

Problem Statement

The goal of this project is to design and construct a radiomics benchmarking phantom for radiographic imaging systems that includes multiple clinically relevant textures, accommodates both small- and large-anatomy imaging protocols via a removable core or interchangeable sizing, and uses materials stable enough for repeated use over multiple years.

Brief Status Update

The team met with Dr. Jennie Crosby to discuss project specifications, better understand the scope of the project, and receive consultation on team phantom designs. Client meeting notes can be found in the "Project Information >> Team Activities >> Client Meetings" folder. Phantom designs have been modeled in CAD. Design matrix has begun.

Difficulties / Advice Requests

Would you like to use the electron density method or physical texture method?

Is there any site for us to make a price estimate for acrylic 3D printing if we were to use your lab's printer?

Current Design

The phantom features a removable core, allowing the same shell to represent both large and small anatomy by swapping in modular phantom texture inserts. Phantom materials and textures are still undecided, but shall mimic either the physical texture or electron density of anatomical tissues.

Materials and Expenses

Item	Description	Manufac-turer	Mft Pt#	Vendo r	Vendo r Cat#	Date	#	Cost Each	Total	Link
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Category 1										
N/A									\$0.00	
									\$0.00	
Category 2										
N/A									\$0.00	
									\$0.00	
								TOTAL:	\$0.00	

Goals

Major Team Goals for the Next Week (09/25-10/1)

1. Finish design matrix grading explanations.
2. Continue literature studies. Be ready for discussions to ensure all team members are on the same page.
3. Design slides and prepare for Preliminary Design Presentation

Next Week's Individual Goals (09/25-10/1)

- Pierson Trapskin: Plans to 3D print model of design that team chooses to prototype based on Design Matrix criteria, continue to individually research and create preliminary design presentation.
- Ava Hodgson: Continue to investigate competing designs and what different densities, materials and textures will appear for accurate results in a CT scan, work on preliminary prototype presentation.

Prelim presentation																
PDS			X													
Design Matrix				X												
Preliminary report																
Decide on final design																
Final Poster																
Meetings																
Client			X	X												
Advisor	X	X														
Website																
Update	X	X	X													

Filled boxes = projected timeline

X = task was worked on or completed

Detailed accomplishments

Previous week's goals and accomplishments by individual

Pierson Trapskin: Created a CAD design for a preliminary design idea in SolidWorks (based on client meeting and information) and it is inputted into the Design Matrix. Completed individual research.

Ava Hodgson: Researched biological and physiological demands of CTscanners (Find under my name and 'Research Notes' for 'Biology and Phsyiology'to help determine different

materials and their textures, also created a 3D model as preliminary design possibility in ONShape AutoCAD and uploaded to Design Matrix

Presley Stellflue: Created a 3D model of a varied radius phantom with a removable core on SolidWorks. The image of the design is in the Design Matrix with our other two designs. Completed individual research on 3d printed phantoms and sizing of parts.

Sonja Pionek: Completed rankings for Design Matrix (written justifications and Preliminary Design Presentation to be completed next). Research on current phantoms to accurately determine the effectiveness of different aspects of our designs in the Design Matrix and how they can be improved.

Matthew Casas: Completed two individual research topics on 3D-printed materials used in CT phantoms and how different texture patterns can affect radiomic features. I also added the progress report to the website.

Allie Ma: Wrote up the design matrix template. Began revising and explaining the grading to each design. Read and annotated physical prints of key literature provided by our client. I have garnered a better understanding of the project purpose and impact, and the previously established 3D modular phantom + inserts design. Also, I now have a relative estimate to the project phantom costs in "Allie Ma >> Research Notes >> Competing Designs >> 2026/9/24 Daly et. al." With the Makerspace 3D printing calculator ([3D Printer Cost Calculator – Grainger Engineering Design Innovation Lab – UW–Madison](#)) looking into PLA, ABS, and ASA (no PMMA/acrylic options under the UW-Madison Makerspace), estimated cost of each phantom will likely be between 55 –90.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Pierson Trapskin	9/14 and 9/15	Individual research on existing designs and materials.	2	2	4
Pierson Trapskin	9/16	Notebook update and progress report 2.	1	3	5

Presley Stellflue	9/16	Research on possible materials and dimensions. Began drafting PDS	3	3	4
Ava Hodgson	9/14-9/16	Research on competing designs, pre-existing patents, and standards used to create previous competing designs	5	5	5
Ava Hodgson	9/17	Adding to draft of PDS	1	6	6
Matthew Casas	9/17	Added progress report to website. Individual research on existing radiomics phantom designs and potential materials/textures.	2	2	2
Allie Ma	9/11-9/17	Began filling PDS information. Researched on standards for phantom development.	1.5	1.5	1.5
Presley Stellflue	9/17-23	Worked on and edited PDS, completed individual research, and created a SolidWorks model for a design idea.	7	7	11
Allie Ma	9/18	Finished editing PDS. Uploaded PDS under "Project Information >> Team Activities >> Design Process". Any further updates to the PDS will be uploaded in that folder too.	1	1	2.5

Allie Ma	9/18-9/24	Wrote up design matrix template. Began editing design matrix grades and reasoning. Annotated key literature provided by client.	3	4	5.5
Ava Hodgson	9/21	Individual research on biological components of CT scans, possible materials and/or texture ideas for phantom	2	2	8
Ava Hodgson	9/18-9/23	Developed CAD design as preliminary design idea for presentation, uploaded to design matrix	6	8	14
Matthew Casas	9/18-9/24	Individual research on 3D-printed materials for CT phantoms and the effects of texture patterns on radiomic features. I also added the progress report to the website.	2	2	4