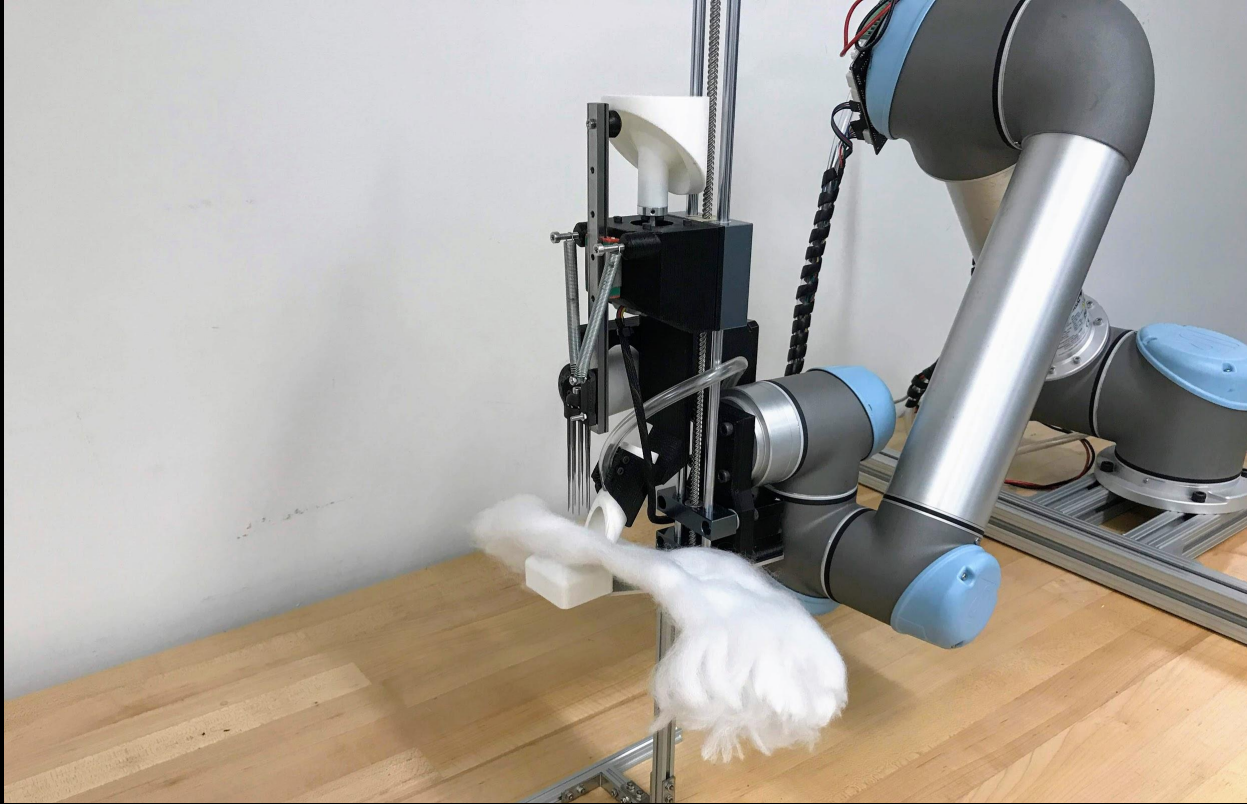


Robotic Felting: ICAT PlayDate MiniTalk



This morning's goals:

