

Research Development Fund – FALL 2019 Application Template  
SUBMISSION DEADLINE EXTENDED: **Monday – April 13, 2020 at 12 noon CDT** to [rdf@tamu.edu](mailto:rdf@tamu.edu)

**\*\*Applications that exceed page limits for any section or do not follow template will not be reviewed\*\***

**Application Title: A Variable Field Strength, Cryogen Free MRI Scanner to Support Translational Research**

**Lead contact for RDF Application:**

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**Key Participating Units:** AgriLIFE Research: Dept. Plant Pathology & Microbiology (Libo Shan) **Qatar Campus:** Science (Othmane Bouhali), **Colleges of: Education and Human Development:** Human Clinical Research Facility (Nicolaas Deutz and Marielle Engelen) **Engineering:** (Jim Ji, Arum Han, Raffaella Righetti, Steve Wright, Mary McDougall, Duncan Maitland, Reza Avaz, Roland Kaunas, Danny Alge) **Liberal Arts:** Psychological and Brain Science (Joseph Orr) **Medicine:** Neuroscience and Experimental Therapeutics (Farida Sohrabji), EnMed (Rod Pettigrew) **Science:** Chemistry (Christian Hilty), Mathematics (Peter Kuchment), Biology (Michael Smotherman) **Vet. Med. & Blomed. Sciences:** Large Animal Clinic (Jay Griffin), TIPS (Vidya Sridhar), Neuroscience: (Peter Nghiem).

**Anticipated Request Amount (\$): \$2,225,000**

**Executive summary of this application to utilize Research Development Funds:**

We are proposing that Texas A&M acquire a unique variable field strength MRI system to support an increasing need for magnetic resonance imaging and spectroscopy throughout the campus to support translational research. The proposed instrument is a 'next-generation' MRI scanner, operating without any liquid cryogen and at variable field strengths. Indeed, the proposed system is capable of changing field strengths in tens of minutes. This unique feature will enable investigators to use enhanced spatial and spectral resolution of imaging at 7 Tesla, and to test their device or biomarker development at the lower field strengths of 1.5T and 3T most commonly used by clinical MR centers. This new technology will provide A&M researchers with an extremely rare and unique research infrastructure.

The scanner is being proposed by researchers in six colleges and AgriLIFE, with an advisory board consisting of the directors or key members of other MRI facilities on campus. This synergistic approach is possible because the proposed facility fills a need not provided by the existing MRI scanners, and also promises to enhance the services provided by these existing, clinically focused facilities by providing expertise, training and support in pulse sequence and image reconstruction and RF coil support, critical for the continued technical viability of any MR center. In addition to operating at fields of up to 7 Tesla, the scanner has a 42 cm bore, supporting imaging of medium sized animals such as small dogs. Smaller than the human 3T scanners, it also provides far higher gradient strengths, the key component in determining imaging resolution. This system will support many research efforts and will enable proposals previously limited by lack of access to MRI with this level of resolution.

Liquid helium, used on all other MRI scanners on campus, is exploding in price now that the federal government has vacated the helium market. (<https://www.aip.org/fyi/2019/helium-users-grapple-supply-crunch>) The cryogen free technology, which also allows the variable field strength feature, promises lower operating costs and higher reliability. The manufacturer will provide the highest level maintenance plan for the first three years at no cost. Two departments in the College of Engineering have agreed to provide support for a half-time lab manager. In addition, the College of Engineering will provide space for the system as part of a move of the College MR facility. After the first three years we expect to be self-sufficient based on user-fees.