

Research Development Fund – Spring 2020

Application Title: *Enhancing Interdisciplinary State-of-the-Art Research at the Single Cell Level – Expansion and Integration of Cell Analysis Shared Resources at TAMU*

Lead contacts for RDF Application:

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Key Participating Units: Colleges of Veterinary Medicine and Biomedical Sciences, Agriculture and Life Sciences, Engineering, Science, Medicine, School of Public Health, School of Pharmacy

Anticipated Request Amount (\$): \$1,278,610.20 (CVM) + \$1,125,263.33 (COM) = \$2,403,873.53

Executive summary of this application to utilize Research Development Funds: *This RDF proposal is a JOINT PROPOSAL of the CVM Flow Cytometry Facility (FCF) and the COM Cell Analysis Facility (COM-CAF); each operating independently to provide the widest possible access for investigators across campus but also collaboratively together on behalf of all investigators at TAMU; both operating under the newly established TAMU Intercollegiate Cell Analysis Facilities (TICAF) organization to strategically manage current and future cell analysis shared facility administration, user input, and expansion at TAMU.* This application is strategically aligned to enhance the research of each key participating unit, and will create and sustain lasting interdisciplinary collaborative research in the Brazos Valley. The lack of cutting-edge equipment and technology in the FCF and COM-CAF is currently unacceptable and way below standards for Tier-One university flow cytometry and cell analysis shared resource facilities. To become more competitive in the current research climate and to meet the rapidly increasing demands on Texas A&M and the surrounding scientific communities within the Brazos valley, we request the following items to augment our current capabilities and establish sophisticated and top-tier state-of-the-art single cell analysis shared resource facilities at Texas A&M. Our goals are to secure funding to purchase: 1) An Amnis ImageStream X Mark II imaging flow cytometer that allows the simultaneous analysis of multiparameter flow cytometric data with the spatial resolution and imagery of microscopy. 2) Upgrade current and obsolete flow cytometer capabilities with a Cytek Aurora Spectral flow cytometer that allows for high throughput detection of up to 64 fluorescent parameters and high-dimensional analysis (one for FCF, one for COM-CAF) and autosamplers for cytometers. 3) Upgrade the current primary cell Sorter (Astrios) to include a 561nm diode laser. 4) Acquire advanced multi-parameter, multi-mode high throughput imaging and environmental-controlled live cell analysis instruments. 5) Downstream post flow cytometry single-cell functional analysis instrument (BD Rhapsody). 6) Upstream ancillary automated tissue and cell processing instruments (AutoMacs). 7) Upgrade current near-obsolete cytometer software to latest versions and upgrade high-end computer workstations for CPU-intensive high-dimensional analysis by Users. These tools will integrate the TAMU FCF and COM-CAF and expand each with distinct capabilities for investigators, while enhancing the existing collaborations between the FCF and the COM-CAF with other institutional shared facilities such as the TAMU Institute for Genome Sciences and Society, the Integrated Metabolomics Analysis Core, and the Institute for Regenerative Medicine. In addition to advancing research, the tools will also be used to implement short courses designed to train users on how to properly use these tools and successfully incorporate them into relevant research, thus, enhancing graduate and undergraduate education. Advanced state-of-the-art single cell analysis technologies are critical to many investigator's grants as evidenced by successful integration into NIH/NSF multi-investigator grants and Center grants. Bolstering the technology within the TICAF (FCF and COM-CAF) will enhance Texas A&M's competitiveness for new funding and increase intradisciplinary research across campus.
