

## ***Project: A phantom for use in an MR imager***

**Team Members:** Missy Haehn - Leader  
Can Pi – BSAC  
Ben Sprague – Communications  
Andrea Zelisko– BWIG

**Client:** Victor Haughton, M.D.  
UW Dept. of Radiology  
3252 Clinical Science Center-E3  
Phone: 263-5306  
email: [vmhaughton@facstaff.wisc.edu](mailto:vmhaughton@facstaff.wisc.edu)

**Date:** 09/01/05 – 09/08/05

**Problem Statement:** Design a phantom for use in an MR imager to calibrate T2 relaxation value to water concentration in a gel over a range of 70 - 90%.

**Restatement of Team Goals:** The phantom is meant to assess the accuracy of an MR scanner. Measurements made with the phantom will help assess which variables affect the accuracy of the MR scanner, such as the distance between the spinal coil and the patient's spine, the size of the patient, and the sensitivity of the MR scanner to very similar doped water solutions. The phantom will hold artificial samples which are comparable to that of lumbar intervertebral disk tissue in order to compare known disk composition (% water) to experimentally found T2 values.

The initial prototype from spring of 2005 needed the following improvements: a new container without the sloping sides (image artifact), possibly new material for container to replace HDPE (less material interface artifact), more testing of doped water samples (more exact T2 values), a new way to compose the intervertebral disk samples (hydrogels or alginates?). Also, the placement of the samples within the phantom needs to be closer together such that the magnetic field the samples are in is constant.

### **Last week's goals:**

- Missy- continue design project work, progress report
- Can- continue design project work,
- Ben- communications with client, material companies, continue design project work
- Andrea- update project website, continue design project work, speak with Professor Masters regarding hydrogel use

### **Summary of last week's accomplishments:**

- Team roles assigned
- Team picture taken
- Team met to discuss project goals and semester timeline
- Client contacted to set up meeting

- Discussed hydrogel use as disk samples with Professor Masters

**This week's goals:**

- Missy- progress report, prepare samples for testing
- Can- Find out when BSAC meetings are, prepare samples for testing
- Ben- communications with client regarding initial meeting, contact Standard Imaging and Gammex companies (phantom materials)
- Andrea- Update project website, revise phantom design

**Difficulties:** The team and client need to meet and discuss the design ideas and decide which to pursue first.

**Rough Project Schedule:**

9/09/05: Meet with Client

9/06/05: First draft of PDS to advisor and client

9/02/05 - 09/16/05: Research new materials for phantom

- Contact Standard Imaging company
- Contact other MR materials company
- Test plastic samples from these companies

9/09/05 - 09/30/05: Research hydrogels disk samples

10/14/05: Midsemester design presentation

10/1/05-12/02/05: Construct and test phantom and disk samples

- Order supplies needed for samples-Gd, Collagen, GAGs, new vials
- Construct or purchase the prototype container of a new shape and material
- Make up disk (hydrogels?) and doped water samples
- Test doped water samples with relaxometer (with Ernie Madsen)
- Build structure to position and hold samples within phantom (cylinder)
- Combine samples and phantom container
- Test prototype phantom

12/02/05: Final poster presentations

12/09/05: Final report and notebooks due to advisor

12/14/05: Final meeting with advisor

**Activities:**

**Week to date:**

- Missy – progress report, class meeting, team meetings: 2 hr
- Can – team meeting, design research : 2 hr
- Ben – class meeting, team meetings, communication with client and various companies: 2 hr
- Andrea – team meeting, website updates: 2 hr

**Running Total:**

- Missy – 2 hr
- Can – 2 hr
- Ben– 2 hr
- Andrea – 2 hr