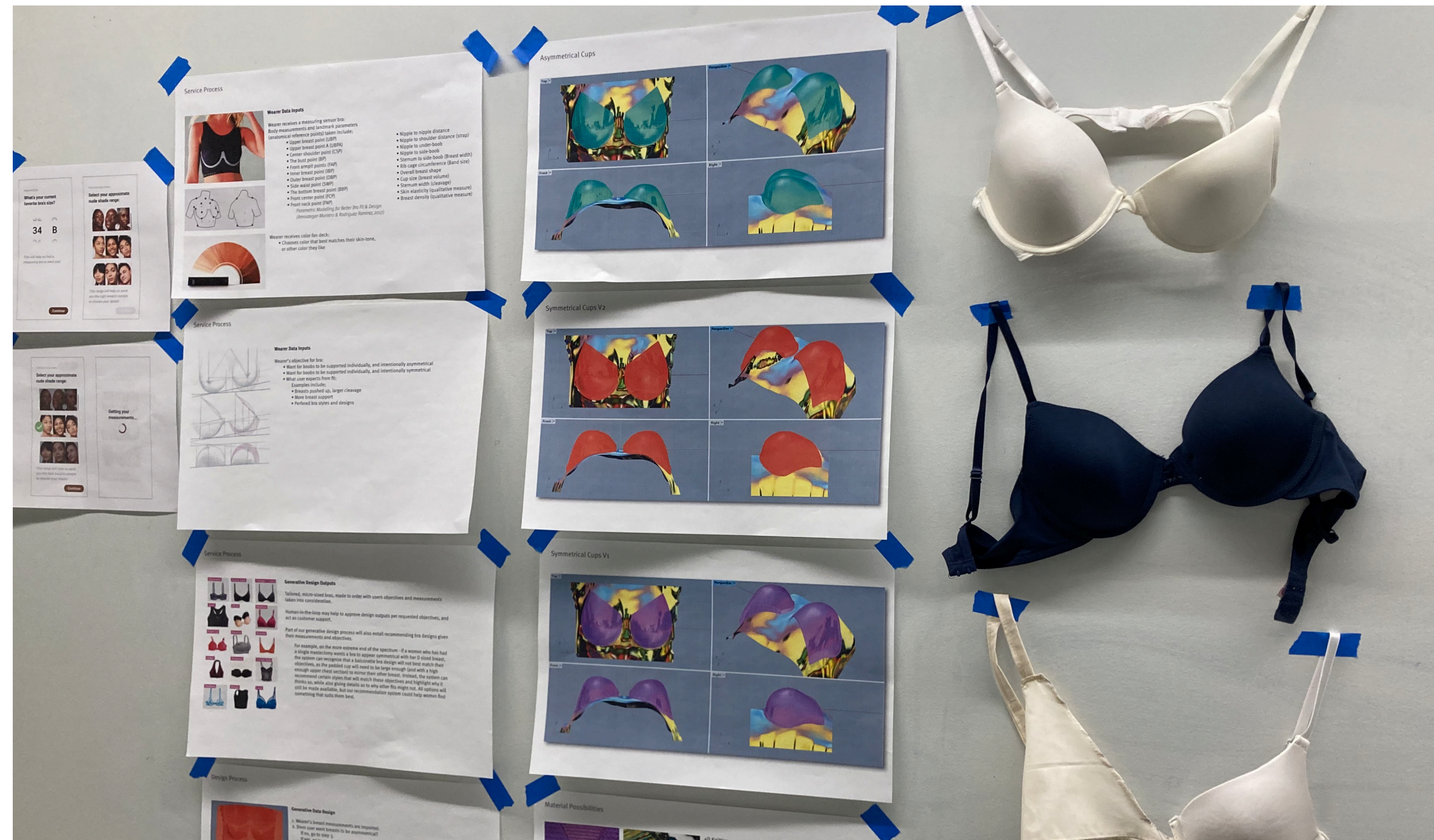


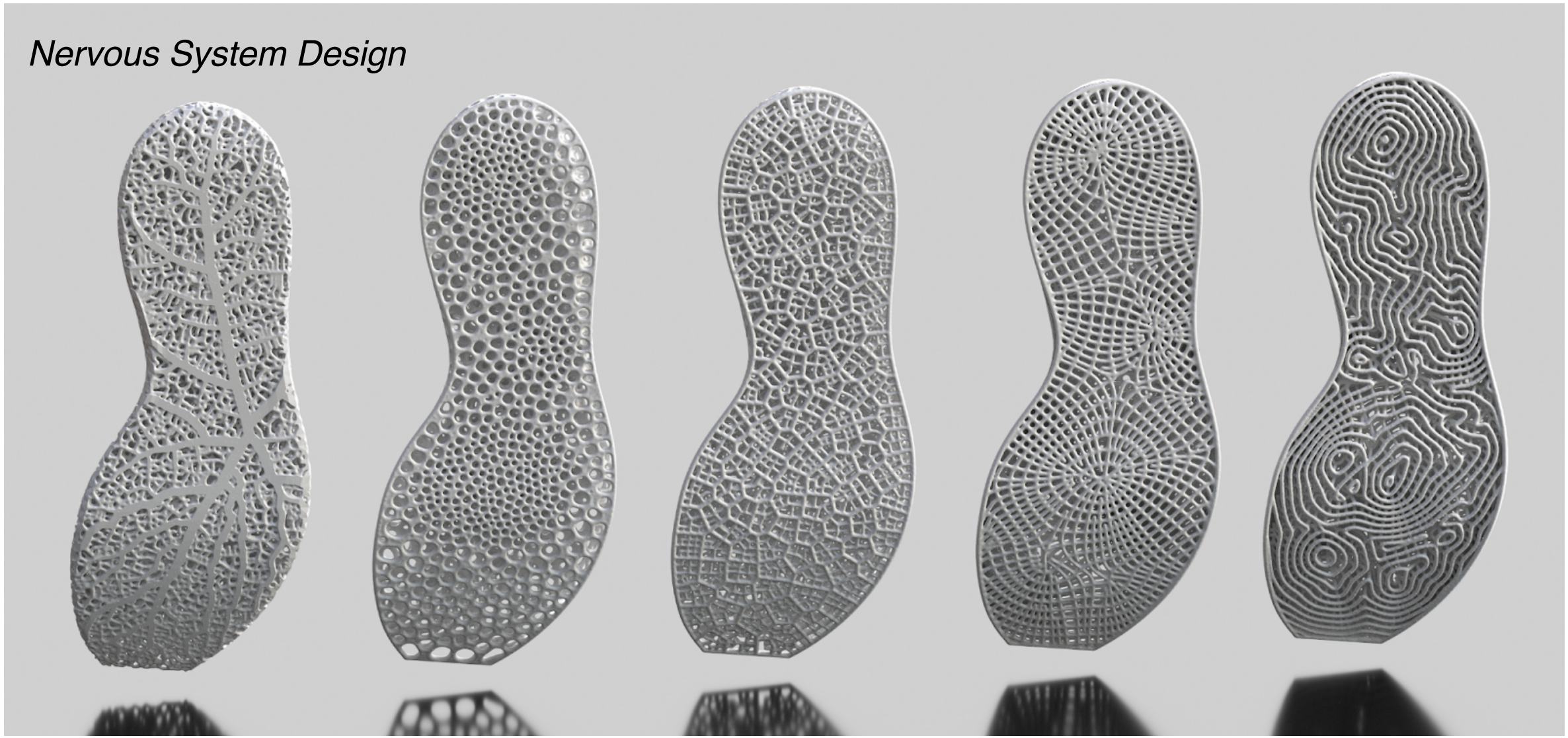
Generative Design Workshop S2022

How can designed products fit individuals better than audiences?

- > Design sprint focused on serving diverse individual needs through selective data capture, careful consideration of user and context data inputs, and algorithmic approaches
- > Participants asked to design with boundaries, variable sliders, and relationships; rather than make specific design decisions
- > Wide user inclusion encouraged from the start of design process



