Pre-proposal for the TWRI Mills Scholarship Program

Basic Information:

1. Research Title: Bank Strength and Bank Vegetation Cover in Texas Streams
2. Personal information:
    a. Student Name: Jacqueline (Jackie) Rambo
    b. Phone Number: (281) 827-1363
    c. Email: jackieer@tamu.edu
    d. Department: Water Management & Hydrological Sciences, Texas A&M University
    e. Degree: M.S. Hydrological Sciences, August 2019 - May 2021
3. Faculty advisor: Dr. Fouad Jaber,
    a. Phone number: (972) 952-9672
    b. Department: Biological and Agricultural Engineering, Texas A&M Agrilife Extension Service
    c. Email: Fouad.Jaber@ag.tamu.edu
4. Applying for: Mills Scholarship Program (Texas A&M, Galveston or Qatar only; tuition only)
5. I have not received either the Mills Scholarship or the USGS Research Program Funds.
6. These funds would assist in tuition and fees only.
7. Research Abstract: Planting riparian vegetation is one of the techniques used to stabilize stream banks during stream restorations, but the quantitative effect that various plant species have on bank stabilization remains elusive still. This study aims to provide further clarity on the role of vegetation on bank stabilization by calculating bank strength values using channel geometry equations and correlating those values to an estimation of the bank area's vegetative cover. Approximate biomass along 7 streams in East Central Texas was calculated in Google Earth Engine using a bare-earth DEM and a LiDAR Point Cloud. Higher percentages of shrub/grass cover were found to be correlated with higher bank strength values. Knowing the quantitative impact of varying vegetation types may help stream restoration planners decide which plant types would be most suitable and cost-effective for an area's stream restoration project.
8.
    a. Statement of problem: Sediment is a leading cause of impairment in Texas's rivers and streams. My research aims to identify which class of vegetation (i.e. grasses, shrubs, trees) is most effective for stabilizing stream banks in Texas. These results would help cater stream restoration plans to fit the specific needs to Texas rivers and streams.
    b. I have been able to use existing stream profiles and discharge rates in conjunction with LiDAR data available from TNRIS to calculate stream bank strengths. During the winter break, I plan on updating this existing dataset with additional streams around Texas.
    c. All LiDAR data that I'm using is publicly available; all stream data was collected by TWRI.
    d. The expected outcome of this study is to generate an expected percentage of shrub/grass/tree cover that is necessary for bank stabilization, given a few parameters (e.g width, discharge, etc.).
9. I intend on working either as a Hydrologist or Water Management Planner, but I am open to other options.

10. I've attached my degree plan and unofficial transcript with this document. My degree plan is subject to change, as I'll be adding a few additional courses for my Spring 2021 semester.
11. Budget n/a