

Structural inequality

Lack of data

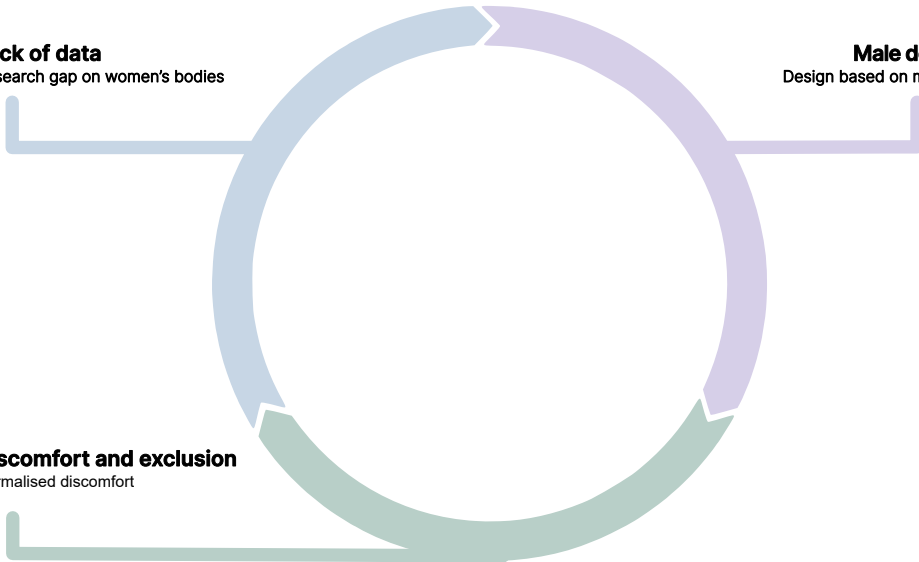
Research gap on women's bodies

Male decisions

Design based on male norms

Discomfort and exclusion

Normalised discomfort



Problem definition - current chest protectors



Fig. 1 Rigid cup chest protector system



Fig. 2 Chest protector integrated sports bra

Fig. 1 https://www.decathlon.es/es/p/top-boxeo-con-proteccion-mujer-outshock-500-negro/_R-p-304531

Fig. 2 <https://www.nytimes.com/2014/06/07/sports/soccer/an-even-playing-field-for-the-womens-world-cup.html>

Problem definition - current chest protectors



Size L sports bra with size M protector (front view)



Size L sports bra with size L protector (front view)



Size L sports bra with size M protector (side view)



Size L sports bra with size L protector (side view)

Step 01

3D-Scan



3D scanning process using a smartphone



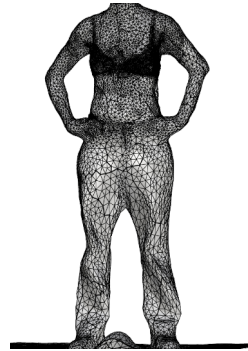
Visualization of the Polycam app during 3D scanning

