

Application Title: *A High-Performance Data Analysis System to Advance A&M Research in Data Sciences and Artificial Intelligence*

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Key Participating Units:

Texas A&M Engineering Experiment Station (TEES); College of Engineering; College of Science; College of Geosciences; Health Science Center (HSC); College of Veterinary Medicine & Biomedical Sciences; College of Agriculture & Life Sciences; College Mays Business School; Texas A&M Institute of Data Science (TAMIDS); Texas A&M Transportation Institute (TTI); Division of Information Technology; AgriLife Genomics and Bioinformatics Service; Center for Geospatial Sciences, Applications and Technology (GEOSAT); International Laboratory for High-Resolution Earth System Prediction (iHESP); Academy of Advanced Telecommunications and Learning Technologies; Texas A&M University at Galveston; Center for Bioinformatics and Genomic Systems Engineering.

Anticipated Request Amount (\$): 2,083,300

Executive summary of the intended application to utilize Research Development Funds:

This proposal seeks funding for acquisition of a new research instrumentation designed as a high-performance data analysis system for big data analytics, computational and data sciences, and artificial intelligence (AI). The proposed system will be equipped with the latest technologies such Intel Xeon Cascade Lake processors, NVIDIA Volta GPUs, NVMe drive, NVMDIMM memory, and interconnected with Intel Omni-Path Architecture (OPA) fabric. This system will provide shared resources for all academic disciplines with the goal advancing Texas A&M research, training A&M researchers to use it and the next generation national leadership supercomputers, and enhancing A&M research strength and competitiveness in computational and data sciences, AI and advanced cyberinfrastructure.

The proposed data analysis and computing system with innovative data processing capabilities and huge high-performance data storage, will greatly enhance the research strength and competitiveness of Texas A&M in computational and data-intensive science and engineering, and leverage the university's efforts and resources for the recently created Texas A&M Institute of Data Science. It will serve as a critical research environment to advance projects dependent on big data analytics and research computing, machine learning and AI, and initially support more than 40 investigators from 30 different departments involved in this project and their groups. It will be the focal resource for more than 5 workshops and over 30 short courses per year intent on training our students and research scientists to use the system to do research and enable new discovery. The system will allow Texas A&M to take the next step in data science and data-intensive research, and prepare Texas A&M researchers ready for using a new generation of national leadership supercomputers for research and discovery.

The payoff from this project is significant, and it has a wide range of broad impacts, from transforming A&M research in science and engineering, advancing research strength and competitiveness for federal grants, to disseminating research results. The HPRC has been a dedicated resource for research and discovery at Texas A&M, and currently supports more than 2,300 users, including more than 450 faculty members. The proposed system will add new capacity and emerging technology to faculty, staff and students at Texas A&M and leverage the existing HPRC resources for research and discovery. The proposed system will be in a critical position to support basic and applied research at the intersection of computational science and engineering, data-intensive sciences and AI. It will significantly enhance the research capabilities of Texas A&M researchers in the fields of data-intensive science and engineering. Access to such a research infrastructure will significantly strengthen research proposals geared for federal funding.