#### Project Title Fabreeka Smart Pad

#### Requester: Luis De Jesus

#### Phone/Email: 800-322-7352 ext.312

#### Company: Fabreeka International

#### Address: 1023 Turnpike Street

#### Stoughton, MA 02072

#### Date: 7/30/19

### Please note that all RFP Forms must be completed by or before August 1 of a project cycle. If you have any questions regarding the RFP process for Senior Capstone Projects please contact the College of Engineering at 508-999-8539. Email inquires may be sent to rlaoulache@umassd.edu

**Title:**

# Fabreeka “Smart Pad”

**Description:**

Last year’s Fabreeka team developed a capacitive sensor integrated into the Fabreeka cotton dusk pad. This project is to continue this project to completion. This will include calibrating the sensors based on variables that could affect the calibration such as temperature and pad size (LxW). Additionally this data must be collected wirelessly and analyzed to be presented in meaningful data (acceleration & Load) onto a phone App so that it can monitor the data in real time.

**Diagrams (optional):**

*<Insert block diagrams, flow charts, assembly drawings, schematics, etc. to better describe your needs.>*

**Scope:**

* The team will need to determine which variables affect the captured data. This will likely include temperature and size of the Fabreeka pad among others
* The pads must be calibrated so that the output data is predictable and repeatable
* The data must be collected wirelessly and stored on the cloud
* A phone app must be developed to collect, analyze and display meaningful results.
  + Be able to manually input variables such as current temp, pad size etc.
  + The app will calibrate the input data by consideration the manually input variables
  + The app will display the result in acceleration, force and fatigue in real time
  + The app will graph a Fast Fourier Transform (FFT) of the acceleration vs. frequency
  + Manually input a Fatigue S-N curve and fatigue multiplier to calculate fatigue
  + All data should be stores to be able to review and analyzed later to determine trends

Fabreeka will provide samples of the sensors and pads as needed

Fabreeka will provide the MTS dynamic test machine for load vs. deflection data and load vs. frequency data

**Known constraints (if any):**

* Hardware (subject to change)

*Open for discussion*

*I would like to use LoRa wireless protocol and long range Wi-Fi for wireless communication*

* Software (subject to change)

Open for discussion

* Interfaces (subject to change)

*The Fabreeka pad sensor must interface with a wireless gateway. The gateway must connect to the cloud and the phone app must collect data from the cloud.*

**Deliverables:**

* Calibration test report including all the variables tested and the resulting calibration data for each variable.
* Bill of material of the data collection system
* Schematic of the system
* All coding for wireless communication and app
* Working App that will collect real time data from cloud, analyze the data as described above and is repeatable

**Legal Information:**

Check below if this project involves:

IP Ownership by Sponsor (please contact rlaoulache@umassd.edu)

Non-Disclosure Agreement (please contact rlaoulache@umassd.edu)

**Project Classification:**

Select one of the classifications— Intradisciplinary1 or Interdisciplinary[[1]](#footnote-1):

Intradisciplinary (select a single discipline)

Bioengineering

Civil and Environmental Engineering

Computer and Information Science

Computer Engineering

Electrical Engineering

Mechanical Engineering

Physics

Interdisciplinary (select multiple disciplines)

Bioengineering

Civil and Environmental Engineering

Computer and Information Science

Computer Engineering

Electrical Engineering

Mechanical Engineering

Physics

**Special Instructions:**

The team will work closely with our Test Engineer, Matt Pladsen.

(To be completed in September by the team that undertakes the project)

Team Number: ­­­­\_\_\_\_\_\_\_\_

#### Student 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Project Manager)

Student 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Student 3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Student 4: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Student 5: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Faculty Advisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Project Mentor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Intradisciplinary: working within a single discipline.

   Interdisciplinary: integrating knowledge and methods from different disciplines, using a real synthesis of approaches. [↑](#footnote-ref-1)