

# 2023F\_03\_ZHANG\_&\_YADAV

## Research Development Fund – Fall 2023 Application Template

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

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

**Application Title:** Acquisition of a Cryo Correlative Light Electron Microscopy with Focused Ion Beam Milling System

### Lead contacts for RDF Application:

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**Key Participating Units:** College of Agriculture & Life Sciences (COALS) | College of Science (COS) | College of Medicine (COM) | College of Veterinary Medicine (CVM)

### Key Team Members or Co-Investigators:

Dr. Lanying Zeng, Department of Biochemistry and Biophysics, COALS.

Dr. Jim Song, Department of Microbial Pathogenesis & Immunology, COM.

Dr. Daniel Paredes-Sabja, Department of Biology, COS.

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**RDF Amount Requested (\$):** \$1,955,258.64

### Executive Summary

This application seeks to bolster research infrastructure at Texas A&M University (TAMU) by acquiring a Cryo Correlative Light Electron Microscopy with Focused Ion Beam Milling (cryo-CLEM-FIB) system. This system will be integrated into TAMU's existing cryo-electron microscopy and tomography (cryo-EM/ET) setup at the Department of Biochemistry and Biophysics. Combining fluorescence microscopy and focused ion beam milling at cryogenic temperatures enables precise localization of areas of interest and creation of thin sample lamellae for high-resolution cryo-ET, facilitating in-depth cellular structure analysis in their native context.

The introduction of the cryo-CLEM-FIB system will yield significant advantages across various units within Brazos County locations, such as the College of Agriculture and Life Sciences, the College of Science, the College of Medicine, the College of Veterinary Medicine, and the College of Engineering. This technology will empower researchers to explore disease mechanisms, host-pathogen interactions, and drug-target interactions at an unprecedented level of detail. It will support investigations into cancer cells, mammalian cells, and pathogenic bacteria, thereby advancing our understanding of vital biological processes related to human diseases. Additionally, it will enhance TAMU's competitiveness in securing extramural research funding, particularly in the realms of cancer and infectious disease research, from agencies like the National Institutes of Health (NIH), Advanced Research Projects Agency for Health (ARPA-H) and the Cancer Prevention and Research Institute of Texas (CPRIT).

We anticipate that the expanded cryo-ET capability will become a valuable resource that benefits (1) TAMU researchers including cell biologists, immunologists and virologists, (2) aids in the attraction and retention of top-tier faculty at TAMU, (3) fosters collaborations across the campus, ultimately increasing our competitiveness in acquiring federal and multi-PI grants, (4) facilitating comprehensive training for our students, postdocs, and the next generation of researchers. Consequently, supporting this proposal will yield substantial returns on investment for the Research Development Fund (RDF).