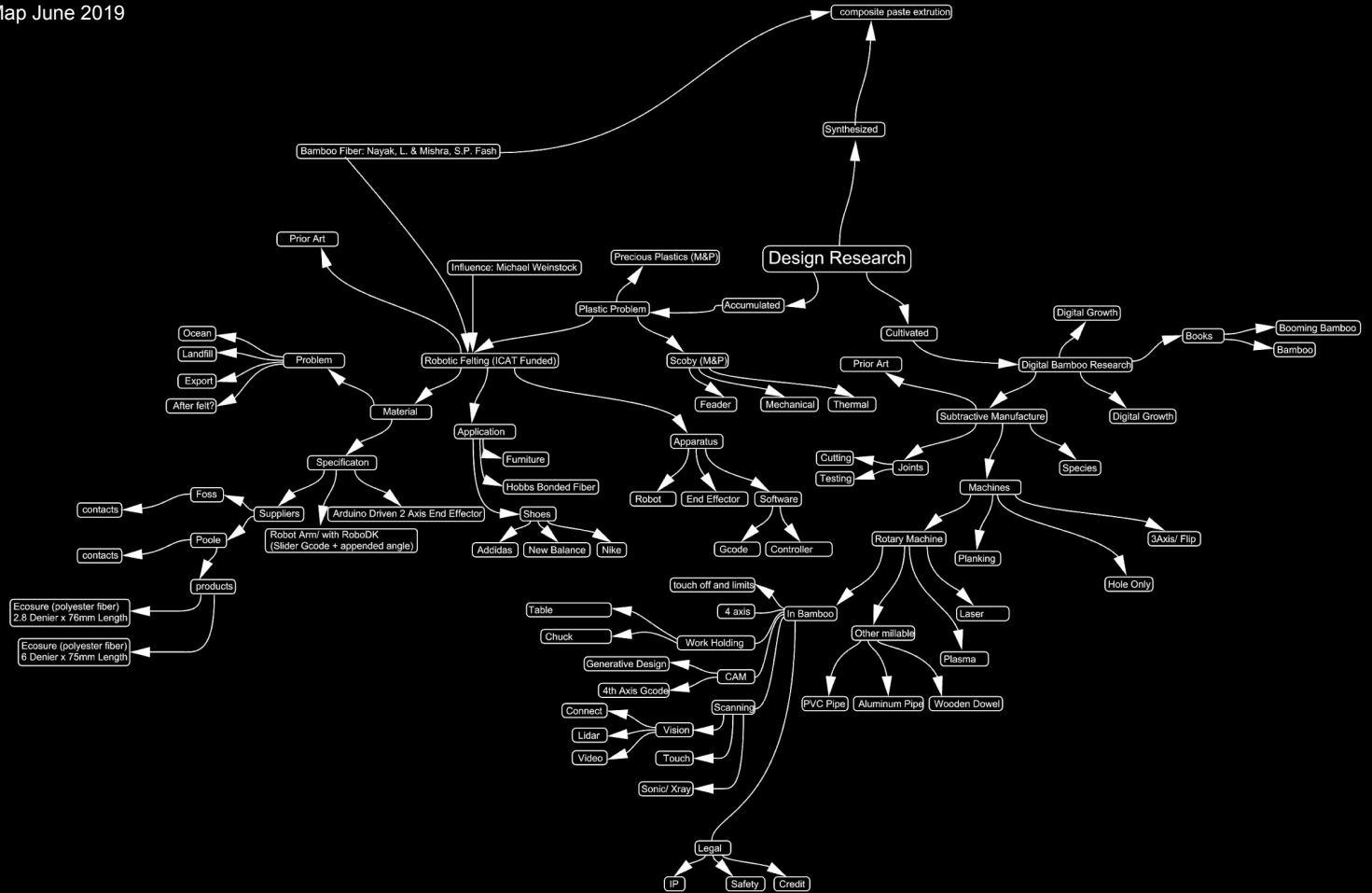
Share donuts, coffee, 32 slides & some conversation

Inspirations & aspirations

Challenges

Lessons learned/ learning

Inspire additional collaborators



(Thermoplastic) Polyethylene Terephthalate (PET)



We're Now At A Million Plastic Bottles Per Minute



91% Of Which Are Not Recycled



Trevor Nace, CONTRIBUTOR

FULL BIO ▾

Opinions expressed by Forbes Contributors are their own.



GETTY IMAGES

A plastic Coke bottle floats in the Pacific Ocean.

Principal Investigators:

Hauptman (ID) & Asbeck (ME)

External Collaborator:

Stephanie Metz (Felt Artist)

Brian George (Textile Engineer)

Industry Advisor & In kind Sponsors:

Foss Performance Textiles

Poole Company

Student Participation

Kaelam Hasler (UG.ID) Micah Hardyman (G.ME)

Blythe Rowe (UG.ID) Martin Agnst (M.Arch) Shreyas Bhat (G.EE)

+/- 25 UG ID Materials & Process Course Students (2018, 2019)

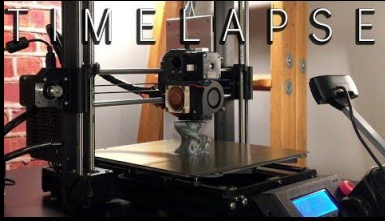
Project Support:

