

BME Design-Fall 2026 - Pierson TRAPSKIN  
Project Information/Progress Reports/Progress Report 5 - 10/8

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Sonja Pionek

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Title: Radiographic Radiomics Phantom Progress Report 5

Date: 10/1 - 10/8

Client: Dr. Jennie Crosby  
Advisor: Yang Lu  
  
Team:

| Last Name | First Name | Role         | E-mail                            | Phone          | Office Room/Building |
|-----------|------------|--------------|-----------------------------------|----------------|----------------------|
| Trapskin  | Pierson    | Leader       | <a href="#">Pierson Trapskin</a>  | (608) 335-7986 |                      |
| Hodgson   | Ava        | Communicator | <a href="#">Ava Hodgson</a>       | (289) 968-7479 |                      |
| Stellflue | Presley    | BSAC         | <a href="#">Presley Stellflue</a> | (847) 224-7803 |                      |
| Pionek    | Sonja      | BWIG         | <a href="#">Sonja Pionek</a>      | (608) 622-2590 |                      |
| Casas     | Matthew    | BWIG         | <a href="#">Matthew Casas</a>     | (262) 290-8734 |                      |
| Ma        | Allie      | BPAG         | <a href="#">Allie Ma</a>          | (781) 990-8825 |                      |

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

Brief Status Update

This week the team focused on researching and writing the preliminary report for the radiomics phantom. We reviewed the literature on radiomics, CT pr finished the report, including formatting, figures and references, and submitted it. Next we'll start turning the design into fabrication plans and testing.

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?
- What is the small size air gap the CBCT would be able to detect?

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. Phant

Materials and Expenses

| Item       | Description | Manu<br>turer |
|------------|-------------|---------------|
| Category 1 |             |               |
| N/A        |             |               |
|            |             |               |
| Category 2 |             |               |
| N/A        |             |               |
|            |             |               |
|            |             |               |

Goals

Major Team Goals for the Next Week (10/9-10/15)

1.

Continue literature studies. Be ready for discussions to ensure all team members are on the same page.
2.

Have a polished budget to send to our client based on an estimate of material choices.

Next Week’s Individual Goals (10/9-10/15)

- Pierson Trapskin: Next week I want to look into how infill pattern and percentage in 3D-printed PLA change CT texture, so we can start choosing insert designs. I also plan to rese
- Ava Hodgson: Continue to design & prototype textural inserts, work to create base core of scanner.
- Presley Stellflue: Create a list of materials to have a more finalized budget. Utilize the amenities in the design and innovation labs for prototyping resources.
- Matthew Casas: Continue researching phantom materials and texture designs, focusing on cost-effective options and reproducibility. Help evaluate potential materials for the final
- Sonja Pionek: Learn more about our prototype and how are going to use the materials we are planning to purchase/use to fabricate our final product.
- Allie Ma: Write a design plan for fabrication of texture inserts. Look into acrylic/fabrication methods for phantom core.

PDS: Completed first draft.

Timeline

| Task                   | Sep |    |    |
|------------------------|-----|----|----|
|                        | 4   | 11 | 18 |
| Project R&D            |     |    |    |
| Empathize              | X   | X  | X  |
| Background...          |     |    | X  |
| Prototyping            |     |    |    |
| Testings               |     |    |    |
| Deliverables           |     |    |    |
| Progress Reports       | NA  | X  | X  |
| Prelim presentation    |     |    |    |
| PDS                    |     |    | X  |
| Design Matrix          |     |    |    |
| Preliminary report     |     |    |    |
| Decide on final design |     |    |    |
| Final Poster           |     |    |    |
| Meetings               |     |    |    |
| Client                 |     |    | 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:

This week I researched and wrote the Introduction and Background sections of our preliminary report. I reviewed the literature on radiomics, CT phantoms and the re electron density, and to build it from an acrylic body with PLA inserts. I also helped finish the report so the team could submit it on time.

Ava Hodgson: This week I continued to research competing designs and the best way to have durable, reproducible reuslts and what materiasl and densities will p bubbles.

**Presley Stellflue:** *I wrote the design specifications, client description, design 1, HU, and the preliminary report conclusion. I also made final edits to the grammar and*

**Sonja Pionek:** *This week, I continued my research on CT scanners and phantoms. I spent more time focused on researching materials this week in order to learn more plans into a formal report-style document. I also uploaded missing documents to Lab Archives, the team website, and Canvas to keep everyone up to date on our current*

**Matthew Casas:** *This week, I continued individual research on CT phantom materials, tissue-equivalent properties, and alternative fabrication methods. I reviewed student keep our project documentation organized and updated.*

**Allie Ma:** *Further literature research testing methodologies. Developing designs for texture modules.*

Activities

| Name              | Date          |
|-------------------|---------------|
| Pierson Trapskin  | 9/14 and 9/15 |
| Pierson Trapskin  | 9/16          |
| Presley Stellflue | 9/16          |
| Ava Hodgson       | 9/14-9/16     |
| Ava Hodgson       | 9/17          |
| Matthew Casas     | 9/17          |
| Allie Ma          | 9/11-9/17     |
| Presley Stellflue | 9/17-23       |
| Pierson Trapskin  | 9/18          |
| Allie Ma          | 9/18          |

|                   |            |
|-------------------|------------|
| Allie Ma          | 9/18-9/24  |
| Ava Hodgson       | 9/21       |
| Ava Hodgson       | 9/18-9/23  |
| Matthew Casas     | 9/18-9/24  |
| Ava Hodgson       | 9/29-10/01 |
| Pierson Trapskin  | 9/29       |
| Ava Hodgson       | 9/29-9/30  |
| Pierson Trapskin  | 9/30       |
| Presley Stellflue | 9/29-10/1  |
| Matthew Casas     | 9/28-10/1  |
| Pierson Trapskin  | 10/3-10/6  |

|                   |           |
|-------------------|-----------|
|                   |           |
| Pierson Trapskin  | 10/4-10/5 |
| Presley Stellflue | 10/5-10/7 |
| Matthew Casas     | 10/7      |