

**Delivery of Aerosol Drugs through Continuous Airway Positive Pressure (CPAP)  
Progress Report 11/29/2009 – 12/05/2009**

**Names**

Patrick Kurkiewicz, leader  
Joe Decker, BSAC  
Steve Welch, BWIG  
Annie Loevinger, Communications

**Clients**

Dr. Mihai Teodorescu

**Problem Statement**

The CPAP system is most commonly used nightly in the homes by patients who struggle with sleep apnea. A method is needed for automated delivery of bronchodilators, like albuterol, while using the CPAP device. Delivery of the necessary dose of such drugs should either be continuous or at timed intervals over a patient's sleep cycle.

Side Project Suggested by Dr. Teodorescu: Create an ultrasonic nebulizer from an ultrasonic humidifier.

**Last Week's Goals**

- Joe – Organize testing results using Matlab to put on final poster.
- Meet at CAE on 11/29 to put together final poster.
- Steve - Put finishing touches on final poster. Due 11/30
- Annie - Receive feedback from Professor Webster on final poster. Due 12/1
- Patrick – Make changes to poster before taking to College library.
- Patrick – Take final poster to College Library for printing on 12/2
- Practice Presenting with poster on 12/3 in ECB on 2<sup>nd</sup> floor at 2:30 PM.
- Make sure prototype is in working order, in accordance with current expectations. Due 12/4
- 12/4 Final poster presentations.
- 12/5 Begin work on final report.

**Summary of Accomplishments**

- 11/30 – Dropped off final poster
- 11/30 – Redid spectrophotometer test
- 11/30 – Finished circuitry
- 12/1 – Picked up final poster
- 12/3 - Practiced final presentation
- 12/4 – Presented final poster

**This Week's Goals / Schedule**

- Put together rough draft of Final Report – 12/07
- Revise rough draft – 12/08
- Final Report – Due 4PM 12/9
- Lab Notebooks – Due 4PM 12/9

- Peer Evaluations – Due 12/11
- Team evaluations of client – Due 12/11
- Give prototype and final report Dr. Teodorescu – Due 12/11
- Final Update of Website – Due 12/11
- Final Meeting with Advisor at 1:00 PM in ECB

#### **Project Difficulties/ Reason for Missing Goals**

- Not enough air agitating the nebulized fog.
- Current prototype setup causes piezo buzzer to get hot when run continuously for a few minutes
- There's not a clear way to remove the magnetic switch from the humidifier circuit
- Problems will likely have to be addressed next semester because of the holidays and preparations for the final presentation / report.

#### **Activities**

##### **Team**

11/29/09 Poster finalization/ dropped off final poster (Steve and Joe)  
 11/29/09 Spectrophotometer test (Patrick and Joe)  
 12/03/09 Practice Presentations  
 12/04/09 Final Presentations

##### **Patrick**

- Wrote progress report
- Picked up final poster

##### **Annie**

- Correspondence with client and Professor Webster

##### **Joe**

- Got materials ready to perform spectrophotometer test

##### **Steve**

- Circuitry/programming work
- Updated web page

#### **Budget**

Dr. T gave team \$40 on 10/01/09

- \$40 given to Patrick on 10/01/09

Dr. T gave team \$200 on 10/29/09

- \$120 given to Annie on 10/29/09
- \$10 given to Annie on 11/09/09
- \$40 given to Patrick on 10/29/09
- \$30 given to Patrick on 12/02/09

Dr. T gave team \$20 on 12/04/09

- \$20 given to Joe on 12/04/09

#### **Costs**

- Patrick - Ultrasonic Humidifier – From Wal-Mart \$30.56
- Patrick - Ultrasonic Humidifier – From Home Depot \$31.64
- Patrick - PVC piping – From ACE Hardware \$6.50
- Annie - DAQ board – From LabJack \$111.99
- Annie – Microphone – From RadioShack \$4.00

- Annie – DC Voltage Adapter \$11.83
- Joe – PC tubing 1.25” I.D – From US Plastic - \$9.87
- Joe – Pipe Fittings – From McMaster-Carr - \$14.14
- Steve – 120 V Switch from DigiKey - \$4.15
- Patrick – Poster Printing from College Library \$33.75

Project Schedule																	
Task	September				October					November				Decem			
	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11		
<b>Deliverables (Date Due)</b>																Key	
Website																Team	
PDS																Patrick	
Progress Report																Annie	
Notebook																Joe	
Midterm Presentation																Steve	
Final Presentation																	
Final Poster																	
Final Report																	
Client Evaluation																	
Peer and Self Evaluations																	
<b>Meetings</b>																	
BSAC																	
Team																	
Client																	
Advisor (in class)																	
Dist. Entrepreneur Lec.																	
<b>Project Research*</b>																	
Current Devices																	
CPAP System																	
How a Nebulizer Works																	
Aerosol Delivery Methods																	
Albuterol/ related drugs																	
<b>Project Development</b>																	
Select Project																	
Brainstrom Ideas																	
Narrow Ideas																	
Select Idea																	
Work on Design																	
Buy Necessary Parts (no later than)																	
Work on Prototype Fabrication																	

*\*After this, research will be done on an as-needed basis.*