Step 01

3D-Scan



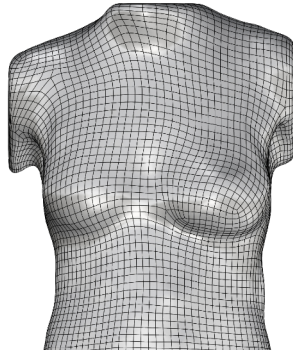
3D scanning process using a smartphone



Full-body 3D mesh model

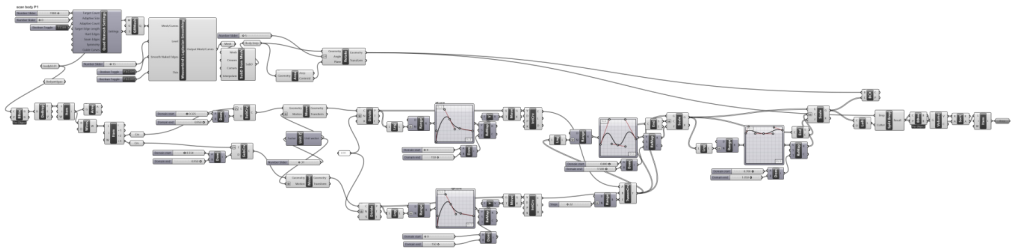
Step 02

3D-Body model



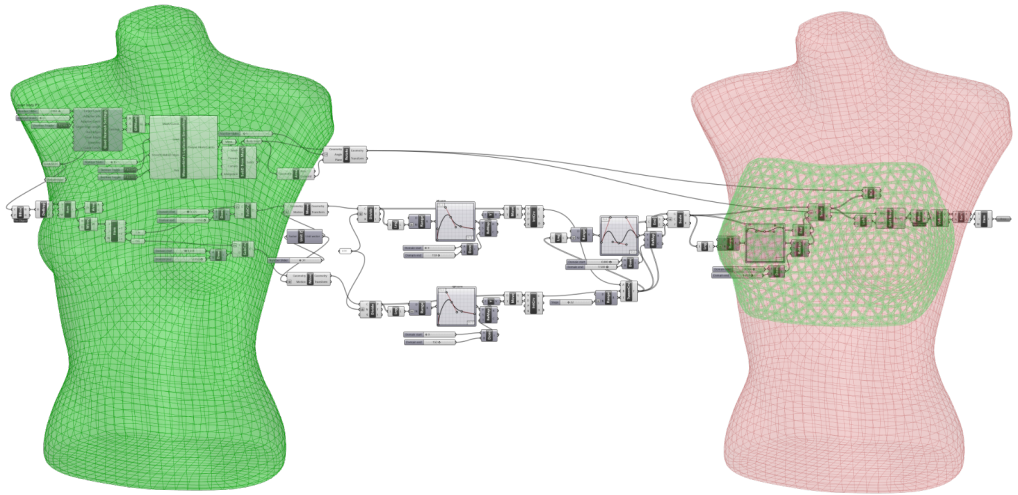
Step 03

Parametric personalisation



Step 03

Parametric personalisation

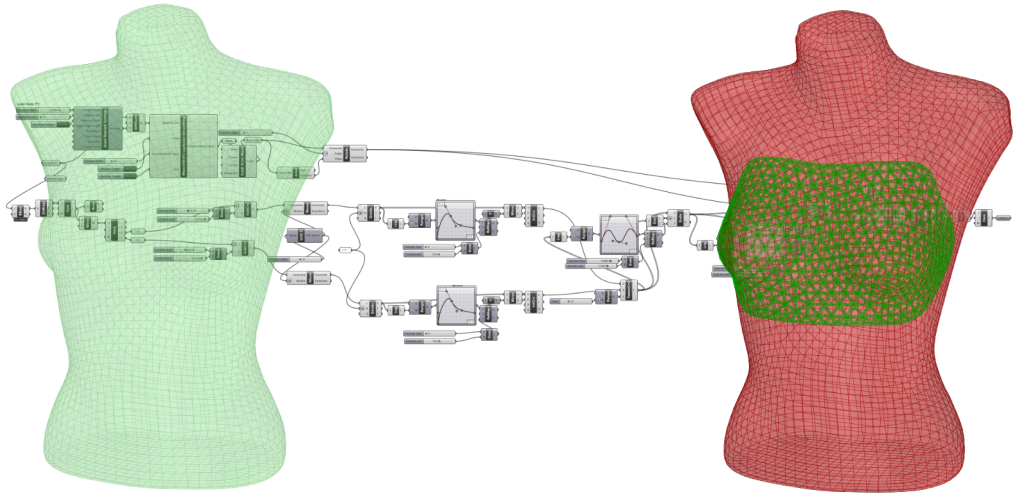


Input

Output

Step 03

Parametric personalisation



Input

Output

Step 03

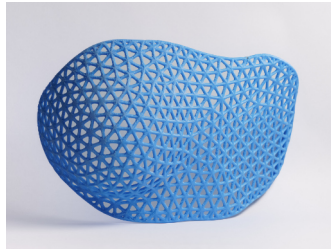
Parametric personalisation



Chest protector for symmetrical breasts



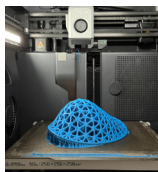
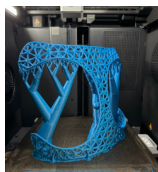
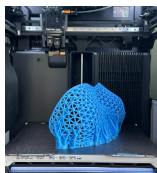
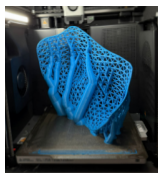
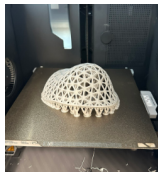
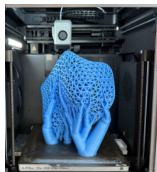
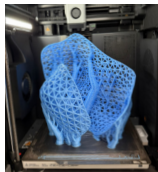
Chest protector for asymmetrical breasts



Chest protector after mastectomy

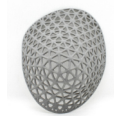
Step 04

3D-Print

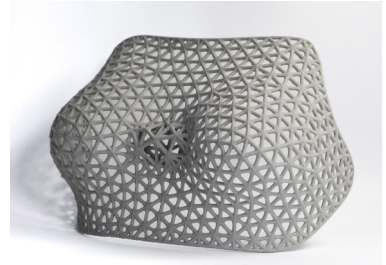


Materials

PLA Tough + (Polylactic Acid, impact-resistant plastic)



