BODY MEETS SPACE. SPACE BECOMES DRESS.

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A thesis presented to Ryerson University
in partial fulfillment of the requirements of the degree of Master
of Architecture in the Program of Architecture

Toronto, Ontario, Canada, 2018

Figure 01

Author's Declaration

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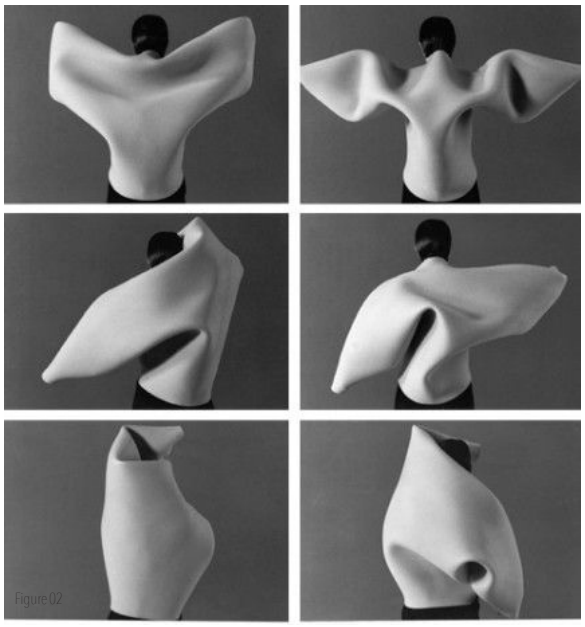

Figure 02

Body Meets Space. Space Becomes Dress.

Master of Architecture, 2018
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Abstract

Forming. Shifting. Shaping. The envelope of one's physiological body extends outwards in multiple shells, layer by layer. The versions of this envelope exist in the interstitial moment between clothing and architecture, ever forming and being formed, they shift and shape the circulation and happenings of the body on one side and the world on the other.

The study of garments lends architecture recognition of various visible and invisible forces that create space and envelope. When space becomes dress, body specificity and movement is emphasized, and the geometries of the physiological body and what it means to experience space as an individual becomes primary, achieving a qualitative, sensory experience extending from the powers of kinaesthetic sense. Oscillating between scales and acts of making, model experimentation invents new ways to conceive and create architecture — a soft architecture finds itself operating here: on the liminal edge of body, envelope, and space.

Figure 02. *Maria Blaisse, Spherical forms in Kuma Guna, 1996*

Figure 03. *Series of envelopes designed for AR8101, Fall, 2016. 'Wearable landscape' coat at most left.*

Preface

I have been often asked about the decision to insert dress into the realm of architecture. Where did the interest begin, and of course, why does the role of (essentially) a seamstress matter in architecture?

My interest in dress began when I was very young; my mother was an incredible seamstress in her spare time, and (seemed) to enjoy making my sister and I matching sets of dresses and extravagant halloween costumes. As I grew up, and the novelty of what I now understand were bespoke garments wore off, designer clothing became the symbol of a desired cultural identity. With the internet, images of far away runway shows and street-style became a fairytale, coloured by the theatricality of decadence, imagination, and impossibility.

I became obsessed with looking at clothes and garments and analyzing their parts; how did they hang on the body, what did a seam, or a pleat, or a tuck do for the contours of shape, how could clothes be attractive, angular, abstracted, amorphous, and later, and more importantly, how could they be described as architectural.

Making physical models to work through all stages of the design process has been ubiquitous throughout my undergraduate and graduate education. From the initial ersatz mess of cardboard and paper explaining an emotional parti, to the final scaled and measured one that permits a scientific understanding of the finished project, in detail or in whole, they have always helped me in times of creative paralysis. Each model – whether experimental or final, lends itself to a prosaic understanding or revelation of the design, where piece by piece, through dint of sheer effort, the hands themselves coax the project to life. This act of model building and exploration has lead to an intimate understanding of space more delicate than one at a distance of the mouse or keyboard.

It is a wonder to watch the ways in which people move through space and interact with a building, and upon entering the Master of Architecture program, I knew my interest was in the act of moving to experience architecture and that I was eager to explore that through model-making. What initially began as a small project to construct a 'wearable landscape', transformed into an obsession in design research to generate new architecture. I returned to my initial interest in dress, but flipped the question. How could architecture resemble dress? What would that do for the body? What would a seam, or a pleat, or a tuck do for the contours of forming space?

