



Sustainable Techniques Texture in Costumes

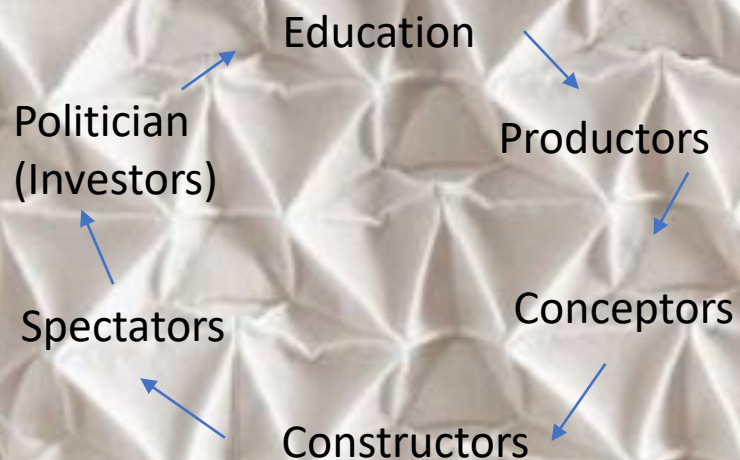
How can we make theatre more sustainable and what kind of texture can we create?

Conception – Realization – Post-production

CONCEPTION

Summary of the 1 O'clock meetings in the Quebec exhibition in Prague Quadriennial 2019

- Circular system – Every level need to change
 - Green runner
- Negative Growth – slowing down
 - Natural techniques
 - More time to make and undo
 - Money evens out
- Culture
 - Based-material process



INITIATIVES AND GROUPS

- Triga Collectives (Toronto)
 - Collaborative model that values the sustainability of **people, planet and profit**,
- Julie's bicycle (London)
 - Charity that supports the creative community to act on climate change and environmental sustainability
 - Can measure carbon footprint in art space: <https://ig-tools.com/signup>
- Fridays for Future (everywhere)
 - A movement that began in August 2018 when Greta Thunberg sat in front of the Swedish parliament every Friday to protest against the lack of action on the climate crisis.
- Broadway Green Alliance (USA)
 - The Broadway Green Alliance is an industry-wide initiative that educates, motivates, and inspires the entire theatre community and its patrons to adopt environmentally friendlier practices. You can become a Green Ambassador.
- Scenery Salvage (England)
 - Scenery Salvage will recycle 95% of Sets and props or store them
- Ready, set, recycle (Canada)
 - Entertainment industry professionals who want to keep used scenery, props and costumes from going to waste (or ending up in landfill)
- Eco scenography Facebook group (International):
 - <https://www.facebook.com/groups/ecoscenography/>

POST-PRODUCTION

- More time to undo everything
- Transport
 - Make it easy to transport for touring (fit in suitcases)
 - Not taking the plane if possible even if it takes longer
 - One plan trip = plant a tree or buy CO2 compensation
- Storage
 - Miss space to store everything
 - Create a network where people can exchange what they already have so we don't need enormous storage space.



REALIZATION
TEXTILES AND ALTERNATIVES
&
TEXTURE TECHNIQUES

Fibres Ecological Footprint

- Natural Fibres (Cotton and hemp)
 - Less energy and less CO₂ released than synthetic fibres
 - Natural fibres absorb CO₂ and can naturally be degraded
 - Require a lot more water than synthetic fibres
- Eco fibres like eco-cotton or eco-hemp are available and have a smaller EF and need less water.

Santanderina Group

- Spanish textile industry group with a complete, traceable, vertical production system.
 - Spinning, Design, Weaving, Finishing, Coating, Printing, Making up
- Responsible textile solutions.
- New fabrics and new textile solutions and improve the fabrics that are already manufactured by the company.



Sustainable indigo dyeing

A dyeing concept* combining:

Indigo solution

+

Organic reducing agent

CERTIFIED
**ECO
INDIGO**

100%
Hydrosulphite
free
dyeing

DyStar

* Based on DyStar
Cadira® Denim.

Sustainable process

Strong reduction of effluent load*

-95%

Sulphate reduction

-82%

COD reduction

-95%

Total solids reduction

* Compared to conventional indigo powder dyeing

Substantial waste reduction*



Salt waste reduction

Up to 30,000 tons of salt in year
=
1,200 TRUCKLOADS OF WASTE

* Compared to DyStar dyeing with hydrosulphite;
based on global indigo consumption

Saving natural resources



Water reduction

Up to 3.25 billion liters of water
=
DRINKING WATER
FOR 3.5 MILLION PEOPLE
PER YEAR

Improved occupational
health



Better for people

Generating new denim shades
& wash down effects



Innovation



High quality recycled polyester fabrics



Recycled polyester is made from recycled materials (PET and polyester fabrics). By choosing recycled polyester, we're able to deliver the same technical performance in fibers with a smaller environmental footprint.



