

Response to Written Question Submitted by Chairman Thune to Dr. Kelvin Droegemeier

*Question.* The President's Council of Advisors on Science and Technology (PCAST), a group of outside experts created by President George H. W. Bush and reestablished under all subsequent Administrations, has traditionally advised the President, the OSTP Director, and the National Science and Technology Council on science, technology, and innovation policy matters. PCAST's charter expired in September 2017 and the panel has not been reconvened. Do you believe PCAST performs an important function in advising both the President and the OSTP Director on matters of science and technology policy, and if so, would you seek to reestablish and re-charter PCAST once you are confirmed to your new role?

*Response.* Yes, PCAST is an essential advising body. On September 29, 2017, President Trump renewed Executive Order 13539, as amended by 13596, which continued PCAST. If confirmed as OSTP Director, one of my top priorities will be to re-charter PCAST and begin inviting experts to serve on the council. My initial focus for PCAST would be to choose diverse members with impeccable scientific credentials and a balance across disciplines including industry experience. I would focus their initial work on topics of critical need for the Nation, with high likelihood for significant short-term impact.

Responses to Written Questions Submitted by Honorable Jim Inhofe to Dr. Kelvin Droegemeier

*Question.* Dr. Droegemeier, your record of working on public-private partnerships shows an appreciation for the benefits of a cooperative and consultative relationship between government agencies and the private sector. Particularly for an office that works at the intersection of science, technology, business, and law, do you agree that robust stakeholder involvement is essential to the decision-making process?"

*Response.* Yes, I agree that robust stakeholder involvement is essential to the planning and decision-making processes. If confirmed, I will seek to ensure that OSTP engages key stakeholders, to include those across the Federal government, Congress, academia, industry, nonprofits, and international partners. I will leverage my past experience in assembling multi-faceted groups and continue my work with public-private partnerships to ensure that sound science and robust stakeholder involvement are considered in the planning and decision-making processes to benefit the American people.

Responses to Written Questions Submitted by Honorable Todd Young to Dr. Kelvin Droegemeier

*Question 1.* Dr. Droegemeier, artificial intelligence has the ability to double our economy's annual economic growth rates by 2035 and boost labor productivity by up to 40 percent. However, it doesn't come with some downsides. That is why I have partnered with Senator Cantwell to develop a federal advisory committee to study and prepare for the development of AI.

Response. Artificial intelligence (AI) is a critical technology for the future of our Nation. I strongly believe that we should not cede America's leadership in AI to other countries. As this technology advances and becomes more powerful and ubiquitous, we must ensure that American values are central to its development and deployment. If confirmed, I look forward to working with Congress to ensure that national AI policy reflects the perspective of multiple stakeholders.

*Question 2.* Do you support a whole-of-government approach to developing a national strategy to lead in the development of AI?

Response. Yes. I am very pleased that the Administration specifically identified machine learning and artificial intelligence as a national research and development (R&D) priority in the OMB-OSTP R&D Priorities Memo, included AI as a specific budget priority, and addressed AI's importance in the President's National Security Strategy and National Defense Strategy.

I understand that the National Science and Technology Council (NSTC) – the Cabinet-level Council that is the principal means within the Executive Branch to coordinate science and technology policy across the diverse entities that make up the Federal research and development enterprise, which is Chaired by the President – has several bodies dedicated to artificial intelligence, made up of key stakeholders from across the government. The Select Committee on Artificial Intelligence is comprised of high-level R&D officials to advise White House senior officials on interagency AI priorities and to leverage Federal data and computation resources; the Machine Learning and Artificial Intelligence Subcommittee implements the Select Committee's initiatives; and the AI R&D interagency working group under the Networking and Information Technology Research and Development (NITRD) program serves as a community of practice for highly technical AI R&D.

If confirmed, I will ensure that the Office of Science and Technology Policy (OSTP) remains focused on AI, which is critical for American national and economic security, and will engage stakeholders, including Congress, to ensure that these important perspectives are considered as we work on coordinated Federal AI policy.

*Question 3.* Would you support legislation like the Future of AI Act, which establishes a federal advisory committee to study and prepare for AI's continued use in our society?

Response. I appreciate your and the committee's leadership on this critically important issue, and if confirmed I look forward to collaborating closely with you on AI related issues. We must ensure that the Nation is optimally prepared to drive critical advances in artificial intelligence,

and to make sure those advances can be transformed, free from undue barriers, from the lab into the market.