There are certain garments that can pierce space and time. They themselves are ineffable and indescribable, filling a new dimension of imagination we didn't previously know was possible. *Body meets Space. Space becomes Dress.* is a cumulation of uncountable hours and the beginning of a continuing investigation to a cross-disciplinary way of making and marking space. I hope that it may initiate a conversation of ways to render a most imaginative artery of forming and creating architecture.

Firstly, thank you to my supervisor, John Cirka, for sharing his limitless knowledge and time throughout this past year. I am incredibly grateful for his unwavering commitment to my work (despite the messiness of plaster dust seemingly ingrained in our meetings) and persistent challenges to unveil the possibilities in developing a soft architecture.

I would like to express my gratitude to my second reader Vis Sankrithi and committee member Arthur Wrigglesworth, not only for their commitment and insights this year, but for being instrumental throughout my architectural education.

A tremendous thank you to Emilija for lending and trusting me with her sewing machine. These explorations would not have been possible without it.

From the beginning I have been incredibly fortunate to have had the support of friends and family who have been enthusiastic and encouraging. To them, thank you for everything.

To my family.

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Introduction

It is possible to propose a new process that, as a necessary condition of creating architecture, we begin with the expression of the body, rather than the first authorial role be a traditional one that yields traditional, predictable, and perhaps unimaginative outcomes. Utilizing other processes, here, dressology, to uncover a new architecture has these concerns:

1. Deny function as legitimizing meaning within the form. A considerable thought in this is not requiring the body to do, but to *be*. This then asks, 'what legitimizes meaning?', how does one know when one arrives at a successful condition?

2. Extracting formal tropic/figurative/metaphorical conditions of the other process found in dressology to conceive of a new architectural space.

3. What is an envelope? How do we envelope the body?

This is where dressology enters the conversation. The discipline of design, organizing, and constructing garments will be described as dressology, and its prevailing studies and theories surrounding it. Outcomes of dressology are containers for the physiological body, and are most often understood as standardized clothing for generic fit, ready-to-wear lines, or even haute couture, a bespoke, custom made product to fit one person specific to their dimensions. However, dressology is a discipline that seeks to understand the body; its movement through space, the identity one wants to project, and most importantly, how to fit and form around the physiological body by creating an envelopement.

Figure 04. ***Philip Johnson, Jose M Bosch House***
Figure 05. ***Dior Wedding Dress***

Figure06

section one

body meets space.

Figure 07

1. An Interstitial Zone

Language surrounding the processes of traditional architectural design has used what can be called on/off procedures, describing or designing projects and choosing between two alternatives, such as solid/void, figure/ground, open/closed, etc.[1] This creates an opposition, where parts can only be one or the other, creating articulations that prevent the possibility in which the two conditions may possibly be embedded within one another.

Binary dualities dissolve in the concept of interstitiality; the dichotomy of body and building begin as a reference point for the thesis, and evolve into a loose, indefinite blurring of architecture, dress, and the non-physical, non-tangible area between entities or boundaries. This in-between space reveals itself as an aesthetic sensibility, an unsettling zone of visual ambiguity and elusiveness, engendering and effectuating an art of the in-between. Liminality proposes that the work is balanced and exists on all sides of the boundaries.

The interstice between dressology and architecture provides a site not only of meaningful connection and coexistance, but also of innovation and transformation for both practices; the middle zone can operate as a new entity, made equally of the individual disciplines, with a slow, mixed gradient of properties belonging to dressology and architecture on either end.

Figure 06. ***Adwoa Aboah by Emma Summerton, Vogue Spain April 2017***

Figure 07. ***Gradient of light, Georgian Bay***

1.1 The Design Brief: Achieving a Soft Architecture

We experience buildings through our physiological body and extended senses in imginative ways. Often, we move unchanged by the architecture around us, but sometimes it becomes difficult to describe a space that affects us emotionally. In part, it is this ineffable quality of spatial experience that the design object seeks to explore and achieve through the interstice of dressology and architecture. By using techniques and theory archetypical to dressology, and applying it to those of architecture, design research explorations conceive of a soft architecture: a new operative middle zone that challenges the conventional interpretations of how to design for the body moving through space.