Nervous System Design



Generative Inspiration

Custom fit, inclusive body garments, and algorithmic recommendations



Inclusive Audience

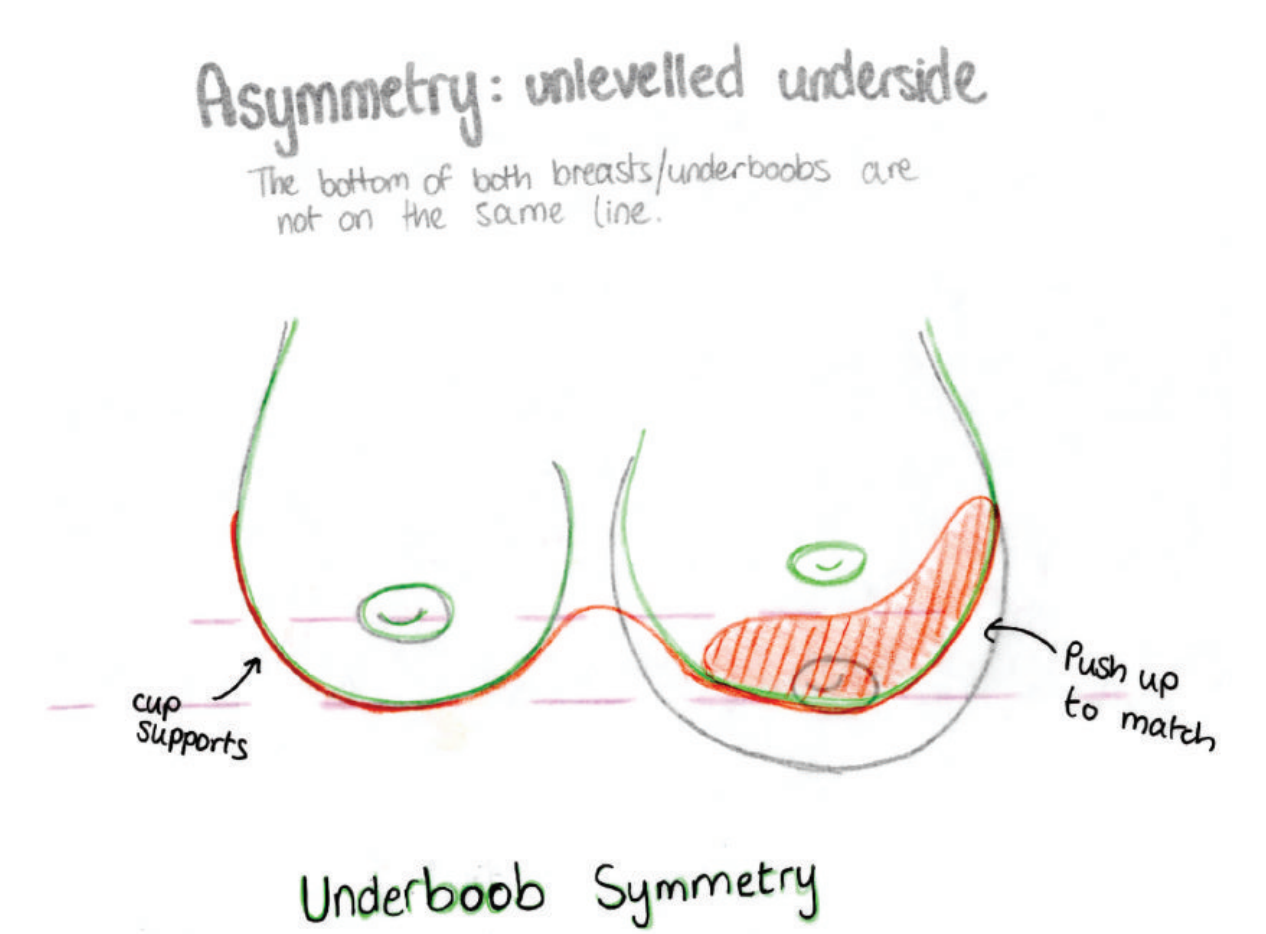
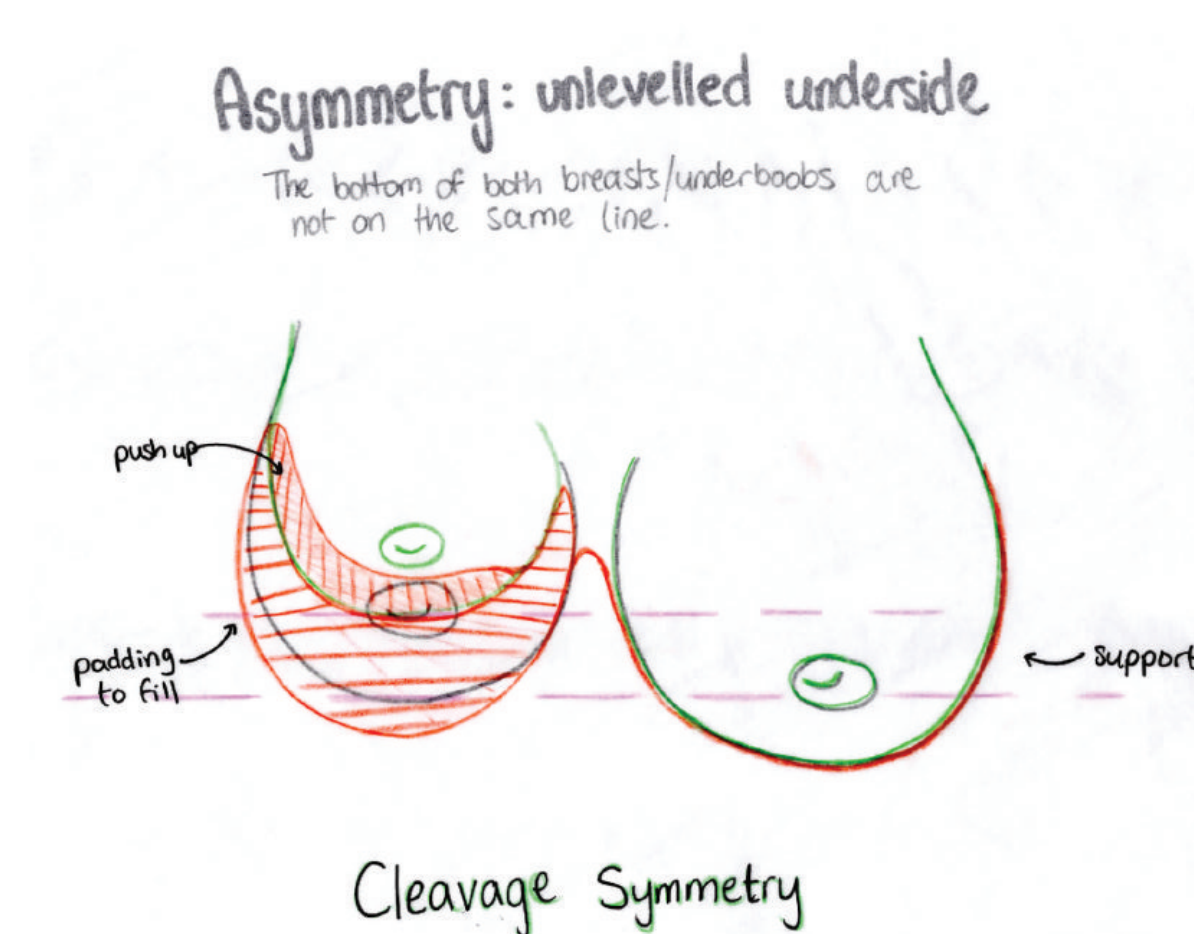
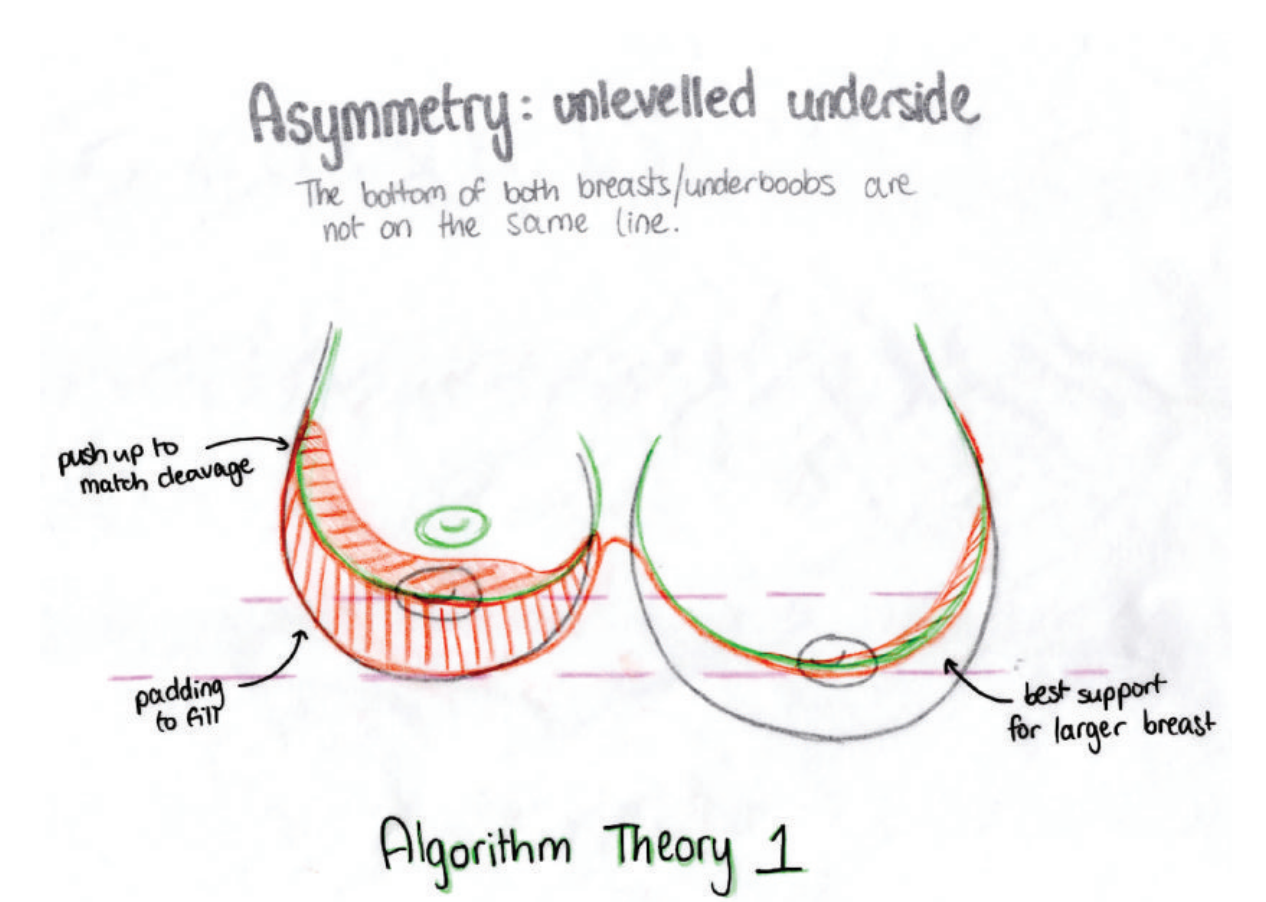