Major SEAD grant from The Institute for Creativity, Arts, and Technology

Materials-Based Research Grant from The Center for Craft

Dr. Alexander Leonessa (TREC Lab) Use of UR5 robot arm

Inspiration:



2.5d Precedent:

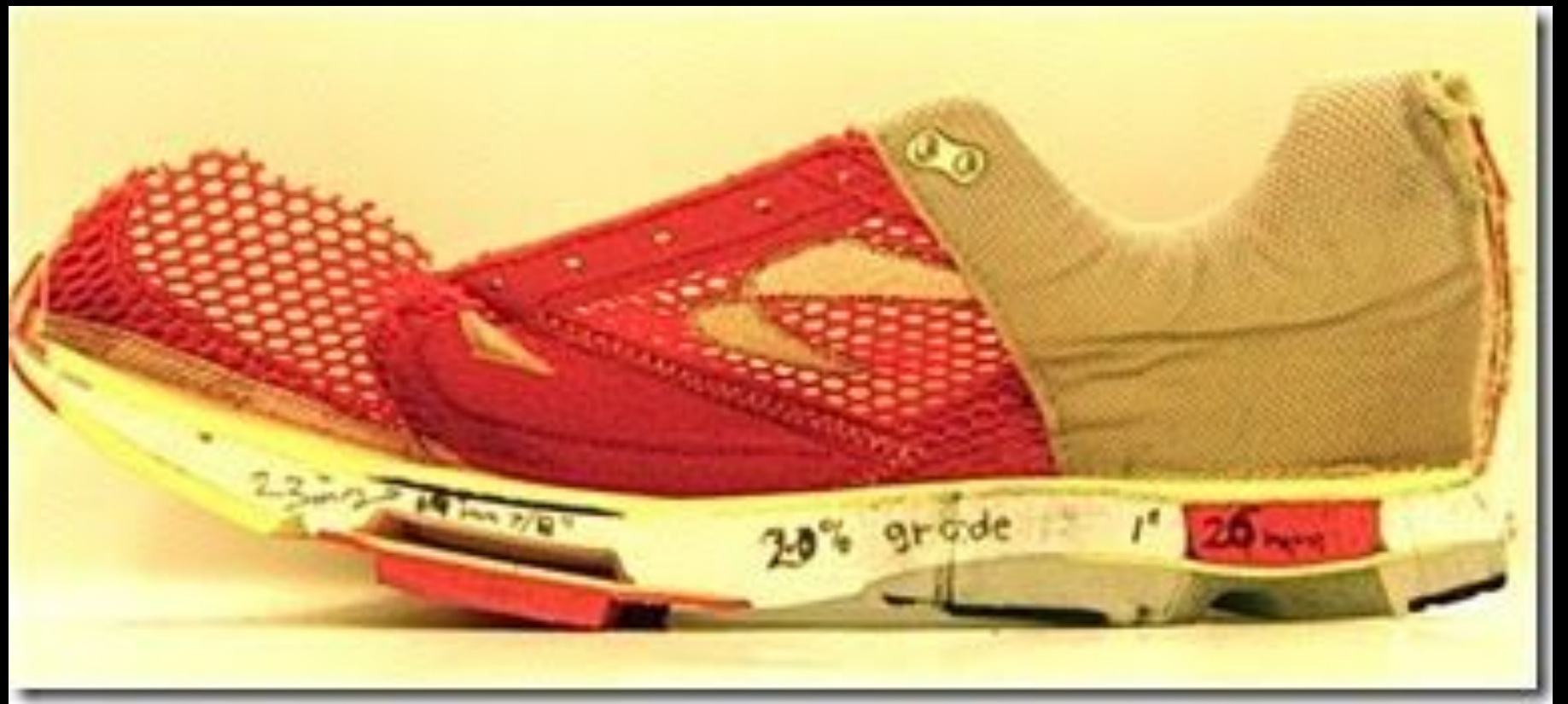


Concept:



Use a robot arm + create an end effector that produce complex 4d shell like felt objects from one material with the finite ability to adjust hardness and density independent of form. This would be a new kind of three dimensional additive fabrication.

Why might this be
important?



Imagine a single material show to replace this frankenstein?