In a soft architecture, the edges of the enveloping boundary create loose enclosures, with their edges not always determinate or definite, blurring one space into another. Concentrating on questioning how to envelope the physiological body, and what an envelope is itself, soft architecture creates a new ecophysiology of how the physiological body responds to and maintains a relationship to its immediate enveloping environment, and vice versa.

Notes: Chapter One

Eisenman, Peter. "Processes of the Interstitial: Notes on Zaera-Polo's idea of the Machine". *Deleuze and Guattari on Architecture: Critical Assments in Architecture*. Edited by Graham Livesey. (New York, NY: Routeledge. 2015), 178.

Figure 08. *A: Fabric Formwork: Gathering, B. Fabric Formwork: an entrance*

"Architecture starts as marking place, and then proceeds from there to elaborate that place and what it consists of into form. It is the weaving together of disparate pieces to create shelter, or the molding and stacking of fluid materials into something solid and enclosing.

As humans make these shelters, patterns appear. They are not applied or extraneous, as is ornament on temples, but rather they come out of the order of the materials themselves, leading to geometries and layers of colors that are more complex. Instead of structural hierarchy, the desire to make a fitting enclosure leads forms to stretch, bend, curve, expand, and contract. Rhythms appear out of materials and use."[1]

Aaron Betsky, *Architecture Matters*

2.0 Interpretations of Space

2.1 Spatial Envelopes

There is a snail in your garden. A soft body contained beneath a hard, protective shell closely linked to her body and emotions, mediating her relationship with the outside world. This calcareous housing shelters the snail from despair and discomfort, damage and dehydration, supporting the creatures muscular body, growing with her all of her life[2]. Yet even more so, this envelope transforms the ways she moves through the world, interpreting the environment around her, and how she understands her surroundings through perceptual touch.

Envelope (noun)

1. *A covering or constraining structure or layer.*
2. *To enclose. Provide shelter to or living quarters; provide space for.*[3]

As we move our physiological bodies to experience architecture, we do so by extending our kinaesthetic sense perception beyond our limiting physical bodies, recognizing the relationship we have to objects we can see, and forces we can feel. Envelopes have the power to enhance our experience of space or suppress the sensations that come from it. What we choose to cover ourselves with filters what the body feels and has the autonomy to create a unique and intimate dialogue between body and environment, narrating a distinct, unwavering position between a poetic dimension of subjective perception and reality.

In traditional building design, envelopes are often understood as hard boundaries, extruded lines to create a tangible surface, separating the flow of circulations in silos and limiting containers. But what if boundaries were rather regions of negotiation and symbiotic zones where two very different subjects meet and blur to provide what one alone cannot: a rainbow edge where the liminal and ineffable comes into being. In this thesis, the architecture is in the envelope; investigating a most basic and near primal element to produce space, questioning, ‘How do we envelope the body?’, and, ‘What is an envelope?’.

Figure 09.A

Figure 09.B

2.2 Defining Spatial Conditions

Envelop (verb)

1. To enclose or enfold completely with or as if with a covering [4]

Architecture is about the organization and circulation of things: people, air, light, temperature, noise, etc. Space is ever forming, shifting, and shaping their relationship to and around us; a lubricant that defines the movement and flow of these things, linking one to another, combining and compounding them together, so much that our act of moving is fundamentally an exchange — as we move through architecture, it moves us: it is a merging of space and self. Maurice Merleau-Ponty's, "I settle in the place, and the place settles in me"[5] synthesizes a distinct space [place] and self, providing a philosophy that offers a fertile conceptual ground for the understanding of artistic, architectural, and existential phenomena.

Space* in this thesis is distinct, charged with substantial meaning, and loose in its extending boundary; to envelope space marks a distinct place surrounding the body; from there, it extends, develops, and defines itself into form. This is reinforced by an essential existential connection between space and the human condition, the world and the mind. Martin Heigegger brought attention to the unity between the acts of building, dwelling, and thinking. He links space indivisibly with the human condition: "When we speak of man and space, it sounds as though man stood on one side, space on the other. Yet space is not something that faces man. It is neither an external object nor an inner experience. It is not that there are men, and over and above them space..."[6].

