

2023F_18_KULATILAKA

Research Development Fund – Fall 2023 Application Template

Submission Deadline: **12:00PM CDT Monday – October 23, 2023**, to rdf@tamu.edu

****Applications exceeding page limits for any section or do not follow the template will not be reviewed****

Application Title: **Agile Ultra-High-Speed Spectroscopy & Imaging System**

Lead contact for RDF Application:

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Key Participating Units: **Texas A&M Engineering Experiment Station (TEES), Texas A&M University (TAMU), Texas A&M AgriLife Research (AgriLife)**

Key Participants: W. Kulatilaka (PI, MEEN), G. Agarwal (BAEN/PHYS), M. Cooper (MEEN), J. Grinstead (AERO), S. Jackson (AERO), T. Lacy (MEEN), I. Leyva (AERO), C. Mashuga (CHEN), S. North (CHEM), E. Petersen (MEEN), P. Rentzepis (ELEN), H. Schuessler (PHYS)

RDF Amount Requested (\$): **\$1,417,431**

Executive Summary

The objective of this proposed Agile Ultra-High-Speed (up to 10-MHz) Spectroscopy and Imaging System is to provide a unique, one-of-a-kind user facility for a wide spectrum of TAMUS researchers engaged in fundamental and applied research in high-rate phenomena, thereby empowering collaborative research and collectively target exceptional grand challenges in science and engineering. A team of twelve established researchers across three TAMUS units has collectively identified the need for a sizable investment for a wide spectral coverage (i.e., ultraviolet-UV, visible-VIS, and near-infrared-NIR spectral regions covering wavelengths of 200~1100 nm), ultra-high-time-resolution (i.e., as fast as 100 ns data rates) spectroscopy and imaging systems to reach the next frontiers of collaborative research. No such spectroscopy system is available from a single OEM vendor; hence, the group will develop a modular, agile spectroscopy system comprised of state-of-the-art cameras and spectrometers, as well as fiber coupling to be used in restrictive and harsh environments of chemical and physical phenomena to study. The realization of such a system will put TAMUS researchers in an advantageous position for preeminent research funding from federal agencies such as NSF, NIH, DOD, and DoD. Eventually, it will help to attract and retain new expertise and high-tech public and private partnerships in aerospace, automotive, petroleum, alternate and biofuels, atmospheric science, homeland security, and space propulsion areas in the Brazos Valley and the State of Texas, in general.