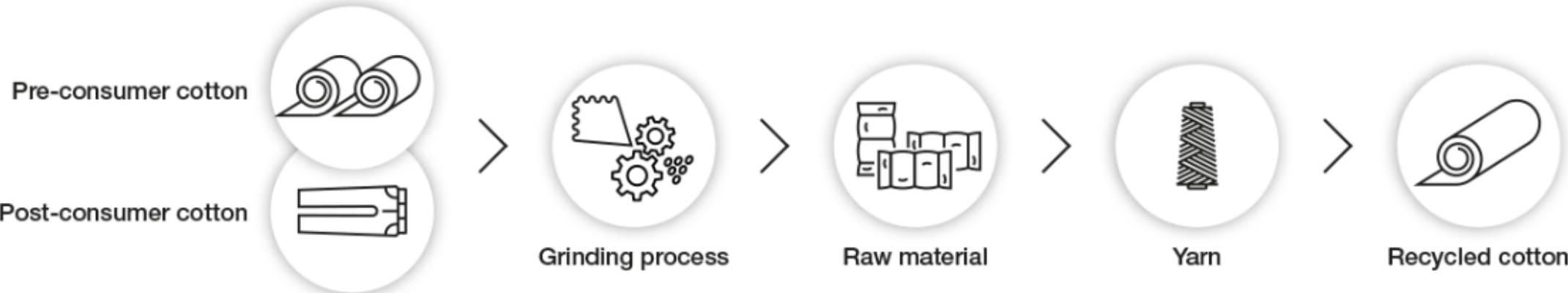
- **THE ENERGY NEEDED TO MAKE THE RPET IS LESS THAN WHAT IS NEEDED TO MAKE THE VIRGIN POLYESTER**
- **RECYCLING PET TO CREATE THE FABRICS PREVENTS IT FROM GOING TO LANDFILL**
- **USING MORE RECYCLED POLYESTER REDUCES OUR DEPENDENCE ON PETROLEUM AS THE RAW MATERIAL FOR OUR FABRIC NEEDS**



High quality recycled cotton fabrics



Recycled cotton fabrics, manufactured with cotton recycled and waste fabrics, reduce our use of virgin cotton and thus the significant water, CO₂ and other impacts from cotton farming.



Many Projects Available on the Website

- LIFE SHRETEX

- The main aim of the project is to demonstrate a novel shredding process that allows the reuse of fibres from used clothing or fibrous waste from the value chain, to produce new garments using recycled fibres from waste garments. These recycled garments will have a similar quality as non-recycled ones. In addition, the efficiency of the manufacturing process will be improved, since it will be possible to reuse all waste generated during the manufacturing process along the whole value chain (it possible to increase the proportion of recycled material for manufacturing new garments by up to six times compared with what current processes allow).

3D PRINTING



In the Fashion Industry

- Not very practical because of its rigidity.
- Until the material problem gets solved, 3D-printed clothing will continue to look a whole lot more like an art project than an actual industry.
- Texture!

So it might not be developed enough yet to be fully part of the textile industry, but I think there is a lot of possibilities and opportunities available for theatre and costumes.



Is it eco-friendly?

- 3D printing is a new technology and do have some specificities that makes it not totally sustainable.
- However, the technology is evolving fast and there are a lot of research towards how to make it more green!
 - Reduce waist
 - On demand = less useless making and storage
 - Less energy in assembling etc.
 - Corn based biodegradable plastic (or just reused plastic)
 - Making the fumes harmless

Growing
your own
leather



BIO COUTURE by Suzanne Lee

- It's kind of like a vegetable leather.
- Same bacteria that are responsible for Kombucha.
- Green tea, sugar, yeast and a sampling of the kombucha microbe.
- “Imagine leather that’s as lightweight and transparent as a butterfly wing or has the natural stretch of rubber,” Lee says. “Or imagine a material with the dynamic responsiveness of the skin of a chameleon.”



Grow Fabric in Your Kitchen

The microbes used to brew the drink kombucha can also produce a strong, leathery cloth—no cow required. Use Suzanne Lee's recipe to make your own.