By defining space, the envelope and ways to envelope space is better understood, designed, and elaborated.

Figure 09. ***A. & B. Adwoa Aboah by Emma Summerton, Vogue Spain April 2017***

*Index note: space is often understood as a vast, open, unmarked and indefinite, whereas place is distinct

Notes: Chapter Two

1. Betsky, Aaron. *Architecture Matters*. (New York: Thames & Hudson, 2017), 41.
2. G. Alan Solem. Gastropod. https://www.britannica.com/animal/gastropod
3. English Oxford Dictionary. "Envelope". https://en.oxforddictionaries.com/definition/envelope
4. Webster's Dictionary. "Envelops." https://www.merriam-webster.com/dictionary/envelops
5. Merleau-Ponty, Maurice. *Sense and Non-Sense*. Translated by Hubert L. Dreyfus & Patricia Allen Dreyfus. (Evanston: Northwestern University Press, 1964), XII.
6. Heidegger, Martin. "Building Dwelling Thinking". *Martin Heidegger: Basic Writings*. Edited by David Farrell Krell, (London: Harper & Row, 1997), 334.

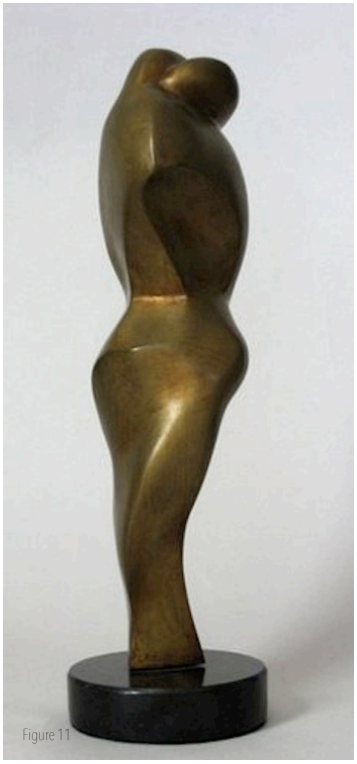
Figure 10. ***Pair of images of Lucinda Childs, Solo of Dance***

Figure 11. ***The Hug, by Lillian R. Engel***

3.0 The Body

The language surrounding the body in this thesis concerns the physiological and perceptual body; it is the physical structure of a human, inclusive of their non-physical structure of senses, emotions, and imagination. The role of the physiological body is to serve as reference, recognizing that space is external to it; architecture and environment is separate from the physiological body.

Figure 10



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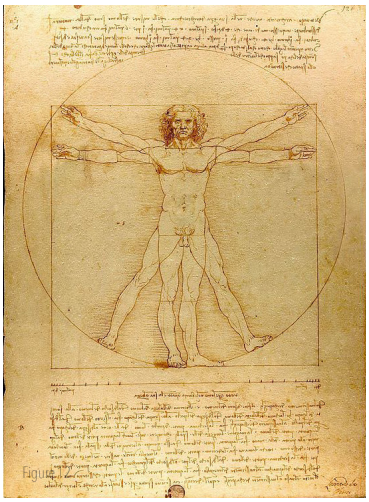

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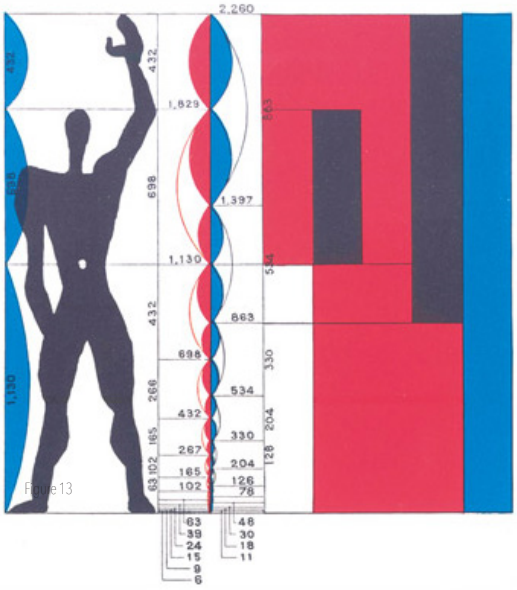