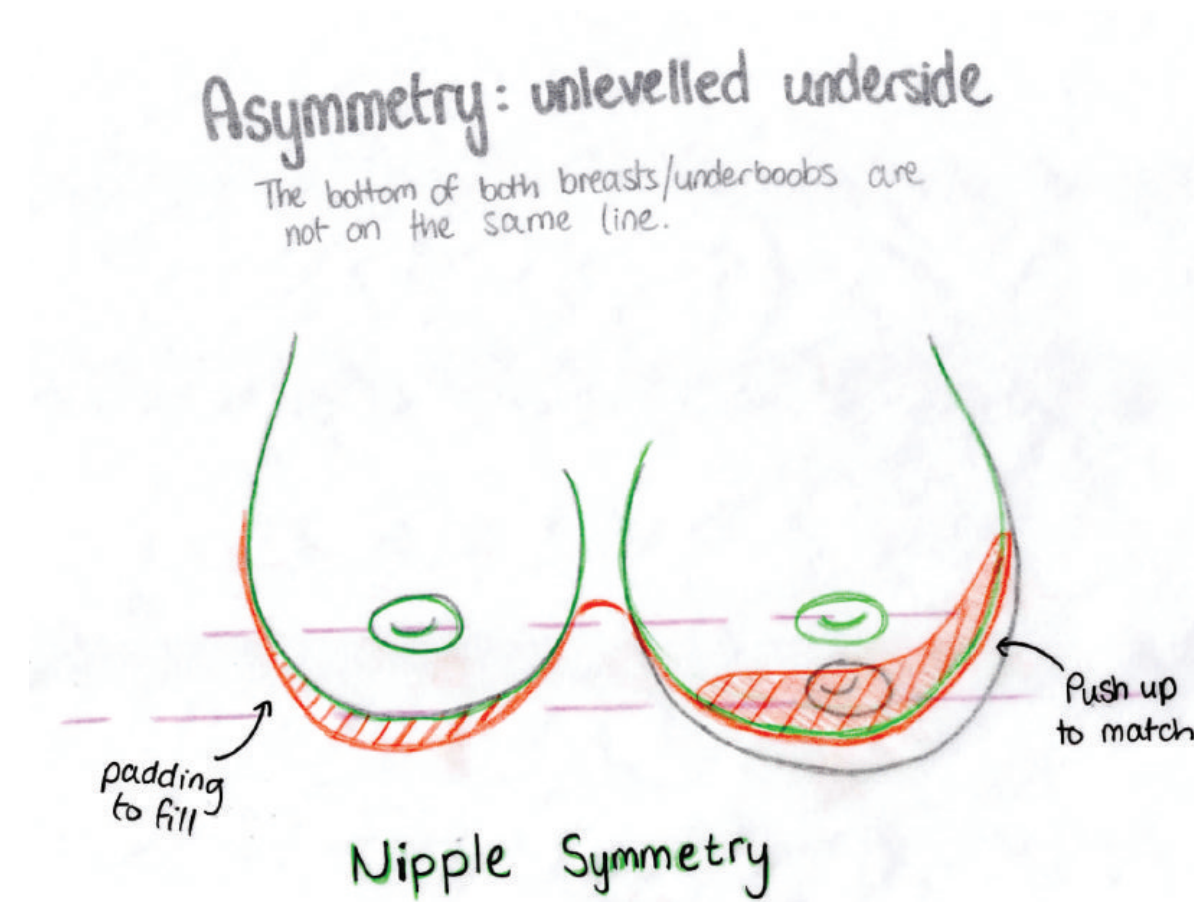
Design pluralism, inclusion, and individualism for half the population

