

MRI Fat Quantification Phantom

Client:

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Team:

Bogdan Dzyubak (Team Leader)
Joe Helfenberger (BSAC)
Nick Balge (BWIG)
Matt Parlato (Communicator)

Progress Report for October 29 – November 5

Problem Statement:

The goal of this project is to develop an MRI phantom for the quantification of fat. This phantom will be used to test MRI techniques developed by the client for the imaging of fat *in vivo*. The phantom must contain samples of known physiologically relevant quantities of fat. The eventual purpose is quality control of MRI scanners that use fat-water contrast imaging.

This Week's Goals:

- Schedule a working time in the machine shop and, if possible, make the honeycomb
- If the rest of the materials arrive, begin mixing the solutions
- If enough materials arrive and progress is made, meet with the client to report this and discuss future progress
- Put together a draft of the report

This Week's Accomplishments:

- Met with Gary Frank to ask about the shop/tool availability, receive comments on the final design, as well as ask about the availability/necessity of a CNC
 - We can come to the shop whenever equipment is available and he is there to supervise us; any work day should be fine
 - Gary Frank has a drill press available but no metric drill bits; we need to find a 21-22 mm bit
 - A CNC should not be used because any accuracy achieved will be dwarfed by imprecision from drilling UHMWPE as it melts very easily
 - Due to the plastic's malleability, separation between vials should be relatively large. We will thus use 16 instead of 25 vials to improve structural integrity
- The machine shop at ECB does not check out drill bits. We will need to receive shop certification use them
- Catherine confirmed the receipt of emulsion supplies late in the week; we have not yet began mixing the solutions
- We have submitted a draft of the report for review by Dr. Chesler; more work is being done on it meanwhile
- People have been allocated to work in groups: Bogdan and Matt on the honeycomb, Joe and Nick on the emulsions

Next Week's Goals:

- Begin manufacturing the honeycomb
- Begin measuring concentrations of fat/water fractions and making the emulsions

Project Difficulties:

- Gaining access to the correct size drill press bit.

Team Activities

Date	Members	Activity	Time Spent
10/29/09	Nick	Working on the report	4 hr
10/29/09	Nick	Working on the report	2 hr
10/29/09	Matt, Joe	Working on the report	2.5 hr
10/29/09	Bogdan	Working on the report	1.5 hr
10/29/09	Joe	Working on the report	1 hr
10/29/09	Matt	Talking to machine shop people	1 hr
10/29/09	Bogdan	Meeting with Gary Frank	1.5 hr
10/31/09	Nick, Bogdan, Matt	Working on the report	2 hr
11/02/09	Matt	Working on the report	1.25 hr
11/02/09	Matt	Communication	0.75 hr
11/04/09	Matt	Working on the report	2 hr
11/03/09	Joe	Solidworks model	2 hr
11/05/09	Matt	Working on the report	2 hr
11/05/09	Bogdan	Working on the report	2 hr
11/05/09	Bogdan	Progress report	0.5 hr

Project Schedule

Task	September				October					November				December		
	3	10	17	24	1	8	15	22	29	7	14	21	28	5	12	17
Project Development																
Research																
Brainstorm/Design Development																
Finalize Design																
Prototyping																
Order Supplies																
Deliverables																
Progress Reports																
Mid-semester Presentation (10/16)							*									
Writing Final Report																
Final Report (12/11)															*	
Final Poster (12/4)														*		
Meetings																
Client																
Advisor																
Website																
Online																

* = deliverable due

Future Timeline

Task	October	November				December	
	—	7	14	21	28	5	12
Project Development							
Brainstorm/Design Development	■						
Finalize Design	■	■					
Prototyping		■	■	■			
Testing				■	■		
Order Supplies	■						
Deliverables							
Draft Paper	■	■	■	■	■		
Finalize Paper						■	■
Prepare Poster				■	■		
Submit Paper (12/11)							*
Present Poster (12/4)						*	

Expenses

Ultra High Molecular Weight Polyethelene (UHMWPE) - \$43.75

Clear Glass Vials - \$83.72

Animal Hide Gel – \$26.71

Ivory Hand Soap – \$8

Formaldehyde – \$23.01

Acrylic Tank (Lock & Lock Box) – \$9.99

Safflower Oil - \$6.99

Total: \$201.17