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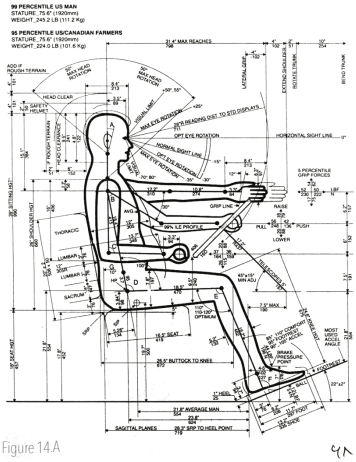


Figure 14.A

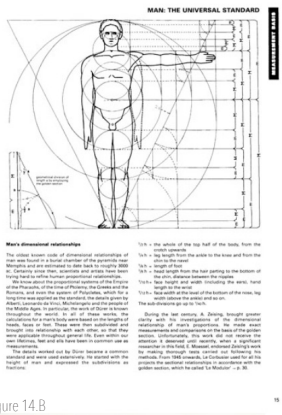


Figure 14.B

Figure 14.C

Figure 12. *The Vitruvian Man by Leonardo da Vinci*

Figure 13. *Le Corbusier's Modulor*

Figure 14. *Excerpts from "Architect's Data": A: "Measurements of the 95th percentile of the American Man", page 13. B: "Man: The Universal Standard", page 15. C: "Dimensions and Space requirements", page 16.*

3.1 A Traditional Role

The role of the physiological body in current and traditional architectural process is primarily for reference of dimensional comfort and to derive function. In the earliest records, the architectural body was first introduced as a system of organization in the humanist tradition and found within Vitruvius' foundational texts. The proportions of "the well shaped man", or male human body was a natural and divine system of ordering around which the building was organized.[1] The Vitruvian man presented geometrical proof of the perfect coherence conferred by symmetry, and it was only his canonic proportions that could produce the circle and the square, becoming the template for the precise, symmetrical building that Greek and Roman temples used as a precedent.[2]

Later during Le Corbusier's development of Modernism, he developed another ideal man, or, 'Modulor', a diagram of ideal anthropomorphic proportions derived from an essential mathematics[3]. It came out of attempts to extend the mathematical proportions in the human body and use that knowledge to improve the appearance and function of architecture, in hopes that architects "would find it relatively simple to produce forms that were both commodious and delightful and would find it more difficult to produce displeasing or impractical forms"[4]. Modernists in this period dealt more directly with the scale of the body, originating from an empirical standard. The image shows the average height of the English man [1.828 m][5], then divided into three proportions based on the golden section and Fibonacci sequence, creating a range of harmonious measurements to suit the human scale. Of the works leading to the creation of the Modulor, Robin Evans notes that the female body "was only belatedly considered and rejected as a source of proportional harmony"[6].

Following Le Corbusier's dissemination of the Modulor, German Architect Ernst Neufert conceived of the book, '*Architect's Data*', an illustrated taxonomy of standardized anthropomorphic measurements, intended to provide architects and designers an informed framework of designing buildings and objects. This extended from Bauhaus rationalism that, like Corbusier, used the golden section as a standard, but rather than to extend ideal proportions of the body to the scaled proportions of buildings, Neufert rationalized the body into discrete measurements stating what can be designed for, around, and with. Here, the body is no longer present in the proportional values of a temple, but in appropriate and exact dimensions for the width of hallways, doors and spatial clearances, railings, and less concretely, specific accommodations for social interactions and domestic activities. It is a functional mechanism. Corbusier and Neufert's investigations fail to recognize bodies that deviate from functional standards. While their inquiry in creating a standardization may serve the European man they were derived from, they are unsuccessful in accommodating a population diverse in size due to gender, race (where geographic differences maintain vastly different measurements), the great variety in physiological shape and form, and lastly, that the body is not static - it moves through space and shapes space around it.