AI is critical to the long term economic and national security of the Nation, and public trust in AI is crucial to safeguarding America's global leadership in this critical frontier. Given the potentially transformative power of this technology, we must work to ensure that American values and America's respect for individual rights and freedoms are integral to global AI development.

Our Federal agencies are working on studying the integration of AI into our society. The National Science Foundation, for example, funds basic research into machine learning and algorithmic bias to help future AI designers build security, trust, and safety into their systems. DARPA has created "The Explainable AI program" which aims to develop new machine learning systems that can explain their rationale, score the strengths and weaknesses of the information being used, and provide some insight into future decision making. OSTP can help by making trustworthiness and the reduction of algorithmic bias priorities for all agencies conducting AI research or utilizing AI systems.

OSTP not only convenes the Federal scientific workforce, but outside stakeholders and those representing consumers and the general public. The office began engaging with experts from private industry and academia at its "White House Artificial Intelligence for American Industry" summit in May 2018. As we address these questions of American leadership and American values within the development of a technology like AI, it is crucial that we as policymakers prioritize stakeholder engagement throughout the process. If confirmed, I will continue and expand the work OSTP has done to bring in external views and perspectives on AI.

*Question 4.* Would you commit to working with my office as we develop and push the government to create a whole-of-government approach to developing a national strategy on AI?

Response. Yes. As discussed in Question 2, if confirmed, I look forward to engaging with Congress, and will work with your office to ensure that your perspectives are considered, and that all relevant Federal agencies are coordinated as we work on AI policy.

*Question 5.* Dr. Droegemeier, you have spoken of the need for integrated funding across all sciences – and more from the onset of projects. Can you speak to your work in Oklahoma and how developing these integrated approach at the onset of projects has improved your results?

Response. In Oklahoma, I have taken a "portfolio" approach to prioritizing research areas at my institution and within the State of Oklahoma and believe the same concept would be fruitful if applied across the Federal government. Specifically, the portfolio approach begins by identifying areas of capability, capacity, and competitiveness based upon existing resources (e.g., personnel, knowledge, infrastructure, funding). It then takes an integrative view as to how these resources – which often exist in relatively isolated "stove pipes" across fields of study and organizations – can most effectively be assembled to provide powerful new capabilities in tackling America's most important challenges. In this manner, inefficiencies and redundancy are reduced, synergy is maximized, and the taxpayer benefits via lower costs. In Oklahoma, the portfolio approach has

helped us develop collaborations and leverage resources in ways that have allowed us to tackle problems we otherwise would not have been able to approach, and do so with fewer resources.

*Question 6.* Dr. Droegemeier, one of the areas that OSTP has previously identified as vital to advancing the national security and economic prosperity of the United States is quantum information science. In fact, the recently released the FY 2020 Administration Research and Development Budget Priorities document highlights the need for continued federal investments in this area. If appointed as the OSTP director, how do you envision strengthening the federal government's partnership role with higher education institutions across the country as well as the private sector to advance this quantum science agenda?

Response. Quantum computing is another emerging technology that is critical to our national interests. There are so many different elements that go into the Quantum Information Science (QIS) ecosystem that the Federal government cannot shoulder the burden of ensuring American QIS leadership alone. We must engage with academia and research institutions as well as the private sector to ensure that we are working towards a common goal, and maximizing the value of every dollar spent on QIS R&D.

Earlier this year OSTP established the NSTC Quantum Information Science (QIS) Subcommittee to convene all relevant Federal stakeholders, enabling them to invest effectively in QIS, coordinate R&D, and share information, expertise, and best practices for program management. Leaders from across the Federal government have voiced their support for this critical initiative. We must build on that which makes the American R&D ecosystem so great – a strong partnership among the Federal government, industry, and academia. If confirmed, I will seek to ensure that QIS basic and lab-to-market research funding is prioritized, which will help to drive innovation in academia and industry. I support science, technology, engineering, and mathematics education initiatives to help grow the quantum workforce of tomorrow, and I will ensure that OSTP brings the leading voices within industry and academia to the table to inform QIS national policy. I envision leveraging the resources of the QIS Subcommittee and relevant advisory bodies and working closely with academia on behalf of the Administration and the interagency to pursue these goals.