12 students, including students from groups historically underrepresented in STEM and rural areas, in STEM learning opportunities like before-school, after-school, and out-of-school programs and summer activities (Sec. 10311(b))

- Authorizes grants to institutions of higher education, nonprofit organizations, or consortia of such institutions to incorporate microelectronics content in STEM curricula, provide “informal hands-on microelectronics learning opportunities for PreK-12 students in different learning environments,” and establish traineeship programs for graduate students who pursue microelectronics research leading to a masters or doctorate degree (Sec. 10318(a))
- Authorizes \$100 million for NSF to support R&D activities by institutions of higher education, nonprofit organizations, or consortia of such institutions to increase access to STEM education opportunities in rural schools and to provide teachers with the resources they need to teach more effectively, including through peer support, mentoring, and hands-on research experiences (Sec. 10512)
- Authorizes \$600 million to establish a ten-year National STEM Teacher Corps pilot program, in addition to a STEM Teacher Corps advisory board, to recognize, recruit and retain high-quality STEM teachers, including diverse educators; promote best practices that emerge from the pilot program; and create a scientifically literate public (Sec. 10311(c))
- Amends the Scientific and Advanced-Technology Act of 1992 to establish centers of excellence among community colleges to serve as national and regional clearinghouses and models; provide seminars and programs to disseminate model science, math, and advanced-technology curricula, teaching methods, and instructional materials to other community colleges; and create networks to coordinate research, share best practices, and promote collaborations (Sec. 10312(b))
- Requires the Director to conduct a study alongside the National Academies to identify research gaps and barriers to implementing innovative STEM education programs at PreK-12 schools, and present a compendium of promising, evidence-based PreK-12 STEM education practices, models, programs, and technologies (Sec. 10311(a))

Federal Agency Policy and Personnel Changes Related to Diversity, Equity, and Inclusion

The bill makes groundbreaking Federal agency policy and personnel changes related to diversity, equity, and inclusion that will promote workplace fairness and address barriers to participation, including developing caregiver policies for all science agencies and creating a position for a Chief Diversity Officer at the NSF.



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- Requires the White House Office of Science and Technology Policy (OSTP) to develop guidance for Federal research agencies to establish caregiver policies, and recommends the agencies collect demographic data on the use of caregiver policies and report that data to OSTP (Sec. 10501)
- Creates the position of NSF Chief Diversity Officer to oversee diversity and inclusion matters for the agency, and authorizes \$25 million to support authorized activities, including ensuring geographic diversity for NSF programs, establishing a strategic plan, advising on efforts to expand outreach to underrepresented populations, and increasing participation by HBCUs, Tribal Colleges and Universities, MSIs, and EPSCoR institutions (Sec. 10327)

National Strategies

The bill calls for the development of national strategies to ensure U.S. leadership in science and technology and recognizes the importance of diversity and inclusion in our global competitiveness.

- Charges OSTP with developing and submitting to Congress a comprehensive national science and technology strategy, including how to maintain and advance U.S. leadership in science and the key technology focus areas, as well as a quadrennial review of the science and technology enterprise of the United States (Secs. 10611, 10613)
- Requires OSTP to coordinate with the National Science and Technology Council (NSTC), the National Security Council (NSC), the Director of the National Economic Council (NEC), and other relevant agency heads to review each national security strategy with regard to U.S. national competitiveness in science, technology, research, innovation, and technology transfer activities, including patenting and licensing; develop or revise a national security-focused science and technology strategy in support of the existing strategy; and submit to Congress a report on its findings, including an assessment of how the Federal Government is increasing the participation of underrepresented populations in science, research, innovation, and manufacturing (Sec. 10612)