Figure 15

Figure 16

3.2 The Flesh of Buildings

In '*The Inhabitable Flesh of Architecture*', Marcos Cruz examines the role of the body, or more particularly, *flesh*, in architecture. His text proposes flesh, borrowing the term from Merleau-Ponty's '*Flesh of the World*', as a concept derives form the meaning of skin as an architectural metaphor, yet is deeper than the thin and flat surface that it is normally understood as.[7]

To initiate his argument, Cruz compiles a taxonomy of different body conceptions, identifying how the relationship of the body to its environment and architecture has changed throughout the course of Western history. Viewing how the body is depicted in differing artworks or books, and comparing it to how the body is related to architecture intends to compile these different bodily images to better comprehend the contemporary conditions and understanding of the body. Cruz outlines five significantly different conceptions of the physiological body found throughout history in subjects of art, science, and philosophy.

3.2.1 The Classical Body

The catalogue begins with the Classical Body (BCE to around 500 AD); which is described as a body of beauty, one with classical proportions, demonstrating strength and equilibrium[8]. While Cruz's taxonomy follows a mostly anthropocentric ontology, the Classic Body is the only form that could arguably also have a theocentric position due to its roots in Greek and Roman history where statues reflected many Gods or myths, such as Hermes. The Classical body was harmonic in that it "relied on predetermined aesthetic parameters built upon rules of geometry and proportion"[9]. References for this period were literally showcased on buildings in ancient Greece and Rome, where postures of statues demonstrated the human strength and equilibrium, grace and beauty.

Figure 15. ***Statue of David, Michelangelo, 1501 - 1504. Galleria dell'Accademia, Firenze Italy***

Figure 16. ***The Erechtheum, Ancient Greece, 421 BC***

*Index note: The text goes on to explore a thick, embodied flesh of architecture and inhabitable interfaces and the impact that digital technologies have on projects. There is a more biological investigation and scaled-up analogies that come from his design project, which are described as 'Synthetic Neoplasms', creations which are partially living entities and partially mechanically designed objects, blurring the line between artificial and natural.

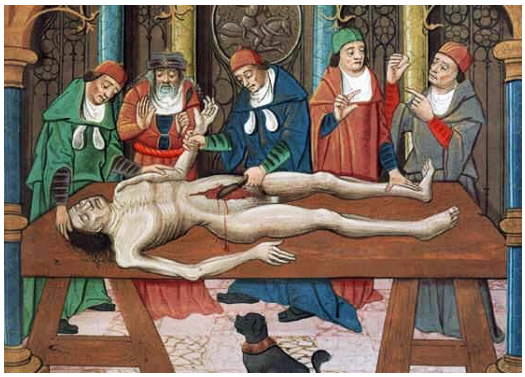


Figure 17

Figure 18

Figure 19

Figure 20

Figure 17. *Dissection of a cadaver, Mondino de Luzzi, 1315.*

Figure 18. *Worm exiting the skin of Saint Roch (Anonymous painter, Pinacoteca di Bari, Italy. Tempera on canvas; 15th-16th Century).*

Figure 19. *William Cowper, Myotomia Reforma: or An anatomical treatise on the muscles of the human body, published 1724.*

Figure 20. *Peter Paul Rubens, The Three Graces, 1639. Museo del Prado, Madrid.*

3.2.2 The Grotesque Body

Following the Classical Body, Cruz jumps to the Middle Ages and the Medieval Era (500 AD to 1399), where, the senses were introduced. "Rather than a visual body, [the Grotesque Body] was a body of touch and hearing in as much as its perceptual field relied most of all on a culture of 'oral-chirographic' media."[10]

There was a fascination with the protuberances, depressions, and openings that could occur on any part of the body, and the liquids that exited them. The body was mysterious, as there was not much known or understood about the medical sciences of anatomy, and so the medieval body was one of porous and permeable space in which the border between interior and exterior was exposed to processes of metamorphosis and mutation, which in turn led to polymorphous, grotesque imagery found in artworks and architecture. Where dangers once only existed outside of the body, the mystery of the inner workings of the body was a dangerous and unknown territory. Ugliness and beauty were understood differently in the Grotesque Body than they are today. The monstrous and disgusting imagery was what attracted society to revel the body as marvellous and fantastic.[11]

3.2.3 The Bourgeois Body

Later, in the late Renaissance and Baroque periods (from 1400 to 1850), the Bourgeois Body emerged, and with it an evolved sense of perception and visual dominance. At the same time, developments surrounding science and anatomy introduced a new scientific model. The Bourgeois Body came to be understood as machine like — in line with the new laws of mechanics, kinetics, and anatomical medicine with surgical explorations, along with a new culture of hygiene, and cleanliness[12].