Early Proof of Concept: A small step forward



Arduino Control Unit

Needling Drive Axis

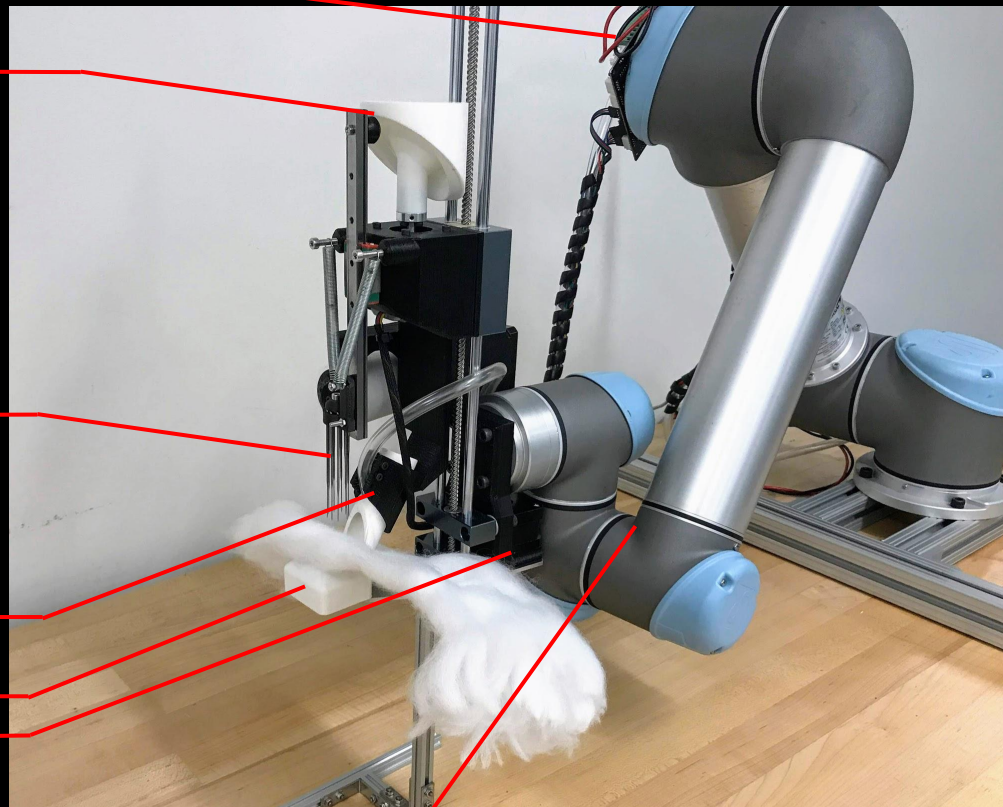
Multi Needling Holder

Pneumatic Assisted Feeder Axis

Anvil

Depth Adjustment Axis

UR% Robot Arm



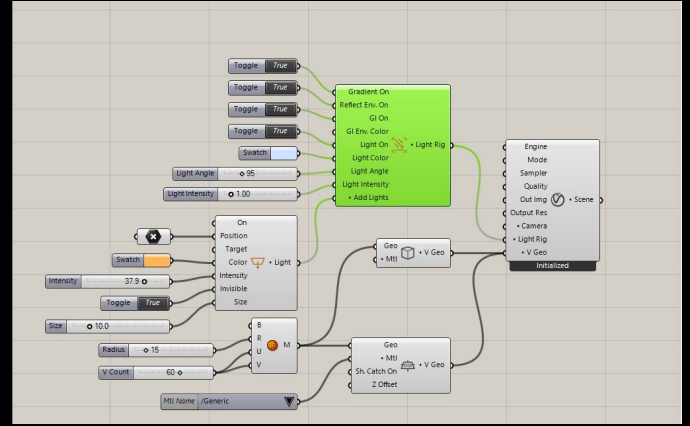
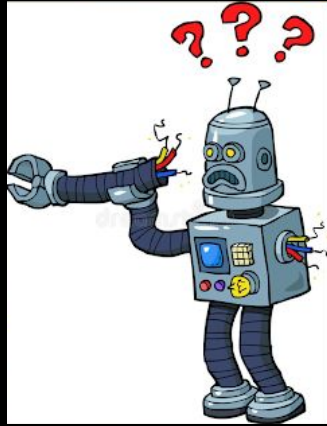
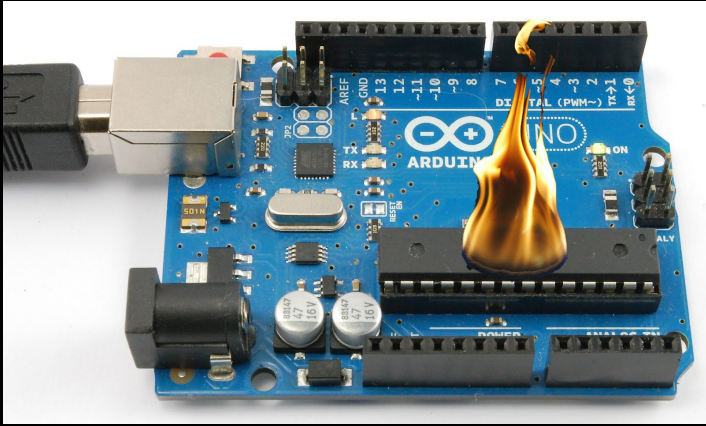
Adding Feeding



