Registration Form

TEAM INFORMATION

Team Name/Project Title: Pro-Pain

Department: Bioengineering

Faculty Advisors: Casey Howard, Steven Lammers

Team Members: Amanda Benjamin, Omar Hamid, Tu Nguyen, Greg Robinson

PROJECT INFORMATION

Description:

Working, mobile, and affordable device that can generate pain in three sensory modalities and record their maximum threshold to facilitate in evaluating drug efficacy.

Abstract:

There is a need for a method to administer and record objective and reproducible levels of electrical, mechanical, and thermal stimuli to aid in the study of analgesic effects of therapeutic drugs. Thus, the intentions of the project at hand are to create a working device that can stimulate thermal, electrical, and pressure pain and record their output values. The purpose of the device is to provide clinicians with the data necessary to aid in their evaluation of the efficacy of any drug.

The device implements a feedback thermostat and heater to produce a thermal stimulus up to a maximal temperature of 55oC. To produce an electrical stimulus, the device uses an Arduino to control a Transcutaneous Electrical Neural Stimulator (TENS unit) to deliver current up to a maximal current output of 5mA. The current is administered to the patient via electrodes. The pressure stimulus is achieved by incorporating a rotating motor rigidly attached to a load cell to produce up to a maximum delivered pressure of 100kPa.

The device incorporates limits on its pain stimulation output such that the subject will not experience any danger in the instance of the device operation or malfunction. Furthermore, the device incorporates a stop button to terminate sensory stimulations at any moment of stimulus administration. To complete the functionality of recording stimulus output, the device utilizes a microSD port to record and output all three of the sensory modalities into digital format.