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Request for Information (RFI) on an Implementation Plan for a National Artificial Intelligence Research Resource: Responses

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INDIANA UNIVERSITY

OFFICE OF THE VICE PRESIDENT
FOR RESEARCH

Email Subject line: RFI Response: National AI Research Resource

Email to: [REDACTED]

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To: Lynn Parker, Director of the National AI Initiative Office and Deputy U.S. Chief
Technology Officer
Erwin Gianchandani, Senior Advisor for Translation, Innovation, and Partnerships,
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Subject: RFI Response: National AI Research Resource

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Indiana University (IU) appreciates the opportunity to respond to the RFI on an Implementation Plan for a National Artificial Intelligence Research Resource, Federal Register vol. 86, no. 139, July 23, 2021.

Increasing the level of innovation in artificial intelligence in the United States will take a partnership between government agencies, public and private academic institutions, non-profit organizations, and private industry. We represent the research campuses of Indiana University (IU), a large public university system in the US Midwest. IU has two main research campuses: Indiana University Purdue University (IUPUI), an urban campus in the state capital, and Indiana University Bloomington (IUB), located in a small college town. IUB and IUPUI have a combined enrollment of over 70,000 students and include the Indiana University School of Medicine, the largest medical school in the United States. The two campuses have made sizable investments in technological infrastructure and digitized assets in support of research. This response represents our perspective on the unique capacity of an academic institution such as IU to contribute to AI innovation enabled by a National AI Research Resource and the national resource itself.

3. How can the NAIRR and its components reinforce principles of ethical and responsible research and development for AI, such as those concerning issues of racial and gender equity, fairness, bias, civil rights, transparency, and accountability?

Respect for Civil Liberties: Respect for the civil liberties of especially vulnerable populations in the context of AI innovation is a complex technical, ethical, and philosophical problem. To make

meaningful progress in addressing these issues, they must be approached holistically, something academic institutions have the unique capacity to do. IUB and IUPUI contain and combine perspectives from the renowned Kinsey Institute for Research in Sex, Gender, and Reproduction, the Maurer Law School, the Luddy School of Informatics, Computing, and Engineering, the famed Ostrom Institute, the Center for Applied Cybersecurity Research, the Institute of Integrative AI, research centers focused on minority populations, and ethics programs working in health, business, IT, communications, and other fields.

Role of the CI Professional in NAIRR: CI Professionals enable the academic research carried out through the use of computational and data resources. As such, they are a key element of the overall integrity of a national AI research infrastructure. As AI models increasingly embody the same traits as the data that they use, the CI Professional must have tools and training to assess the inherent ethical limitations of one model over another, for instance. Models must have the ability to provide explainability when queried, and CI professionals be trained to interpret these results.

4. What building blocks already exist for the NAIRR, in terms of government, academic, or private-sector activities, resources, and services?

Academic Assets: Academic institutions such as IUB and IUPUI have made sizable investments in hardware and data infrastructure in support of research as well as operate significant infrastructure in support of their campuses overall. This technical infrastructure could be part of the NAIRR as a core building block by providing both computational infrastructure and real-world data. This combination of infrastructure, data, and capable CI staff could serve as a living laboratory to test and validate AI algorithms in a controlled environment with real-world data, particularly in focus areas that leverage the strengths of an academic institution. The strengths that IUB and IUPUI could bring to bear are in fundamental AI research and its application to the study of virus and human health as well as to global network management, cybersecurity, and to unique digitized assets.

Exemplar in NSF National CI Infrastructure Academic Service Providers: The National Science Foundation has funded a series of projects that provide national cyber infrastructure within the US. Through the Teragrid/XSEDE/ACCESS programs, what has arisen is a successful model of service providers, housed at academic institutions, that deploy and operate compute resources shared nationally, and who work together to provide common access mechanisms to federated compute resources. The service providers have additionally organized into a community of practice where they share knowledge. The agility and flexibility of this model was demonstrated by resources that were immediately available for COVID-19 research. IU has participated in these programs since the beginning and has rich expertise as a service provider.

6. Where do you see limitations in the ability of the NAIRR to democratize access to AI R&D? And how could these limitations be overcome?

Tools for hands-on AI education: To truly democratize AI such that we reach the diverse student populations in our public universities, AI education needs to improve by becoming more hands-on and more available. Students should be able to plug a new AI program into a robot, and see if

the robot dances better. Or plug a new AI algorithm into a vacuum cleaner to see if it cleans more efficiently. Or make an algorithmic change to a drone and experiment with collision avoidance. This improvement will require synthetic simulation environments available for classroom use. Large public universities with cyberinfrastructure investments such as IUB and IUPUI have the capacity to host these environments in partnership with commercial clouds.

Model commons: barriers to access can be lowered with investments in the creation of curated collections of data and AI models that are available using the principles of open science. This need is apparent to us for medical research to advance, though elsewhere as well. The NSF AI Institute (NSF 21-12606) effort in model commons could be a building block.