Challenge 1:



Challenge 2:



Challenge 3:



Next Steps:

The work on the UR5 is ongoing, we are still struggling to actually produce basic samples, though the problems are now limited to developing proper machine instructions (gcode like movement).

We have forked end effector work into a project that is something of a cyborg with plans of making a 3-4 axis human machine collaborative device.

- using machinekit io/ not arduino

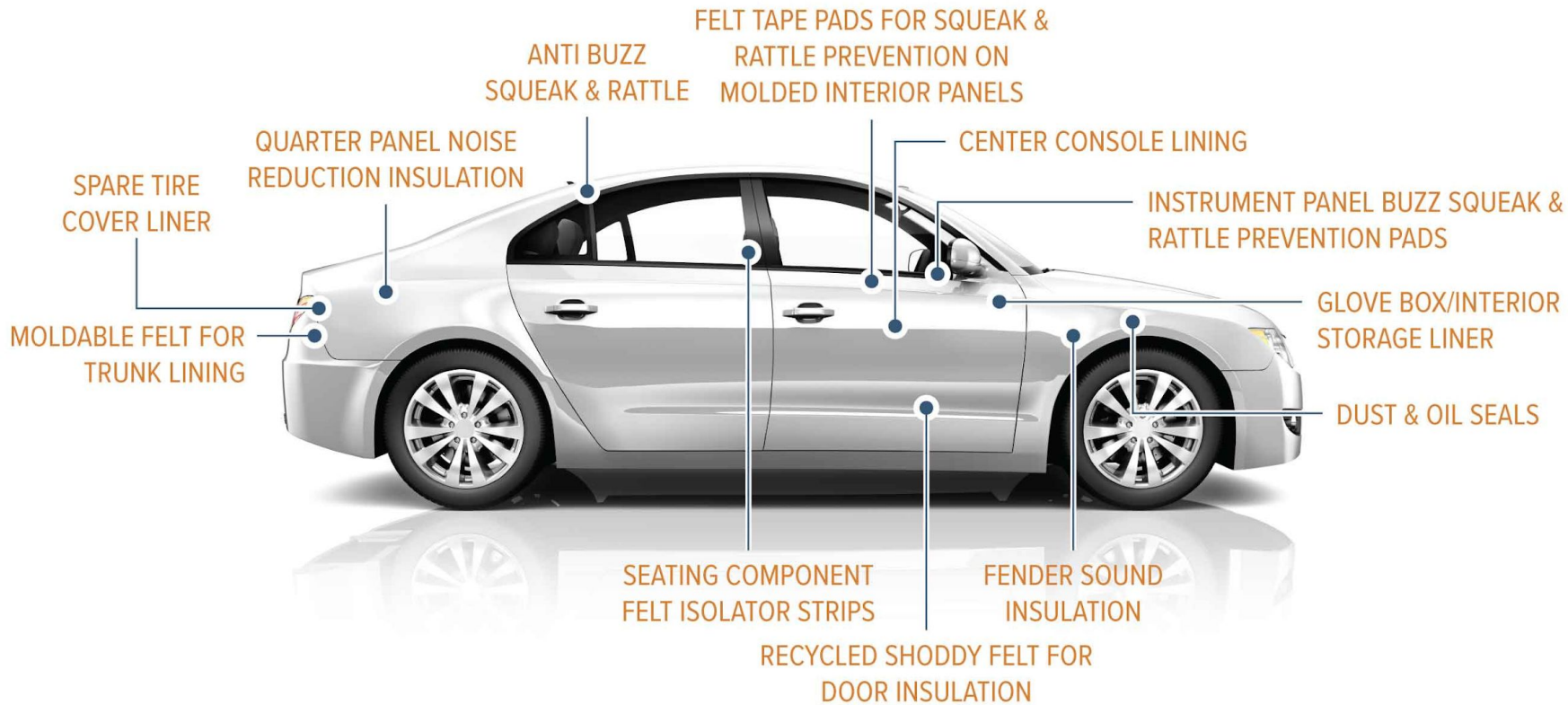
- using a combination of inputs other than hands and feet included voice activated or eye tracking

