

## **Open-source, low-cost, web-guided spirometer**

**Team:** Jeremy Glynn – Team Leader  
Jeremy Schaefer– Communications  
Andrew Dias – BWIG  
Andrew Bremer – BSAC

**Week:** January 30- February 5, 2009

**Client:** David Van Sickle, PhD  
Dept. of Population Health Sciences  
UW School of Medicine and Public Health  
Phone: (608) 719-9531  
e-mail: [vansickle@wisc.edu](mailto:vansickle@wisc.edu)

**Advisor:** Mitch Tyler  
2156 Engineering Centers Building  
Phone: (608) 262-5112  
e-mail: [metyler1@wisc.edu](mailto:metyler1@wisc.edu)

### **Problem Statement**

Spirometers are used to diagnose many pulmonary diseases including chronic respiratory diseases that affect approximately 300 million people. Many of these people do not have access to a spirometer because current models are expensive and operation requires the presence of a trained technician. The purpose of this project is to develop a low-cost spirometer capable of measuring lung flows and volumes that can be used by patients without the aid of a trained technician. The project includes the physical design of the spirometer, software development, and designing a universal interface. We envision a first generation device that connects to a computer via a USB port and guides and coaches patients through the testing using digital audiovisual clips. As the procedures are performed, a combination of client and server software will graphically display flow and volume data, monitor and evaluate the quality of the maneuver, and instruct the subject when their performance needs to be corrected. The software should also carry out some rudimentary analysis and interpretation using algorithms that are freely available from the American Thoracic Society. Overall, we hope to develop a tool that would be widely affordable and would standardize pulmonary function measurements by delivering the same instruction and coaching across sites for the first time.

### **Last Week's Goals**

- Get keycard access to 2029 ECB
- Continue developing PDS, send preliminary version to client and Amit
- Establish website
- Perform/review BME 310 Spirometry lab
- Begin to break project into components for division of tasks
- Target areas to modify spirometers for cost efficiency

### Accomplishments

- Performed BME 310 Spirometry lab, analyzed equipment and process
- Met with Amit, John and David to discuss product specifications on 1/30
- Extensive work on PDS
- Compiled list of various components that could be included in our design
- Launched website

### This Week's Goals

- Create various designs and analyze them with a design matrix
- Get keycard access to 2029 ECB
- Check patents to prevent infringement
- Create list of software features/ideas for standardized coaching

### Difficulties

- The career fair this week consumed considerable time for multiple members.

### Team Effort

Team Member	Accomplishments	Time (Hrs)	Running Total (Hrs)
Jeremy Glynn	Class time, individual research, client meeting, 310 lab, PDS work	4.0	7
Andrew Bremer	Class time, individual research, client meeting, BSAC, 310 lab, PDS work	4.0	7
Jeremy Schaefer	Class time, individual research, client meeting, 310 lab, PDS work	4.0	7
Andrew Dias	Class time, website development, individual research, client meeting, 310 lab, PDS work	4.0	7

### Project Schedule

PROJECT TASKS AND PROGRESS	Jan.	February				March				April				May		
	29	5	12	19	26	5	12	19	26	2	9	16	23	30	7	14
<b>WORK</b>																
Brainstorming																
Research																
Designing Prototype																
Selecting Prototype																
Obtaining Materials																
Building Prototype																
Testing Prototype																
Modifications																
<b>DELIVERABLES</b>																
PDS																
Mid-Sem. Report																
Mid-Sem. Presentation																
Final Report																
Final Presentation																
Weekly Reports																
Notebooks																
<b>MEETINGS</b>																
Team Meetings																
Client Meetings																
Advisor Meetings																
BSAC Meetings																
<b>OTHER</b>																
Web Page																
Special Lectures																

### Expenses to Date:

- No expenses to report at this time.