- > Individuals with varying degrees and types of anisomastia (breast asymmetry)
- > Individuals proceeding through gender transition surgery and therapies
- > Individuals undergoing uneven pubescent growth
- > Individuals needing post-mastectomy prostheses

Data Capture Challenges

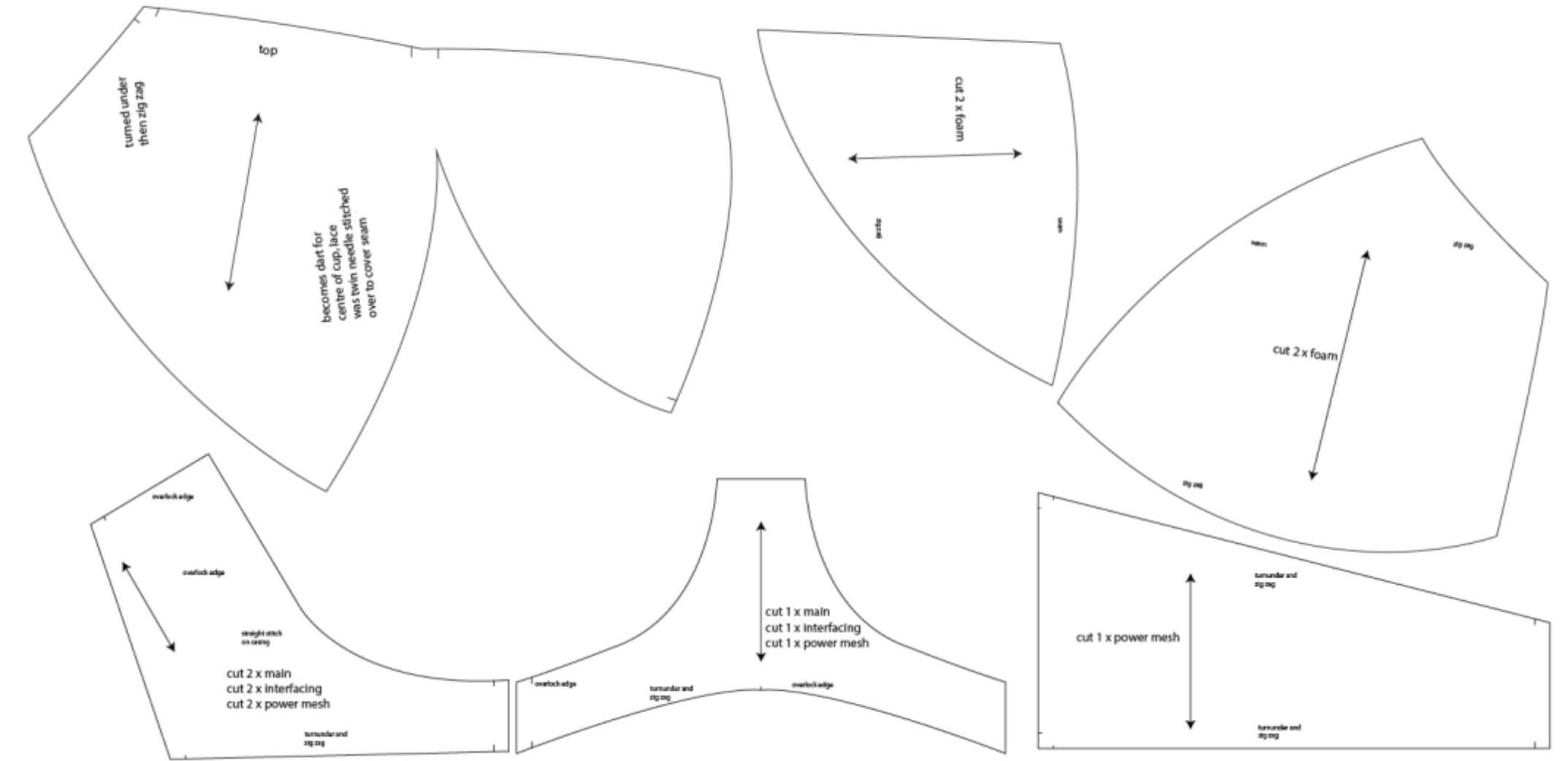
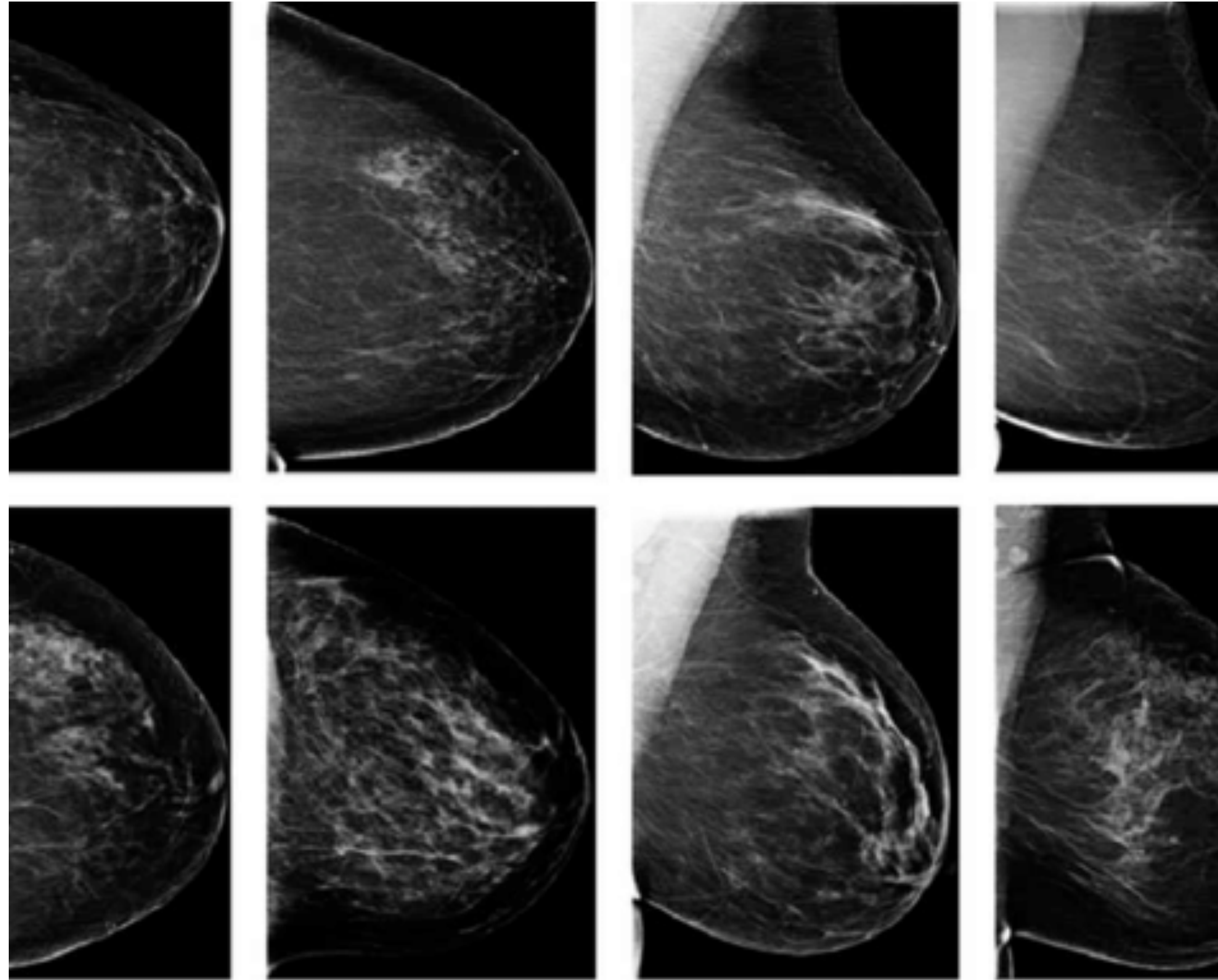
Inclusive and sensitive data capture rituals

- > Accessibility of data capture for breast data
- > Resulting privacy concerns
- > Self-perception and body image sensitivity
- > Who is being included?



