

Progress Reports are graded on the (i) write-up of what has been accomplished and (ii) the amount of said progress on the overall project.

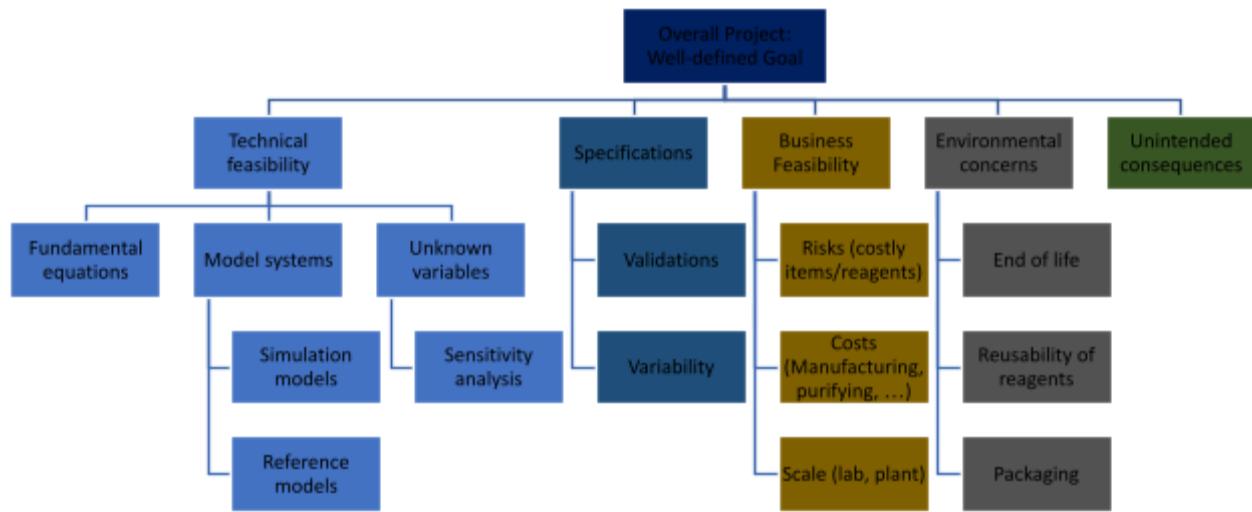
1. Group Number and Title: Group 11 – Sustainable Polymers

2. Week 6/16 and Date: 2/28/2025

Understand	Synthesize	Ideate	Prototype	Implement
Explore	Debrief	Brainstorm	Create	Support
Observe	Organize	Propose	Engage	Sustain
Empathize	Define	Plan	Evaluate	Evolve
Reflect	Interpret	Narrow Concepts	Iterate	Execute

3. Provide a brief list of activities that were done and their corresponding HCD space(s) and subspace(s) (add rows if necessary):

Activity	HCD space(s)	HCD subspace(s)
Continuing Degradation Tests	Prototype	Evaluate
Cleaned melt indexer	Ideate	Plan
Planning for mechanical testing (finding instrument, thinking about sample prep)	Ideate	Plan, Propose
More sample preparation for fiber drawing	Prototype	Create
Testing 3D printed piece for fiber extrusion	Ideate	Plan, Narrow Concepts
OM Image analysis	Prototype	Evaluate
Assigned tasks for midterm presentation	Synthesize	Organize



4. What branches/blocks were work focused on this week?

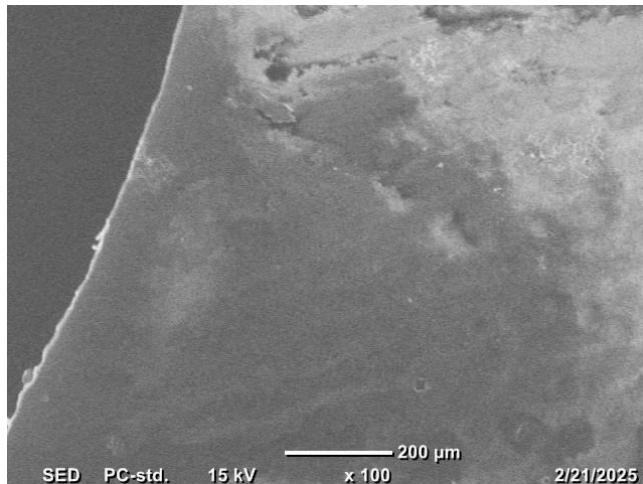
Technical feasibility - model systems (reference models)

Specifications - validations and variability

Environmental concerns - end of life

5. What was accomplished? (4-5 bullet points, include data/charts if applicable)

- Obtained SEM images of samples



- (hopefully) Removed brown residue from the melt indexer
- Hot pulled first fiber samples with PEG/PLA polymer blend makeup
- Made a template for the midterm presentation and assigned individual tasks for who should complete what slides.
- Learned that soaking barrel of melt indexer in acetone and then extruding will remove stuck fibers

6. What challenges are still outstanding? (2-5 bullet points)

- Still have to find somewhere to do the mechanical testing for the fibers.
- Still need to find a more controlled manner to pull fibers and determine if it makes consistent sizes.
- Still need to determine how to make polymer/natural fiber composites.

7. As you engaged in human-centered engineering design activities this week, do you think you became curious about any new content? If yes, how?

We have become curious on how to more accurately pull fibers and potentially use creep testing equipment.

8. As you engaged in human-centered engineering design activities this week, do you think you made any new connections (e.g. connections between ideas, connections between people, etc.)? If yes, how?

We found new literature about the hot pulling and melt spinning extrusion of PLA fibers, which is similar to how we are fabricating our fibers. The data gives us a better estimate of what properties we might obtain and how to do the sample preparation and setup for them. We also realized that the creep testing apparatus used in the 307/308 labs could potentially be used to control the force pulling on a fiber, which we could use for hot pulling fibers.

9. As you engaged in human-centered engineering design activities this week, do you think you created any value (e.g. identified a way to work together more efficiently, found a way to improve your idea or design, etc.)? If yes, how?

The SEM images revealed that our initial samples have small bubbles spread throughout some parts of the surfaces. However, this issue was not apparent in later samples as the polymer blending method was improved to lower solution viscosity and allow easier solvent evaporation.

10. What feedback did you obtain from the instructor or TA last week that you addressed in your work this week?

The feedback we received was to prioritize mechanical testing, since the properties determined from that data will be important to the value of our final design. We found more literature to help us prepare for mechanical testing and followed up with new potential equipment to conduct our testing on.