Materials:



200 milliliters of organic cider vinegar



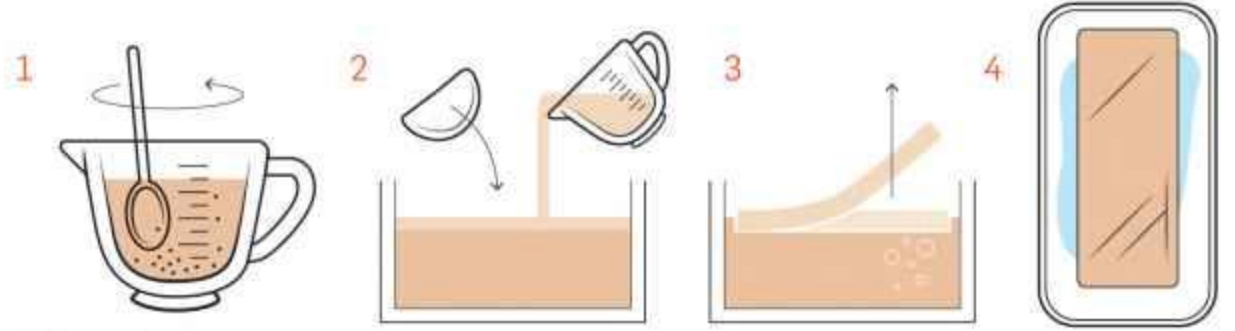
200 grams of granulated sugar



1 live kombucha culture



2 green tea bags



Directions:

1. Brew the liquid: Boil 2 liters of water, and steep the tea for 15 minutes. Remove the tea bags and add the sugar, stirring until it's dissolved.

2. Prep the culture: Make sure the liquid is cooler than 86°F, and then pour it into your container. Add the cider vinegar and the kombucha culture. Cover the container with a cloth.

3. Harvest the mat: While it grows, the mixture should be kept at room temperature. First, the culture will sink to the bottom. You'll know fer-

mentation has begun when bubbles and a transparent skin start to form at the surface. Over time, the culture will rise to the surface and accumulate in a thick layer. Once the mat reaches 2 centimeters in thickness (around three to four weeks), take it out of the container and gently wash it with cold, soapy water.

4. Dry the material out: Spread the sheet flat on a wooden surface. When it no longer feels wet, you can cut and sew it like any other fabric.

NOTE: This recipe will produce a piece of microbial leather as large as 7 x 6 inches, and it will take the shape of the container you put it in. To grow a larger or smaller sheet, adjust the proportions accordingly.



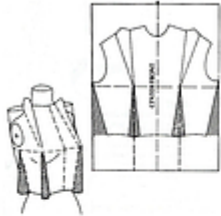
ZERO WASTE PATTERNS

MILAN NV-JC

ZERO WASTE FASHION DESIGN

BARRIERS

TECHNIQUE



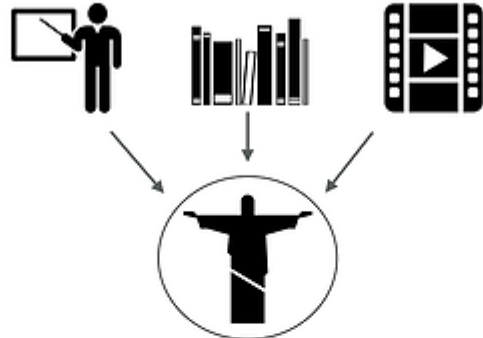
Pattern blocks
templates



Standardization



EDUCATION



Become a fashion DESIGNER
- **Or nothing !** -

Ignorance & underestimation
of the other possible occupations



ORGANISATION



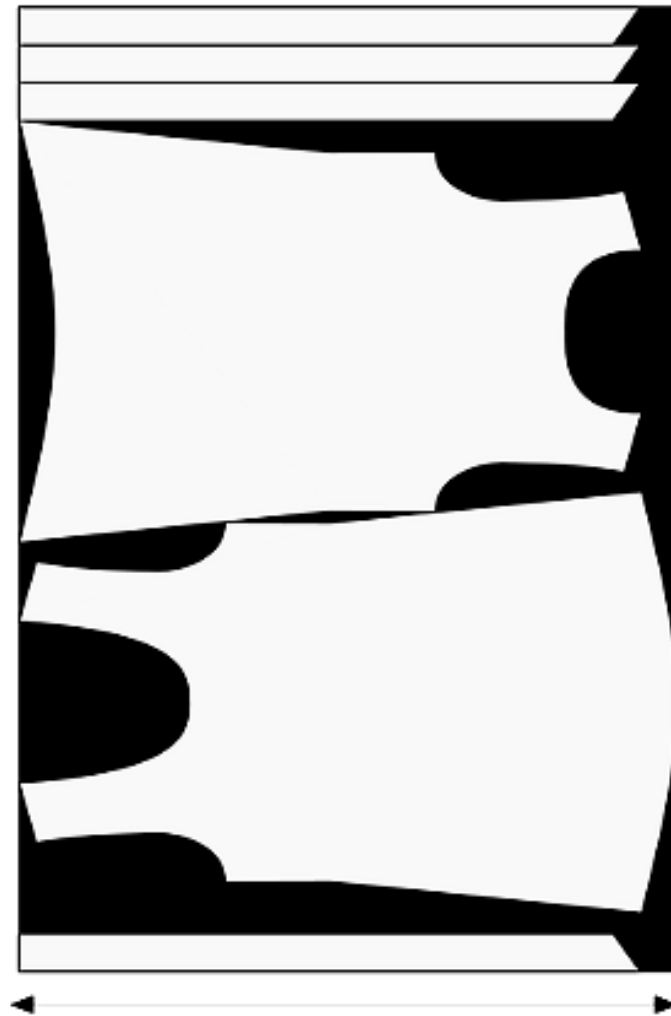
Separation between
garment making
players



We produce 400 billion m² of textile annually, but 60 billion m² of this is left on the cutting room floor. Most of these leftovers end up in Asian landfills.