- we will need to develop machine safety using likely some sort of proximity stops, perhaps embedded into safety gloves.

What can be made?





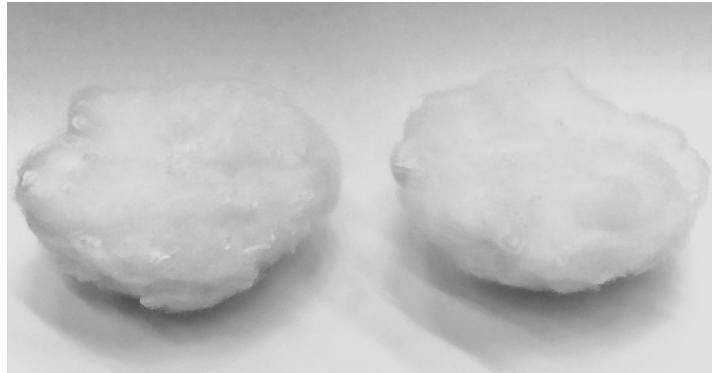




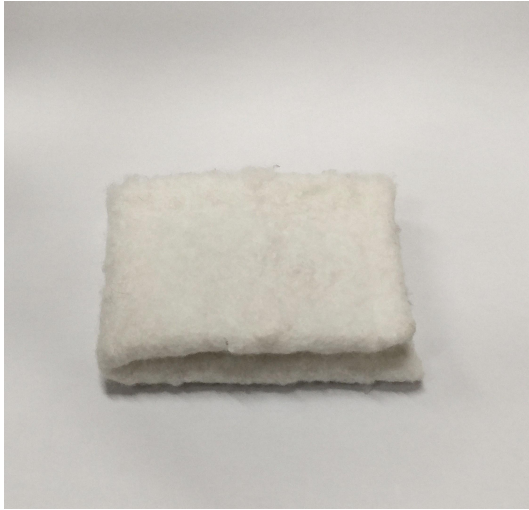
VIVOBAREFOOT

Handmade students experiments

Needle Felting Ear Pads



Needle Felted Wallet



Needle Felting around a Mold



Needle Felting around a Mold



Wet Felted Hat: Felting



Pile the Wool One
Layer at a Time



Wet and Agitate

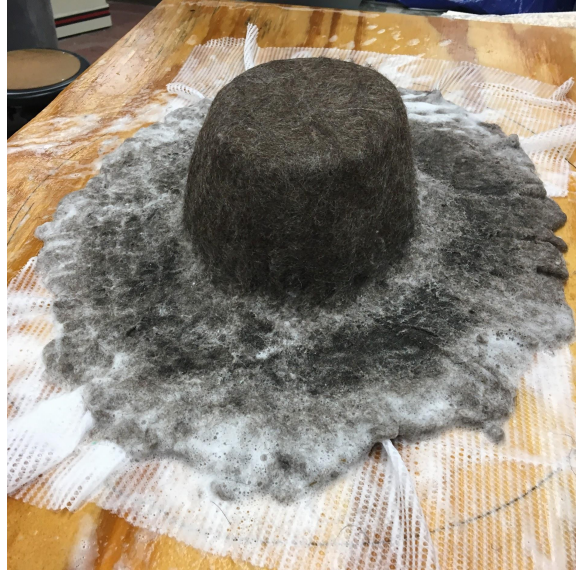


The Big Flip

Wet Felted Hat: Forming the Hat



Place Felt on Buck
and Continue Forming



Felting Done



Buck Removal
and Drying