User Research, Outreach, and Validation

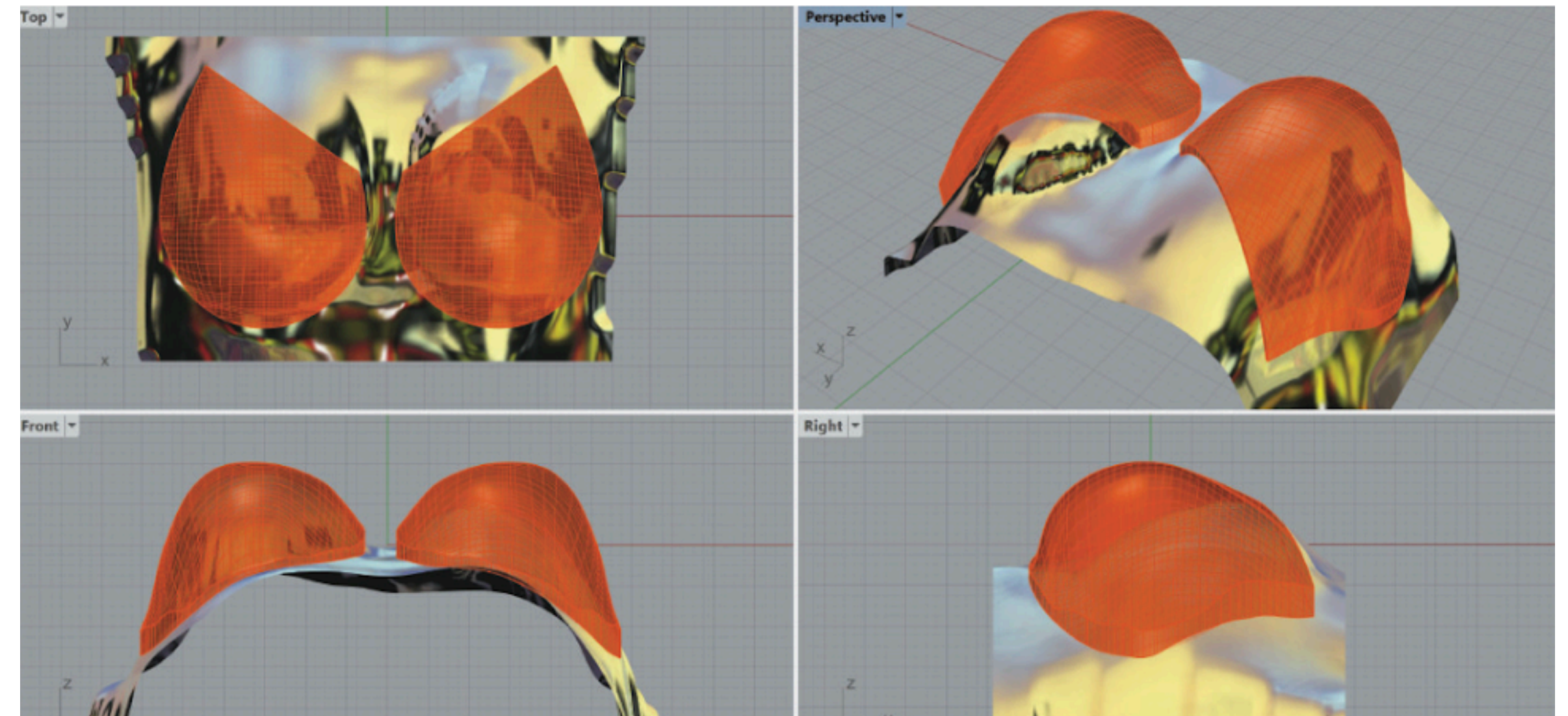
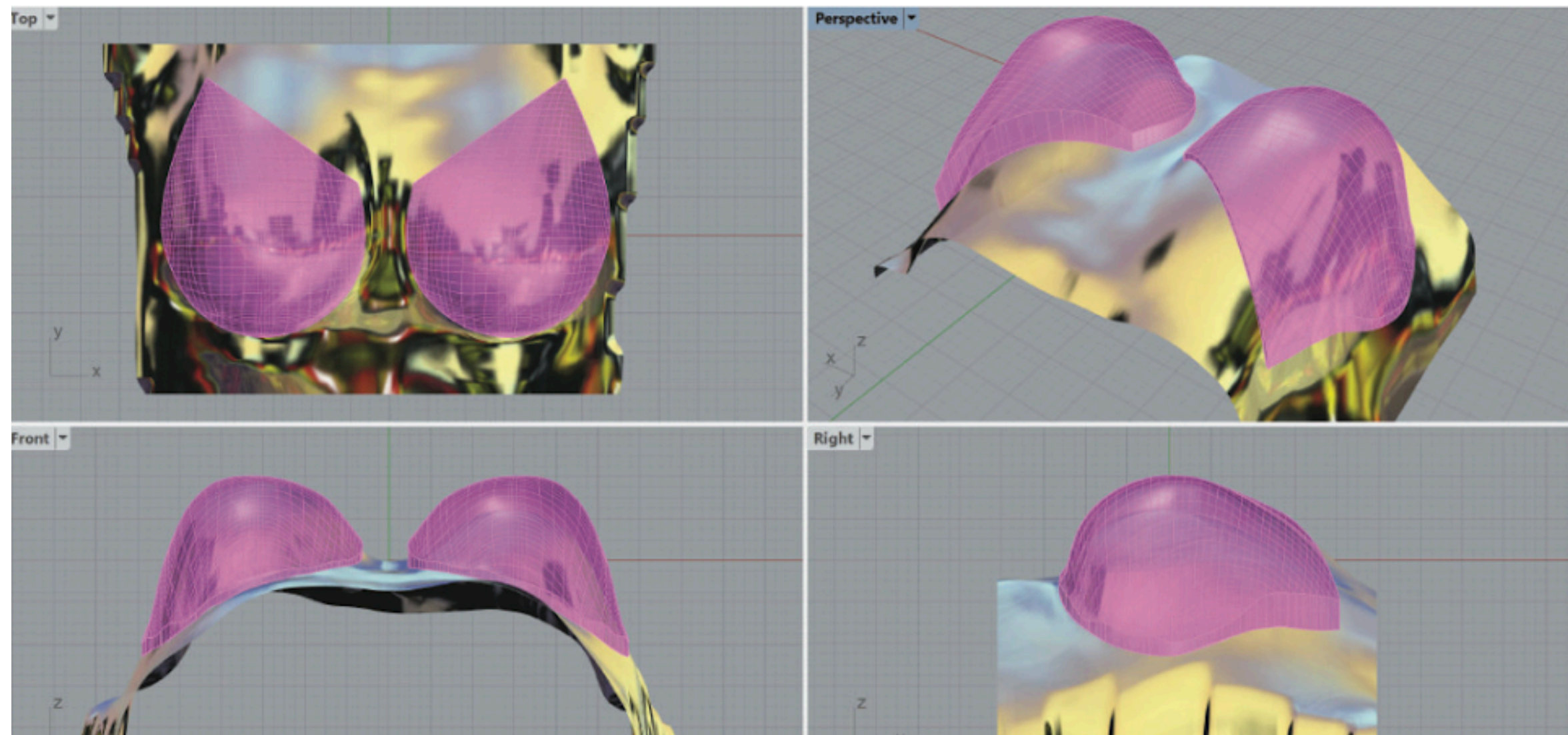