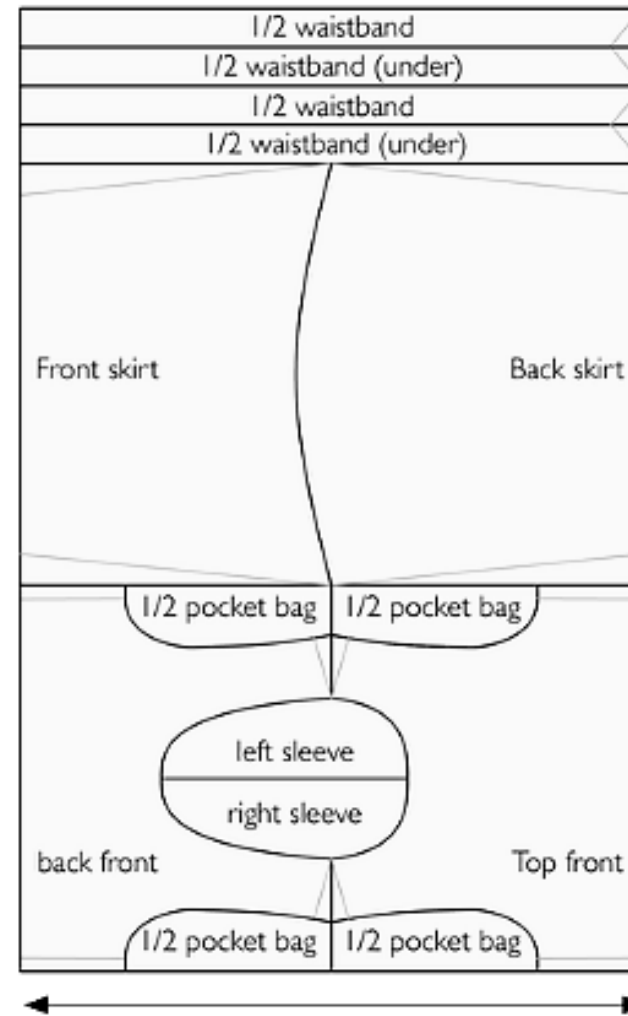
15% of the energy and money spent on growing, harvesting, weaving, shipping **is spent for NOTHING** - aside from polluting.

CONVENTIONAL CUTTING PLAN



Fabric used: 0,96m

ZERO WASTE CUTTING PLAN



Fabric used : 0,91m



- Bigger seam allowance = more durable and alterable
- Use excess material as "strengthening" in sensitive areas
- Reduction of cutting time

Petit Citron Website gives away free zero-waste patterns

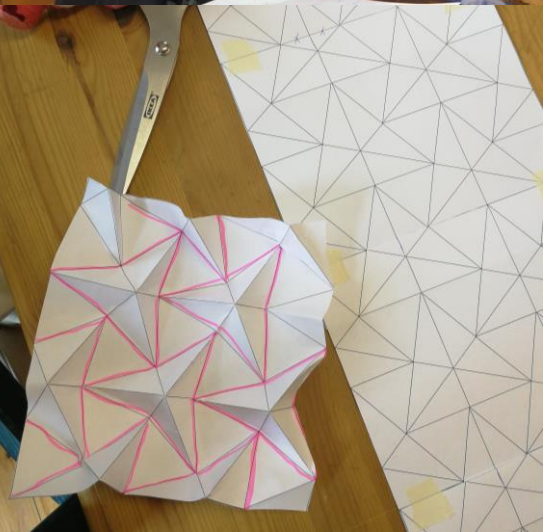
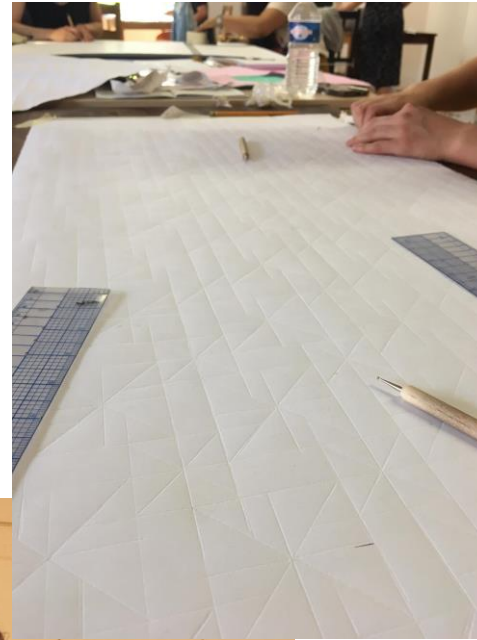
<https://www.petitcitron.com/patron-couture>



