

Ready to Spin-up! A multidisciplinary human-rated short-radius centrifuge facility

Lead contact:

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Key Participating Units: College of Engineering (COE) | Texas A&M Engineering Experiment Station (TEES) | College of Education and Human Development (CEHD) | College of Medicine (COM)

Key Team Member or Co-Investigators:

Dr. Bonnie J. Dunbar: Aerospace Engineering, NAE COE/TEES
Dr. Susan Bloomfield: Health and Kinesiology, CEHD
Dr. Melinda Sheffield-Moore: Health and Kinesiology, CEHD
Dr. Richard Kreider: Health and Kinesiology, CEHD
Dr. David Zawieja: Medical Physiology, COM
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Anticipated Request Amount (\$): \$730,000

Executive summary of this application to utilize Research Development Funds:

We propose to install a human-rated short-radius centrifuge on the Texas A&M University (TAMU) – College Station campus. This unique, world-class NASA funded facility, which was formerly at the University of Texas Medical Branch (UTMB) in Galveston, will tremendously advance TAMU capabilities to investigate the impact of variable gravitational fields on both physical and biological systems (from cellular levels to full organisms). This research will be applied to a number of areas ranging from aging and physical rehabilitation to space exploration (e.g. reduced gravity levels on the Moon and Mars). Additionally, technology development, such as wearable technology or fluid physics, under artificial gravity conditions could also be supported. Thus, multiple Colleges across campus will benefit from the facility, including College of Engineering, College of Education and Human Development, and College of Medicine. TAMU and local STEM students from the Brazos area will also be exposed to centrifugation research through classes, visits, workshops, and conferences.

The centrifuge, originally built by KRBwyle for the National Aeronautics and Space Administration (NASA), will be the only facility of its kind in the United States. Currently, NASA and other University researchers must travel overseas to use international facilities located at the German Space Agency (DLR) in Germany. Thus, our facility will attract outside investigators, such as NASA Johnson Space Center (JSC) funded researchers from across the nation, and will enhance TAMU investigators' competitiveness for extramural funds in multiple federal agencies, including NASA, National Science Foundation (NSF), National Institutes of Health (NIH), and Department of Defense (DOD).

The centrifuge, which will be permanently loaned to TAMU under a Space Act Agreement currently in development with Dr. Bonnie J. Dunbar, will be housed at the Human Research Clinical Facility (HCRF) on West campus. Dr. Dunbar has agreed to dedicate up to \$1M of her Chancellor Research Initiative (CRI) funds to the construction of a small annex to the HCRF to house the Centrifuge. NASA originally invested about \$1M to construct the Centrifuge. This unique facility will also advance Chancellor Sharp's recently stated goal at the TAMEST Conference in 2018 that TAMU will be preeminent in Texas and the nation in supporting human space exploration research. The recent introduction of a bipartisan bill (February, 2019) by Texas Senator John Cornyn to extend the life of the International Space Station (ISS) to at least 2030 and to establish the goal of permanent human presence beyond Earth as national policy, underscores the important opportunity for TAMU to establish academic research leadership in human space exploration.