3 April 2019

The Honorable Brenda Lawrence
2463 Rayburn House Office Building
U.S. House of Representatives
Washington, DC 20515

Re: Feedback on FY2020 appropriations for artificial intelligence R&D in federal agencies beyond the Department of Defense

Dear Congresswoman Lawrence.

On behalf of the U.S. members of IEEE, thank you for your strong support of the science and engineering community, and your commitment to ensuring that the United States, when developing artificial intelligence technologies, maintains not only the innovation edge, but does so with the full input and participation of our society.

Your staff asked for specific input on where the Unites States should be investing funding and resources. We urge you to consider prioritizing long-term, high-risk, high-reward research and increased federal investments in *all* areas of AI, beyond defense.

The 2016 *National AI R&D Strategy* stressed that greater federal investment in programs dedicated to AI R&D is critical to maintaining U.S. competitiveness in this field. Since publication, multiple AI-focused programs have been established in the Department of Defense – e.g. the Joint Artificial Intelligence Center (an investment of $2 billion through the year 2024) and DARPA's "AI Next Campaign" (another $2 billion commitment over 5 years on new and existing programs).

First, On the surface these defense appropriation numbers appear impressive, but we ask that appropriators be cautious of how appropriations are being invested in AI, and provide new money to AI R&D to ensure that federal agencies are not reprograming existing R&D funds away from important programs.

Second, IEEE-USA wants to promote AI R&D that leads to innovation of AI applications for *all* aspects of our daily lives. While defense-related AI programs are critical to our national security, IEEE-USA recommends that 2020 budget proposals include similar strong investments in non-defense AI R&D, across all civilian research agencies. Per the White House FY2020 budget request, non-defense AI spending amounts to only $850 million to help the Department of Energy, National Institutes of Health, National Science Foundation, and National Institute of Standards and Technology advance artificial intelligence. Considered next to the planned investments in DoD, non-defense AI R&D pales in comparison.

Much of the US government's dedicated non-defense AI research is taking place within agencies comprising the NITRD (The Networking and Information Technology Research and Development) consortium, specifically within the AI and the Intelligence Robotics and Autonomous Systems Program Component Areas (IRAS PCA). IRAS R&D advances intelligent robotic systems yet IRAS was only 7 percent, or $342 million, of the total NITRD budget FY2019 budget request ($5.277 billion).
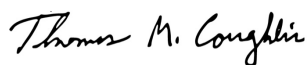
We recommend:

- Doubling the NITRD's IRAS budget in FY20 with a target of $1 billion in 5 years and distributing it among contributing members of the program including not only the DoD, but NSF, NASA, and NIST.

- Increasing the NSF Computer and Information Science and Engineering (CISE) Research Initiation Initiative budget in FY20 to the FY18 enacted level of $961 million. In FY20, the NSF CISE plans to invest $492 million in AI-specific programs (defined as machine learning, computer vision, natural language processing, explainable AI systems, and personalized medicine). Significantly increasing the CISE budget, with significant annual increases for the next five more years will allow CISE to continue its impressive track record of identifying and funding early research that led to such things as the Google search algorithm.

- Including language prioritizing investments in NITRD high performance computing (HPC) programs (including R&D for High-Capability Computing Systems (EHCS) and High Capability Computing Infrastructure and Applications (HCIA)) and Advanced Scientific Computing at DOE.

- Providing strong funding support for NIST's Scientific and Technical Research and Services (NIST's core laboratory research programs) account. We recommend increasing STRS funding by 4 percent real growth or a minimum increase of $41 million above FY19 to further advance research projects in key areas, including cybersecurity, internet of things, and artificial intelligence. Additionally, we recommend $80 million toward quantum activities already underway at NIST, an increase of $50 million over FY19, and urge Congress to appropriate $150 million for NIST facilities and construction.

Also, consider funding for NIST to develop industry-focused annual benchmarking efforts to measure the effectiveness of AI in real-world circumstances, such as NIST did in the landmark studies known as *TREC Legal Track Interactive Task (2007-2011)*. These studies were exemplary of how a non-regulatory government body can provide industry and other stakeholders tools to enable evidence-based decision-making when considering adoption of AI in important societal functions including, healthcare and financial services. These studies were a contributor to the comfort level of litigators and the courts when using AI in civil and criminal discovery. Note that NIST is also tasked with the development of standards for secure, trustworthy and safe AI – per the President's Executive Order on AI.

NITRD's IRAS, NSF CISE, NIST and DOE ASC are all poised to focus research on the fundamentals of AI and data-intensive theories and applications, high performance and supercomputing, novel computer architectures like neuromorphic computing and novel semiconductor materials. This research will enable faster and more powerful artificial intelligence computing. These programs should devise research projects that prevent cognitive biases of human administrators and unintentionally inferred biases from extending to AI. Thank you for your consideration, and we look forward to working with you and your colleagues as the appropriation process continues. Please do not hesitate to contact Erica Wissolik on my staff, at e.wissolik@ieee.org or (202) 530-8347 with questions.

Sincerely,

Thomas Coughlin
2019 IEEE-USA President