PLEATING

Plica Ex Plica Workshop
with Tsai-Chun Huang
Prague Quadriennial 2019

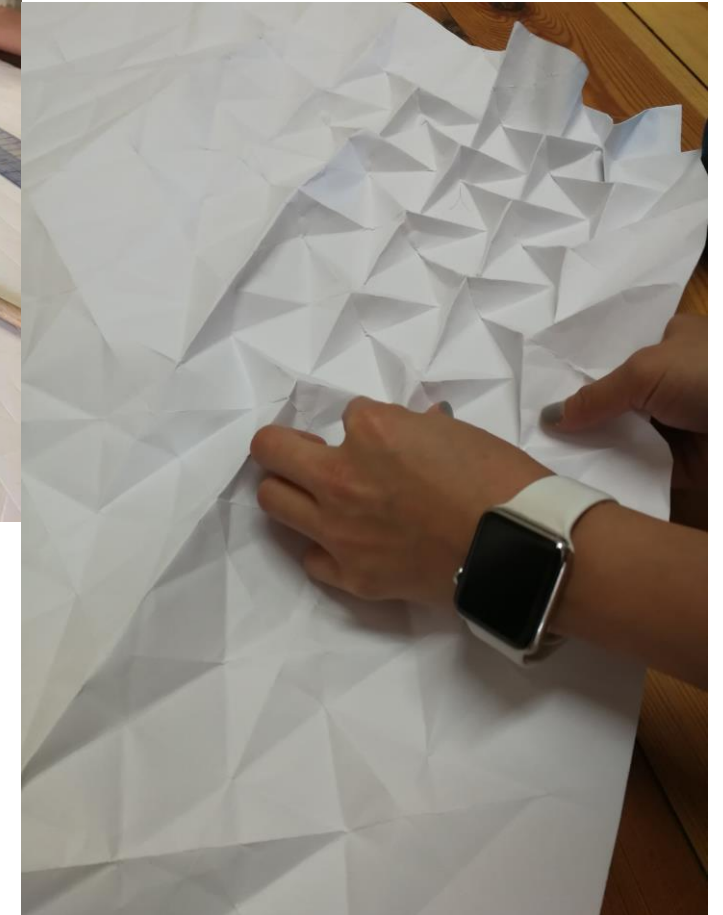
STEPS



Create your pleating pattern



Ingrave the paper with it



Once it's done, make the pleats!



When you have your
two molds...



Fold them back with fabric between them.

