April 19, 2021

The Honorable Rosa DeLauro Chair Committee on Appropriations U.S. House of Representatives Washington, DC 20515

The Honorable Patrick Leahy Chair Committee on Appropriations U.S. Senate Washington, DC 20510 The Honorable Kay Granger Ranking Member Committee on Appropriations U.S. House of Representatives Washington, DC. 20515

The Honorable Richard Shelby Vice Chair Committee on Appropriations U.S. Senate Washington, DC 20510

Dear Chair DeLauro, Ranking Member Granger, Chair Leahy, and Vice Chair Shelby:

As a broad community of research organizations, professional societies, universities, and private companies, we write to urge you to provide the highest possible fiscal year (FY) 2022 allocation for the Commerce-Justice-Science (CJS) Appropriations Subcommittees in order to robustly fund the basic and applied research programs in the CJS portfolio. Significant growth is urgently needed for CJS programs, which are vital to the advancement of science, technology, economic development, and criminal justice. These include the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the National Institute of Standards and Technology (NIST), the Office of Science and Technology Policy (OSTP), the Department of Commerce statistical agencies, and the Department of Justice (DOJ) Office of Justice Programs.

Investments in research and education, including the departments and programs in the CJS bill, lead to innovations and new technologies that improve our health, grow our economy, and enhance our quality of life. The U.S. was once the uncontested leader in science and technology but has seen our advantage erode as other nations have dramatically increased their investments in research. In particular, China has continued to dramatically increase its investments in science and technology, which have grown by 13 percent annually between 2010 and 2017.¹ It is likely that China has now surpassed the U.S. in total R&D expenditures.² While U.S. R&D expenditures have increased modestly over the last decade, total R&D spending as a percentage of GDP has not grown in over 30 years.³ Moreover, due to discretionary spending constraints over the last decade, U.S. research capacity has been eroded significantly. Due to the limits

¹ Research and Development: U.S. Trends and International Comparisons. Science and Engineering Indicators, National Science Board, January 2020

² Widener, A. China may have pulled ahead of U.S. in race for top spot in global science R&D. Chemical and Engineering News, 15 January 2020

³ <u>The Perils of Complacency: America at a Tipping Point in Science and Engineering. American Academy of Arts</u> and <u>Sciences Report Brief, 2020</u>

imposed by the Budget Control Act, federal R&D spending is approximately \$200 billion less than it would have been if agency expenditures had maintained the same annual rate of growth as they had prior to 2011.⁴ If the U.S. is to remain at the forefront of fields such as artificial intelligence, space exploration, quantum computing, and other critical technologies, the nation must recommit to strong investments in R&D, including CJS programs. In both the short and long term, such investments are critical both to our prosperity and global leadership.

Research and education programs within the CJS portfolio are also vital for addressing national emergencies. Notably, basic and applied science programs supported by CJS agencies including NSF, NIST, and NASA have been an invaluable part of the nation's efforts to address the COVID-19 pandemic. Harnessing the nation's scientific expertise, CJS agencies have funded groundbreaking research on airborne viral transmission, monitoring SARS-CoV-2 in wastewater, studying possible COVID-19 seasonality, and developing more sensitive and accurate COVID-19 tests.^{5,6,7} Moreover, decades of federal investments across agencies built a foundation of scientific knowledge that allowed the nation to rapidly develop technologies to counter COVID-19. For example, research projects sponsored by NSF beginning in the 1980s contributed to the development of cryo-electron microscopy, a molecular imaging technique now widely used by researchers around the world. This technology was instrumental in studying the structure of SARS-CoV-2 and in the development of vaccines that target the virus's spike protein.^{8,9} Robust and sustained funding for the CJS research agencies is therefore critical both to end the current crisis and to ensure that we have the scientific and technical capacity to address the next public health emergency.

Agencies within the CJS portfolio have key roles in addressing the threat of climate change and other environmental challenges. CJS agencies support research to model global warming, understand its effects on the Earth's ecosystems, advance mitigation and adaptation efforts, and develop clean energy technologies.^{10,11,12,13} NSF, NASA, and NOAA together fund over 60 percent of our nation's federal investment in environmental research, as well as funding a large portion of our civilian observational capabilities. CJS agencies also collaborate with others across the federal government to help advance coordinated efforts to assess and address the effects of climate change on all aspects of our society and effective strategies to become a climate-ready nation.¹⁴ For example, disaster resilience research headed by NIST, including investment in post-disaster impact research and pre-impact mitigation, help address threats from

⁴ Hourihan, M. The Budget Control Act may have cost over \$200 billion in federal R&D. AAAS News, 19 January 2021

⁵ NSF COVID-19 Response Funding Update, January 2021.

