# Pelvic floor Biofeedback Design

**Client**:  Dr. Patrick McKenna, UW Urology Department

**Advisor**: Dr. Amit Nimunkar

**Team**:   Sam Lines (Leader)

Michael Simonson (Communicator)

Shawn Patel (BWIG)

Andrew Vamos (BSAC&BPAG)


**Date**: 9/22/2014-9/26/2014

## Problem Statement

Pelvic floor muscle biofeedback systems have been used to educate and train people how to correctly control the process of urination in children and elderly patients. As devices slowly fail or get outdated, a new device and interface system that can be used in conjecture with videogame like training programs is desired. With the completion of a basic EMG biofeedback system, our goal is to continue to improve the functionality of the software while simultaneously designing hardware with commercial standards in mind. This product will be designed and tested so that use in a hospital will be safe for both the hospital staff and the patients.

## Last Week's Goals

- Since processing will have to occur on the microcontroller, research into different microcontrollers will have to continue to determine the best one for our application.
- Finish research on the filters needed for a pelvic floor EMGs
- Use BME 462 webpage to learn about driven right leg so that we can power our EMG with single power supply

## Summary of Team Role Accomplishments

- Leader (Sam): Worked with Shawn to finalize frequency response research. Began constructing and testing the filters.  Started to prepare to construct and test total circuit
- Communicator (Michael): Worked with Andrew on the decision matrix for the microcontroller, discussed the digital signal processing, and took over driven right leg research
- BWIG (Shawn):  Worked with Sam to finalize frequency response research. Began constructing and testing the filters.  Started to prepare to construct and test total circuit
- BPAG And BSAC(Andrew): Worked with Michael on the decision matrix for the microcontroller, discussed the digital signal processing, and took over driven right leg research

## Summary of Design Accomplishments

- Desired frequency response has been determined, and construction of the filters has begun.
- Due to work loads, Michael and Andrew will be working on the driven right leg circuitry.
- Decision matrix for the microcontroller has been made, and just needs a few more adjustments
- We updated the schedule to have a more precise timeline of the semester.

## Project Difficulties

- Due to heavier work load than expected, Shawn and Sam will no longer be working on the driven right leg circuitry. Michael and Andrew have taken over
- We haven't found a way to rectify the signal digitally, and it can't be done with the analog circuitry because we are using only positive power supply
- We don't know how to use the driven right leg circuitry and still obtain a usable signal from the patient.

## This Week's Goals

- Continue research on driven right leg, and speak with Amit to overcome our problem of losing our signal when using driven right leg.
- Finalize the construction and testing of the filters.
- Test the common mode gain and differential gain of the constructed circuit to determine the common mode rejection ratio of our EMG.

## Activities

| Person(s) | Task | Time (hrs) | Week Total | Semester Total |
|---|---|---|---|---|
| Sam | Filter research and construction. Worked on determining how to get signal using driven right leg | 3 | 3 | 8 |
| Michael | Microcontoller design matrix and Worked on determining how to get signal using driven right leg | 3 | 3 | 8 |
| Shawn | Filter research and construction Worked on determining how to get signal using driven right leg | 3 | 3 | 7 |
| Andrew | Microcontoller design matrix and Worked on determining how to get signal using driven right leg | 3 | 3 | 7 |

## Timetable

- Due to the large size of our timeline, I will attach the full excel spreadsheet

## Expenses

- No current expenses