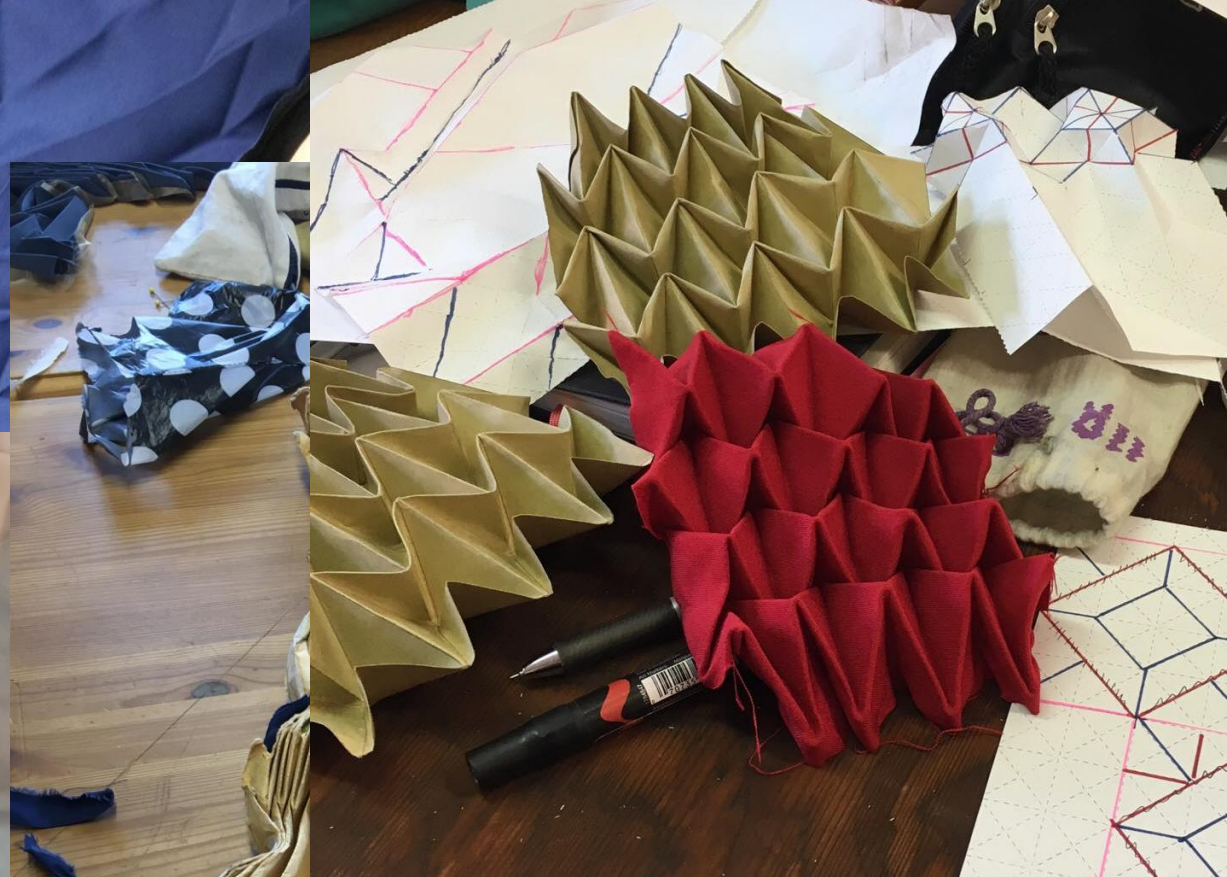


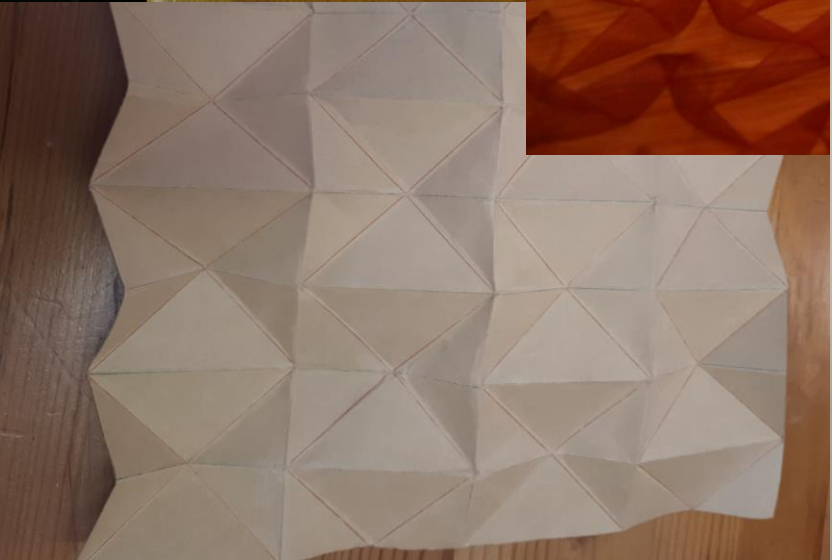
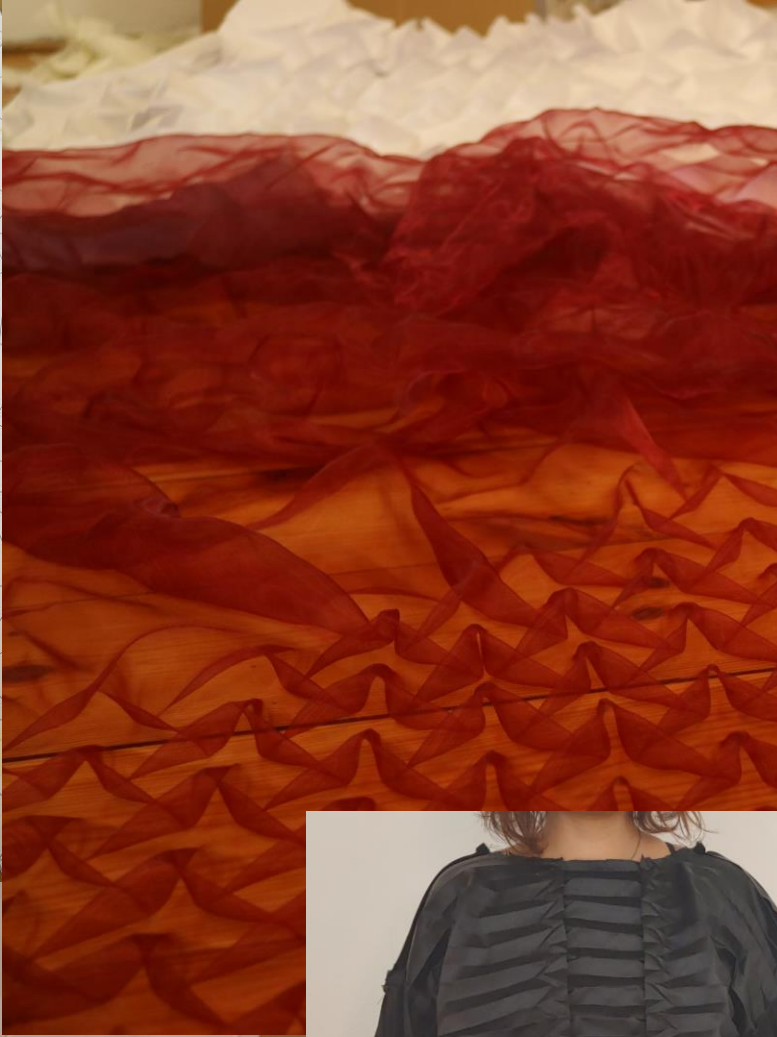
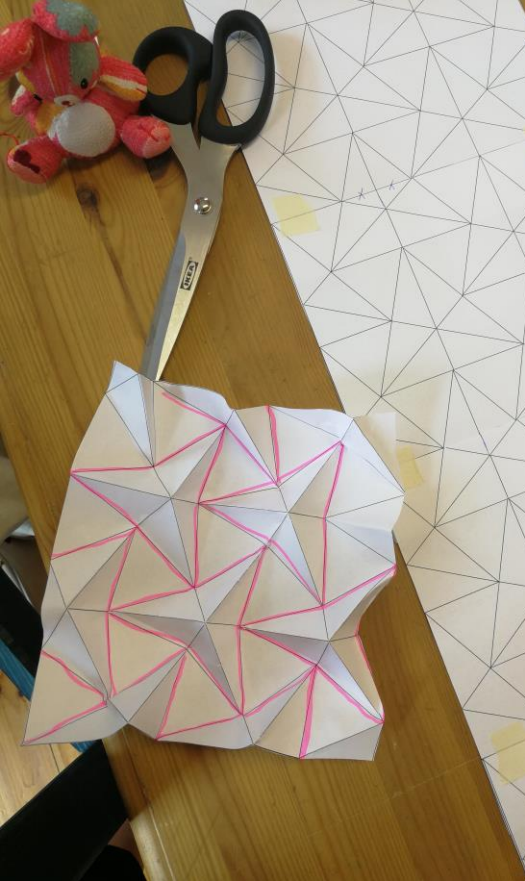
Steam it for 30 minutes and...