⁶ Could COVID-19 Have Seasons? Searching for Signals in Earth Data. NASA Earth Observatory. 14 July 2020

⁷ NIST and COVID-19.

⁸ NSF Statement on Nobel Prize in Chemistry 2017

⁹ Moore, J.P. and I.A. Wilson. Decades of basic research paved the way for today's 'warp speed' Covid-19 vaccines. STAT, 5 January 2021

¹⁰ <u>Climate Prediction, NOAA National Center for Environmental Information</u>

¹¹ Global Climate Modeling, NASA Goddard Institute for Space Studies

¹² Disaster Resilience Research Grants (NSF and NIST joint program)

¹³ <u>NIST Alternative Energy</u>

¹⁴ U.S. Global Change Research Program

high-winds, fire, or flood. Research programs supported by the CJS bill are central to addressing global environmental threats.

A robust CJS allocation will allow the Commerce Department to fund programs that are vital to the U.S. economy and our economic recovery. Commerce Department programs, including the Bureau of Economic Analysis, produce detailed analyses that are indispensable for understanding our multitrillion-dollar economy. Although the 2020 Census has concluded, ongoing programs such as the American Community Survey, continue to collect high quality socioeconomic and demographic data that scientists and policymakers use to inform basic, clinical, and applied research and research training activities.^{15,16}

CJS research programs also play an important role in advancing equity and racial justice. As our nation continues to struggle with structural and systemic racism, research supported by DOJ, including the National Institute of Justice, informs policies related to prison and sentencing reform and policing strategies. These research programs provide vital data and complement other efforts across the government to address racial prejudice and other injustices in our society. In addition, DOJ research programs are exploring other questions with important societal implications, including police response to homelessness and the prevention of domestic terrorism.¹⁷

In sum, the federal government has a unique role in funding the R&D crucial for our national needs, but the federal share of R&D spending remains at or near its lowest point since the 1950s.¹⁸ The CJS bill is singularly responsible for the majority of the nation's annual investment in non-biomedical, non-defense research – the very research that is essential for our long-term economic growth, security, and prosperity.

Given the importance of federal support for R&D and the central role of the CJS Subcommittees in funding the nation's research enterprise, we respectfully urge you and your colleagues to provide a robust CJS 302(b) allocation. With sufficient resources, the Subcommittees will be able to make the R&D investments necessary to meet our nation's challenges and opportunities.

Sincerely,

The Census Project Coalition for Aerospace and Science Coalition for National Science Funding Crime and Justice Research Alliance Friends of NOAA The NIST Coalition

African American Health Alliance American Anthropological Association

¹⁵ Bureau of Economic Analysis

¹⁶ American Community Survey

¹⁷ National Institute of Justice, Current Funding Opportunities, Accessed March 2021

¹⁸ <u>Research and Development, Science and Engineering Indicators, 2020</u>

American Association for the Advancement of Science American Association of Geographers American Association of Physics Teachers American Astronomical Society American Chemical Society American Educational Research Association American Geophysical Union (AGU) American Institute for Medical and Biological Engineering American Institute of Biological Sciences American Mathematical Society American Physical Society American Physiological Society American Psychological Association American Society for Pharmacology and Experimental Therapeutics American Society of Agronomy American Society of Civil Engineers American Society of Plant Biologists American Sociological Association American Statistical Association Association for Psychological Science Association of American Universities Association of Population Centers Association of Public & Land-Grant Universities Association of Public Data Users (APDU) Association of Science and Technology Centers **Biophysical Society Boston University Brown University** California Institute of Technology Carnegie Mellon University **Computing Research Association** Consortium for Ocean Leadership Consortium of Social Science Associations Cornell University Council of Professional Associations on Federal Statistics (COPAFS) Council on Undergraduate Research Crop Science Society of America **Duke University** Ecological Society of America Entomological Society of America Federation of American Societies for Experimental Biology Federation of Associations in Behavioral and Brain Sciences Florida State University

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