PLA Tough +



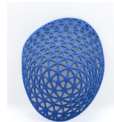
Chest protector prototype in PLA tough +

TPU 95A (Thermoplastic Polyurethane)



TPU 95A

PETG (Polyethylene Terephthalate Glycol-modified)



40 PETG

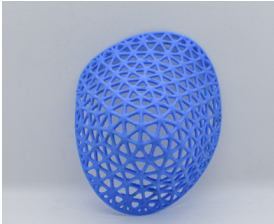


Chest protector prototype in PETG

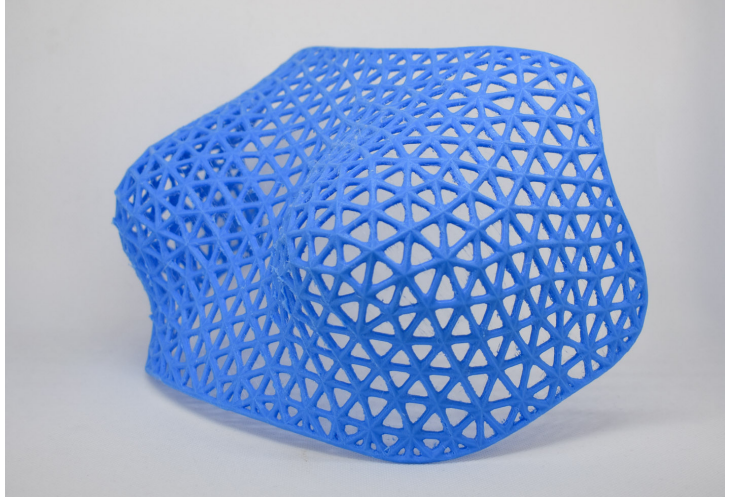
TPU for AMS



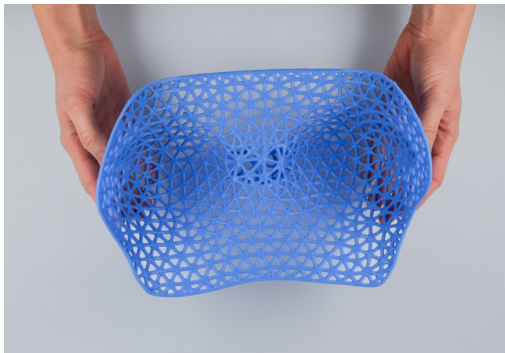
Flexibility of the TPU for AMS lattice prototype