TADAAA!







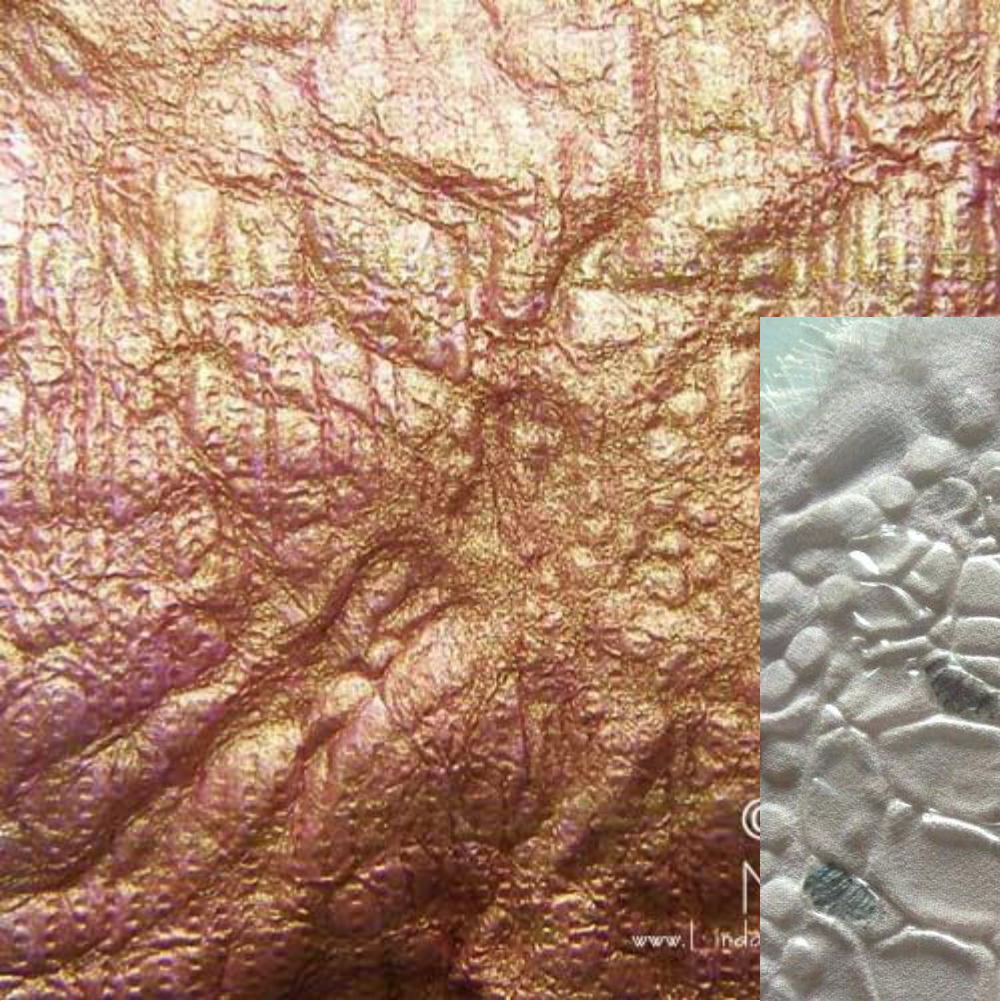
A close-up photograph showing the effect of a heat gun on a surface. The top left portion of the image shows a smooth, reddish-brown material. A heat gun nozzle, partially visible on the left, is directed at the surface. The heat causes the material to crack and peel away, revealing a multi-colored, textured layer underneath. This layer features a gradient of colors including orange, red, and pink, with a prominent blue-green section in the lower right. The overall appearance is that of a decorative or protective coating being removed or altered by heat.

