

**Research Development Fund - FY17**

**Application Title: Enhancing On-Campus Access to Broadband NMR Spectroscopy**

**Lead contact for RDF Application:**

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**Key Participating Units:** College of Science, College of Engineering, Health Science Center

**Anticipated Request Amount (\$):** 1,800,000

**Executive summary of the intended application to utilize Research Development Funds.** We seek to enhance on-campus access to high-resolution NMR spectroscopy, serving a wider range of applications than is possible with the presently existing instrumentation. Current and new research ranging from basic chemistry to polymers, materials science, energy, biomedical and environmental research requires the characterization of organic and inorganic compounds containing low- $\gamma$  nuclei. Access to NMR at TAMU, while excellent for other applications, does not meet the simultaneous requirements on sensitivity, resolution and, most specifically, broadband detection capability imposed by research projects in this nexus. The current proposal would enable the acquisition of a high-field liquid state NMR spectrometer that includes a cryogenically cooled probe capable of servicing these needs. It will thus ensure competitiveness of modern research across campus, that increasingly requires identification and quantitation of a variety of molecular species even at low concentration. The instrument will be managed by the NMR facility in the Chemistry Department, and operational aspects will be advised by an interdisciplinary user committee. Using this model, the operation of the instrument can be supported using existing personnel, providing for long term stability. At the same time, broadest possible access will be ensured. In fact, the facility had a user base in the past academic year of >450 individual registered users, drawn from >40 research groups in various departments, as well as from classes. The existing staff has a strong track record of assisting all users across campus with highly diverse NMR applications. As a result of the new capabilities provided by the proposed instrumentation, the user base will further increase as described in the proposal. The user group will provide leadership in the application of NMR spectroscopy to emerging areas of science and technology that are currently not well served, including polymeric materials for chemical and biomedical applications, environmental speciation, batteries, metal-organic frameworks, and others.