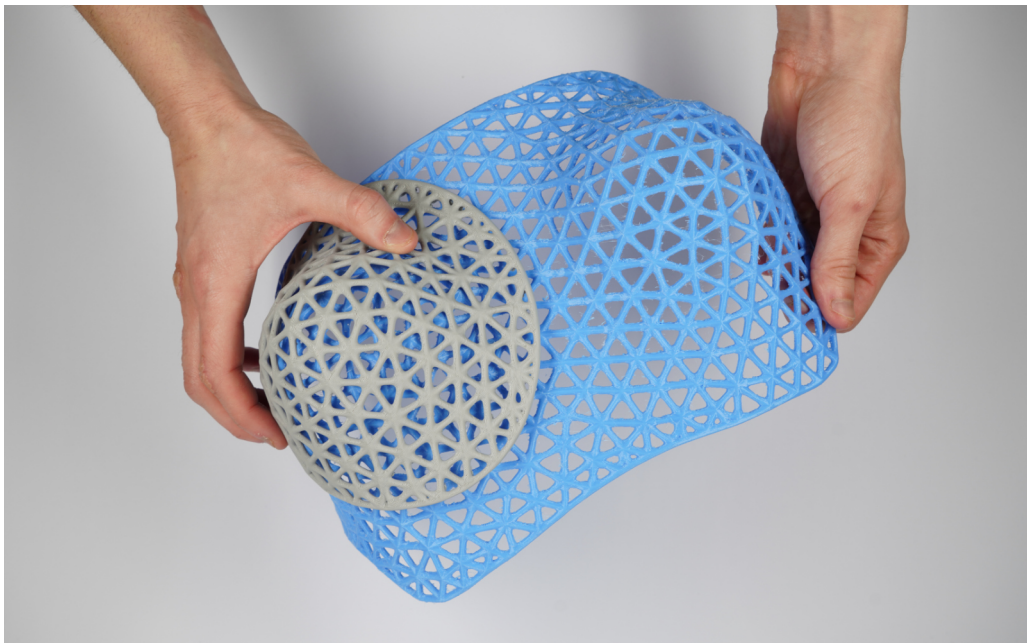
TPU for AMS lattice prototype



Chest protector prototype in TPU for AMS



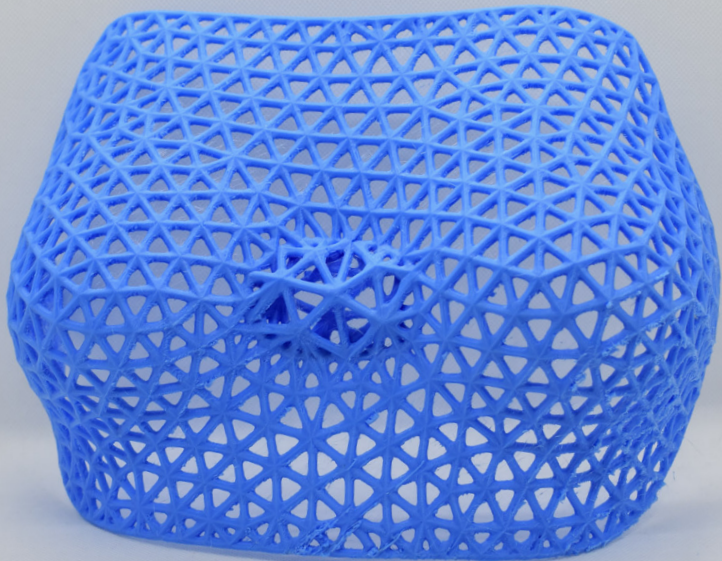
Flexible areas of the lattice structure



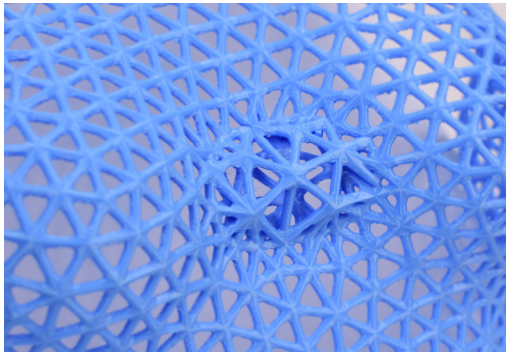
Combination of PLA Tough+ and TPU for AMS



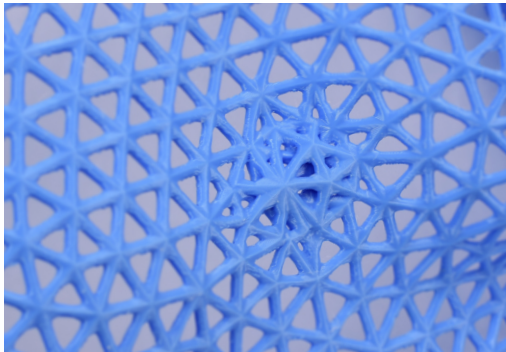
Comparison of existing solid chest protector shapes with a chest protector featuring a grid structure



Central connection



Large central connection element



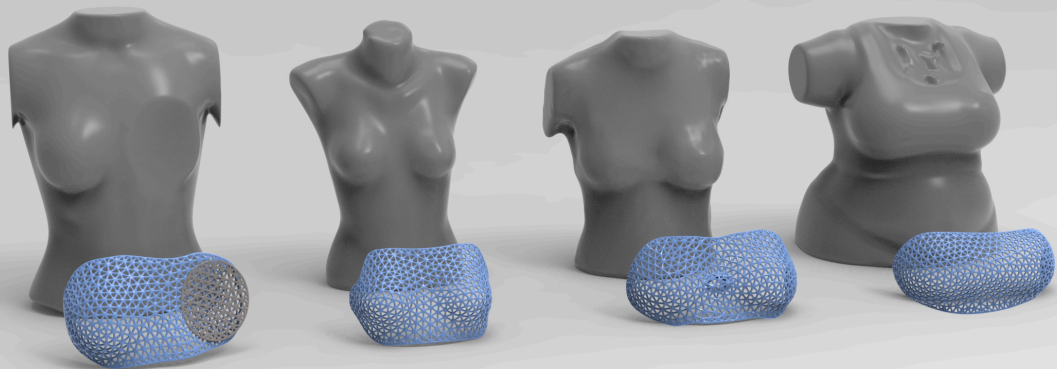
Small central connection element



Sports bra with inner fabric layer for the chest protect







Chest protector adaptation to different body shapes