HEAT GUN

HEAT GUN

- Changing the surface texture of fabric using a heat gun and quick even movements.
- Bubbled effects on synthetic fabrics or scorched and burned patterns on natural fabrics.
- Synthetic and natural fibres
- Only requires heat, but burning synthetic fabric releases fumes





NATURAL DYES



Turmeric
Yellow & Deep yellow with vinegar



Avocado skins
Light pink



Onion skins
Yellow & deep peach/terracotta



Beets
Dusty pink



Red Cabbage
Purple (Vinegar)
Blue (Baking Soda)



Black Beans
Blue & grayish purple



Chlorophyll
Green
Darker green with iron nails



Tea
Black tea = brown
Green tea = brownish green



Aura Herbal Wear

Company that uses natural dyes at scale at their factory in Ahmedabad, India.

- Make ready-to-wear garments but give the dyes themselves to other dye houses.
- Want to turn the other industry around into natural dyes
- Use organic cotton
 - Less water,
 - Less pesticides
 - Easier on the soil.
- “The water that comes out of our process is **purier than the underground water** we start our production with. That’s our trophy.”

Table-2
Water Consumption Pattern in Textile Mills

| Process | Water consumption ((% of total) |
|-----------------------------------|----------------------------------|
| ▪ Bleaching, Finishing | 38 |
| ▪ Dyeing | 16 |
| ▪ Printing | 8 |
| ▪ Boiler House | 14 |
| ▪ Humidification (spinning) | 6 |
| ▪ Humidification (weaving)..... | 9 |
| ▪ Sanitary, Domestic etc..... | 9 |

NATURAL DYES

Advantages of Natural Dyes

- Biodegradable
- Non-toxic
- Non-allergic.
- Easy to extract the colors by boiling the plants, leaves, bark or flower heads in water.
- Higher UV absorption
- Have antimicrobial properties and moth proof
- No chemicals that are harmful to health and more reliable than the chemical synthetic dyes.

Disadvantages of Natural Dyes

- It is difficult to reproduce shades
- Mordant is required to fix the dye in the fabric (heavy metal salts).
- It is difficult to standardize .
- Expensive and color and light fastness are low.
- The dyed textile may change color when exposed to the sun, sweat, and air.
- Vast areas of land for its production.
- More time consuming.

Solution...?

- For SMALL SCALE dyeing, natural dyes are definitely more sustainable. They do require more time and don't have standard colors so more tests are required.
- For LARGE SCALE, on the opposite, the line is quite blurred. The biggest problem is the quantity of land and water required to produce not only the natural fibres, but also the land to grow the plants needed.
- Non toxic, but more expensive and more time consumption. (*going back to this idea of slowing down*)
- SOLUTION: find a balance between natural and synthetic dye and find a way to clean the water after using synthetic dye...?

CONCLUSION

- Overall, being eco-friendly is mostly being aware.
- It is impossible to be 100% sustainable and it's okay to not be perfect.
- Celebrate the little steps which will cause the big changes!
- This research will definitely have an impact on my work.

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- 2: What costume Can Do and Be by Rosane Muniz (artist, curator), Sodja Lotker (Prague Performing Arts Academy), Christina Lindgren (Oslo National Academy of the Arts), Arianne Vitale Cardoso (University of São Paulo).

1'oclock meeting from Quebec professional exhibition

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