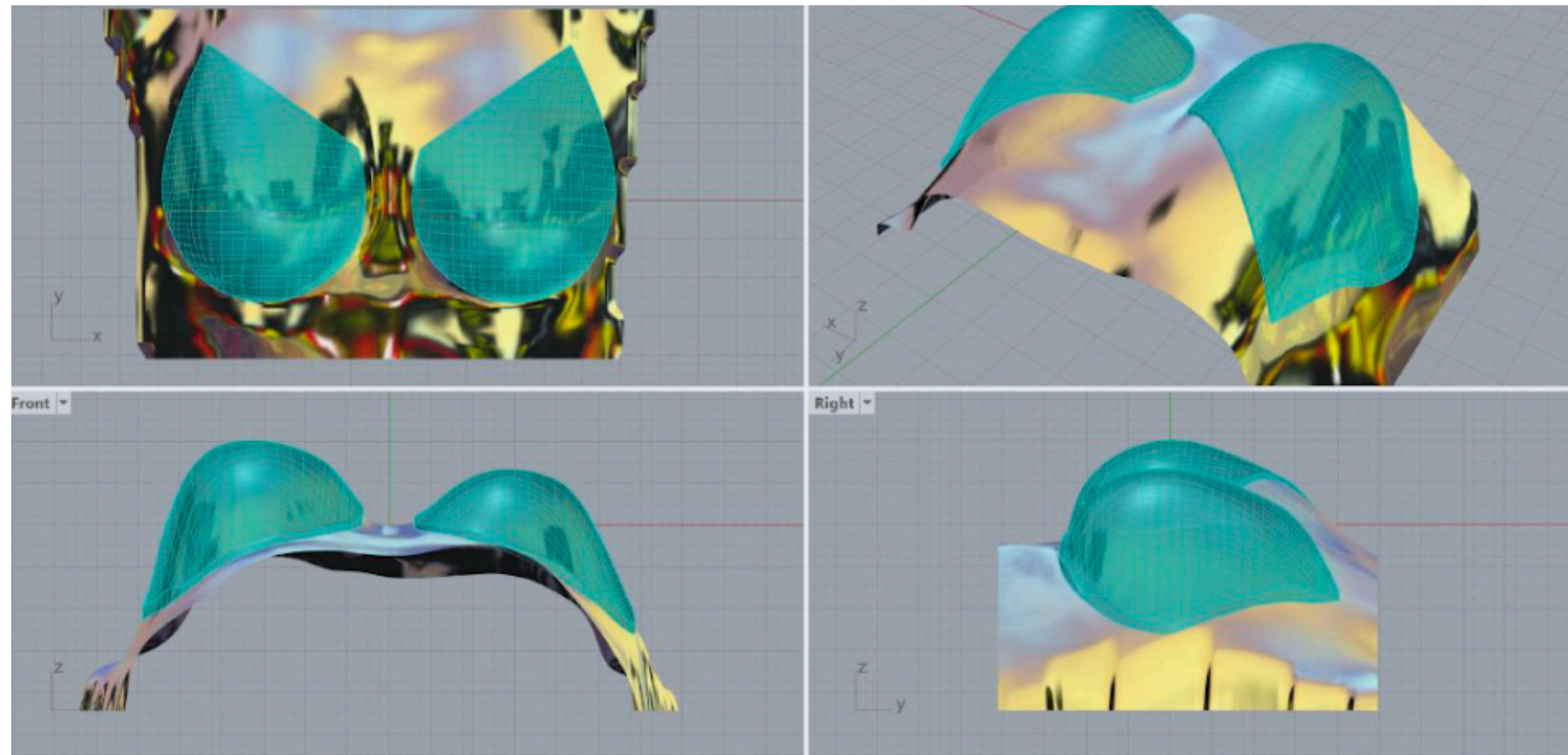
Anatomists, psychologists, designers, fabricators, and people with breasts



