

# *Quad Rat Vitals Monitor*

## *Progress Report #13, March 12, 2009*

*Client: Dr. Alex Converse*

*Team: Jack Ho (Leader)*

*Nate Werbeckes (Communications)*

*Joseph Yuen (BWIG, BSAC)*

**March 6 to March 12, 2009**

### **Problem Statement**

Design and construct a quad rat vitals monitor to be used during PET imaging experiments in order to maintain appropriate anesthesia dosages on each of the four rats independently. The device will monitor heart rates, SpO<sub>2</sub> values, respiratory rates, and rectal temperatures.

### **Last Weeks Goals**

- Work on Mid-semester presentation
- Schedule time to work with rats

### **Summary of Accomplishments**

Time this week was spent mostly on the mid-semester presentation. However, we were able to determine the process in obtaining the two signals from the pulse oximeter sensor (waveforms from the red LED and IR LED). By reversing the polarity, it changes the activation of LEDs. By switching between the two LEDs we are able to obtain the blood plethysmograph waveform from both transmission wavelengths. Nonetheless, using this to determine blood oxygen levels will still be lower on the priority list, as the current priority is to determine the heart rate from the waveform, whether it's from the red or IR LED. We have discussed different algorithms for detecting heart rate, and it has been suggested that we look for the high slope values that correspond to each peak in the waveform and we are currently working to create the appropriate algorithm in Matlab.

We also need to get in contact with our client and schedule times to test our sensors, particularly the pressure sensors so that we can appropriately calibrate them for signal optimization. Thermometers from Walgreens will also be purchased to create 3 more temperature sensors required for the final design.

### **This Weeks Goals**

- Schedule time to work with rats
- Order op amps
- Buy more thermometers form Walgreens

### **Activities**

Jack:

Work on device/Team Meeting (1.5 hrs)  
Work on Presentation (3.0 hrs)  
**Total: 4.5 hrs**

Nate:

Client meeting/communications (1.0 hrs)  
Team Meeting (1.5 hrs)  
Work on Presentation (2.0 hrs)  
**Total: 4.5 hrs**

Joseph:

Team Meeting (1.5 hrs)  
Work on Presentation (2.0 hrs)  
**Total: 3.5 hrs**

### **Project Schedule**

1/25 Form team, contact client, assign team roles, set up client meeting  
2/1 Literature search, create problem statement, begin PDS  
2/8 PDS, brainstorming, begin developing designs  
2/15 Brainstorming  
2/22 Decide on 3 design alternatives, prepare for mid-semester presentation  
2/29 Work on presentation  
3/7 Mid-Semester Presentation  
3/12 Hand in report (and PDS) and notebooks, decide on final design  
3/14 Work on final design  
3/21 Spring Break  
3/28 Work on final design  
4/4 Work on final design  
4/11 Work on final design  
4/18 Work on final design  
4/25 Work on final design, poster presentation and paper  
5/2 Final Poster Presentation  
5/7 Hand in final written report and notebooks  
5/9 Final meeting with advisors

### **Expense**

<i>Date</i>	<i>Place</i>	<i>Purchased</i>	<i>Price</i>
-------------	--------------	------------------	--------------