

**Team Spirometer Progress Report**  
**July 23, 2009 – July 29, 2009**

**Team:** Jeremy Glynn and Andrew Dias

**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

**Goals for the past week**

- Continue trying to build a new Fleisch prototype with new cutting methods
- Learn how to access all the data in the SQL files from David's contact
- Continue I<sup>2</sup>C code development
- Continue PCB development with Amit
- Improve software specifications to include GUI illustrations and flow diagrams

**Accomplishments**

- Tried new cutting methods with hematocrit tubing
  - Improved results (less fusing) but resulted in very rough edges and lots of debris in the tubes.
  - Heating techniques didn't significantly improve the capillary edges
  - Contacted MS&E lab to see if they offer better options for polymer cutting
  - Also ordered some double-barrel straws online. Exact dimensions are unknown, but they may provide an alternative to the tough-to-machine PC tubes.
- SQL and Ruby on Rails
  - Spent considerable time learning Ruby language to run Rails and learning the basics of managing SQL databases
  - Made progress with each, but are having difficulties getting Rails and the SQL databases working together
  - Rails and SQL are both open-source and widely used by free web applications
- Algorithm development with NHANES data
  - NHANES data uses unknown processing techniques to generate PFT results from raw curve data
  - E-mailed David's contact (a pioneer in spirometry and very familiar with NHANES data) for insight
  - Unfortunately, no reply yet. David is following up on this point
- PIC Programming - USB
  - Completed the USB tutorials that came with development board

- Most of tutorials was “cut & paste” code style. We will have to do more research into developing things like Descriptors and Configurations for our device
- PIC Programming – I<sup>2</sup>C
  - Acquired I<sup>2</sup>C code from a ZMD contact to handle the communications from the PIC to the iLite.
  - The code, as is, does not compile. However, it should be just a matter of including the proper files in the project to generate a successful code.
- PCB Hardware layout
  - Amit is heading this up. By end of summer he will have the layout from the iLite development board to the PIC development board to PC (via USB) complete
  - Layout from iLite to PIC is fairly simple, so soon we could have that built for testing our PIC I<sup>2</sup>C code

### **Goals for the upcoming week**

- Continue debugging of I<sup>2</sup>C code
  - Once debugged, we could load it on to the PIC
- Develop and build prototype hardware from iLite to PIC
  - This will let us test the code and continue debugging as necessary
  - This stage will be different than final hardware development as it will likely use 2 USB cables per assembly (1 for iLite, 1 for PIC)
- Continue SQL, Ruby and Rails development
- Improve capillary manufacturing methods
  - This could include using the double-barrel straws if they have appropriate dimensions
- Continue PCB development with Amit

### **Difficulties**

- Unfamiliarity with Ruby and SQL programming languages and their development tools has provided a large number of areas for which we need to research.
- It is not looking likely that any of our members will be able to attend the ME 601 due to course overlap and general over commitment.

### **Areas we would like assistance/feedback**

- We can give you a brief review of the pros/cons of using Ruby on Rails and SQL if you would like to help us evaluate their usefulness in our design.