Data-Driven Garment Generation

From image and measurements to garments

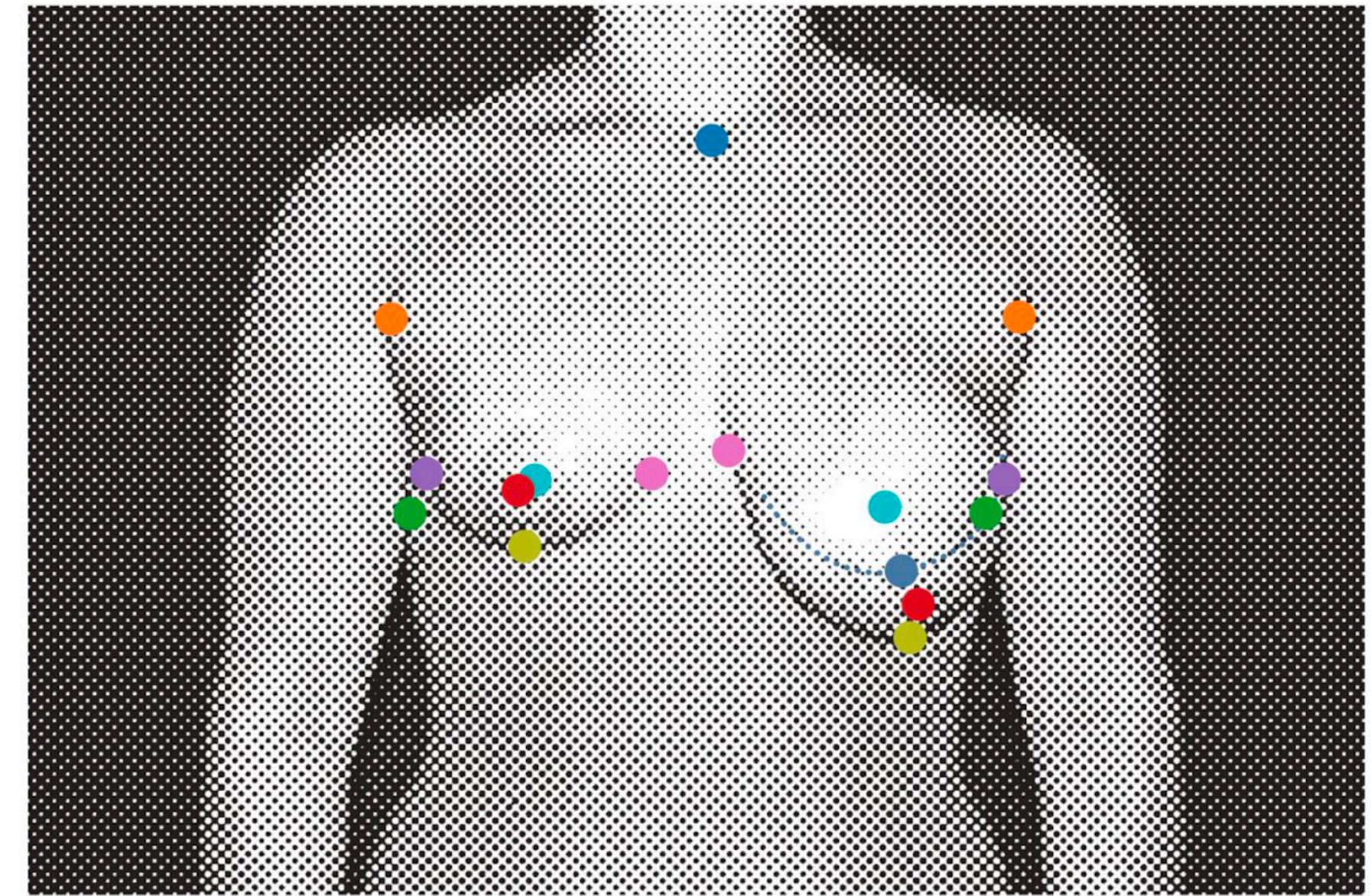
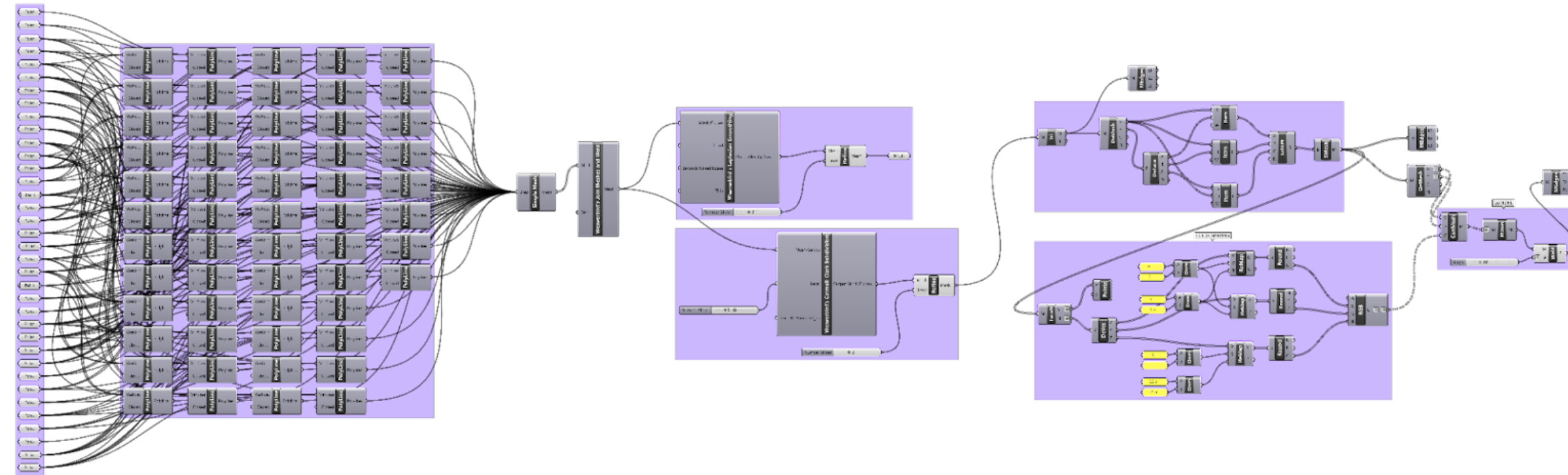
- > Create a digital simulation of the torso (as is)
- > Analyze the digital simulation to identify best placements for support, padding, and symmetry-preserving interventions
- > Determine required material properties and garment construction logic
- > Generate definitions for a bra that would shift and support anatomy in the desired position (to be)



Data Capture and Modeling

Reducing Data Capture Burdens with Landmark Point Reconstruction

- > Simplifying anatomy based on key coordinates and regions
- > Different measurement types to capture anatomical dynamics — static skeletal origin points, stretch and movement based biomechanical extents, and 3D-sampled volumetric coordinates
- > Designed for sensitive but accurate data capture experiences



Process for bra cup generation:

1. Determine landmarks;

- Clavicle, median plane
- Armpit, coronal plane
- 7th rib, coronal plane
- Nipples (if available)
- Farthest exterior breast edge
- Farthest interior breast edge
- Lowest breast edge point
- Farthest frontal breast plane
- Lowest interior fold point of underboob
- Others:

Determine measurements

- Volume
- Weight
- Center of gravity
- Others:

Determine distances;

- Clavicle to Lowest breast edge point
- Center gore: interior breast edges
- Breast width: Exterior breast edge to interior breast edge
- Exterior breast edge to 7th rib (help determine breast shape and position relative to torso)
- Line and slope from clavicle to farthest frontal breast plane point, nipple, and lowest breast edge respectively
- Armpit to 7th rib point
- Length of underboob fold (vertical)
- Curve from interior breast edge point, to lowest breast edge point to farthest exterior breast edge point / 7th rib
- Others:

