

Stereotactic device compatible with a 4.7 Tesla Magnetic Resonance Imaging system

Team: Jeremy Glynn – Team Leader
Jeremy Schaefer– Communications
Adam Goon – BWIG
Michael Conrardy – BSAC

Week: February 1- February 7

Client: Ian J Rowland PhD
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Problem Statement

This project requires the design and fabrication of a stereotactic device used to minimize the movement of the heads of anesthetized animals whilst positioned within a 4.7 T magnetic resonance (MR) imaging scanner. The magnetic field within the scanner is approximately 100,000 times greater than the Earth's magnetic field and therefore significantly restricts the choice of materials that may be used. Consequently, the entire system should be constructed of MR-compatible materials that are non-magnetic and non-conductive, to avoid artifacts and distortion of the MR images. The device should fit into a range of MR coils used specifically for imaging mice or rats and should also be able to support the positioning of additional MR coils so that images may be obtained from different anatomical regions. Further refinements might include the incorporation of a warming unit, using circulating water or air, within the base of the device. The unit construction may involve the use of 3D printing techniques. In addition, the stereotactic device should also be compatible with a dedicated uCT/PET system so that images may be more easily merged between the three different imaging modalities. In addition to the design and fabrication processes, this project would provide the opportunity to gain some experience with the use of both a 4.7 Tesla dedicated animal MRI and a uCT/PET systems.

Last Week's Goals

- Hold preliminary client meeting
- Establish website
- Begin developing PDS

Accomplishments

- Preliminary meeting with client on 2/1 at the UW Hospital
- Additional meeting with client on 2/4 at UW Hospital to see current stereotactic

equipment and MRI imaging process.

- Individual research on existing stereotactic devices and 3D printing

This Week's Goals

- Develop PDS
- Establish website
- Brainstorm potential head restraint designs – submit to client for feedback
- Investigate heating methods, potentially modifying CPU cooling unit
- Set up additional client meeting to see mice in the current holders
- Seek SolidWorks training or tutorials.

Difficulties

- Interview/Career Fair conflicts kept the entire team from being present at second client meeting.
- No team members are proficient with 3D modeling software. Additional training and experience with software such as SolidWorks will be necessary for quality design.

Team Effort

Team Member	Accomplishments	Time (Hrs)	Running Total (Hrs)
Jeremy Glynn	Individual research, Client meeting	3.5	6.5
Adam Goon	Individual research	3.5	6.5
Jeremy Schaefer	Client meeting, individual research, client communications	3.5	6.5
Mike Conrardy	Client meeting, individual research, BSAC	3.5	6.5

Project Schedule

TASK	Jan.	February				March				April				May		
DATES	31	6	13	20	27	5	12	19	26	2	9	16	23	30	7	14
WORK																
Brainstorming																
Research																
Designing Prototype																
Selecting Prototype																
Obtaining Materials																
Building Prototype																
Testing Prototype																
Modifications																
DELIVERABLES																
PDS																
Mid-Sem. Report																
Mid-Sem. Presentation																
Final Report																
Final Presentation																
Weekly Reports																
Notebooks																
MEETINGS																
Team Meetings																
Client Meetings																
Advisor Meetings																
BSAC Meetings																
OTHER																
Web Page																
Special Lectures																

Expenses to Date:

- No expenses to report at this time.