The previous Grotesque Body transformed into a new body of aestheticism; there was a new significance on both visual beauty and health; cleanliness regulated the dirty inner flesh to in turn manage a clean and virtuous skin. There was a conceptual shift from flesh to skin, which placed value on the surface, thinness, and delicacy. Interpretation of skin changes — blushing, rashes, and expressions or behaviour formalities were perceived as new emotions and intelligences of the inner body reflecting on the outer skin.

Aesthetic reforms of the body were reflected in culture and society, with a heightened sense of civilization. The perception of beautiful skin had repercussions on how architecture came to be perceived. The importance of sanitization and health of the body, cleanliness was mirrored in the dwelling. The construction of homes and hospitals and their interaction with bodies were seen to be environments that were not mutually exclusive, and could potentially produce diseases; the dirtiness of one may affect the other.

The Borgeouis Body timeline includes the Industrial Revolution, which initiated the transformation of urban cities into manufacturing and industrial centres. Suddenly, factories, railways, and new infrastructure radically changed social and family life. The massive urbanization displaced rural communities into a polluted city centre. With hyper dense housing situations; people moved into the city faster than appropriate housing could be constructed and often resulted in overcrowded slums with limited clean water and sanitation. Despite Cruz's claim of cleanliness in the body reflected in architecture, diseases and mortality rates were high in these places.

Figure 21

Figure 22

Figure 23

Figure 24

3.2.4 The Modern Body

A new reading of the body was shaped by a whole set of socio-political and demographic circumstances affecting modern urban life. "More than having a coherent image, this body was expressed through a new social ordering that later lead to a variety of styles and attributes".[13] Perhaps the Modern Body (1851 to 1980) signified the most notable change; the presentation of the physiological body in art became abstracted and interpreted in new ways rather than presented realistically, contrasting that of the Renaissance and Baroque periods. There was a search for a new identity.

The transition from the Bourgeois Body to the Modern Body in the early twentieth century saw radical changes in urban development that resulted in the social alienation of the urban inhabitant and estrangement of the body from the machine, architecture, and urban surrounding.[14] With the heightened visual aestheticism of the Modern Body, Georg Simmel spoke about the growing fear of touch, and a growing anxiety towards the future of mechanical and technological progression.

As psychology developed in this time period, so did an understanding of certain anxiety disorders, such as Agoraphobiais in which you fear and avoid open places or situations that might cause you to panic and make you feel trapped, helpless or embarrassed.[15] Anthony Vidler portrays these phobias as essentially psycho-spatial diseases. Modern architecture and the International Style are often 'sterile, clean, undisrupted spaces', often depicted with a lack of activity. The body began to become dependant on the machine.

3.2.5 The Cyborgian Body

Also considered the 'Post-Human Body', the Cyborgian Body follows the Second World War with a new exploratory interest in creating man-machine hybrids, a constructed blur between natural and artificial, with embodied intelligences. "At a time when 'intelligence' is becoming virtually embedded everywhere, the Post-Human Body turns out to be, above all, a networked organism that is strongly influenced by locations where knowledge and actions are sensed, controlled, and transferred."[16]

Figure 21. *Pablo Picasso, Les Demoiselles d'Avignon, 1907. Museum of Modern Art, New York*

Figure 22. *Le Corbusier, Chandigarh College of Architecture, 1961. Chandigarh, India.*

Figure 23. *Sterlac, Third Hand, 1980.*

Figure 24. *Philip Beesley, Epiphyte Chamber, 2013, Museum of Modern and Contemporary Art, Seoul*

The Cyborgian Body may sometimes include a virtual realm blended into physical skin; artists such as Stelarc, whose work imagines a body that it no longer tied to its skin, so much that the removal of skin as a meaningful surface signifies an expanded self, merging with the world.[17] There is no more intimacy in touch, but is rather replaced with haptic media in virtual technology; touch commands and directs a digital reaction. In visual arts like film, especially science fiction genres, the Cyborgian Body is often rendered monstrously, reviving imagery found in the Grotesque Body era, a fascination with perverting and distorting flesh. Mutations, deformations, and bionic configurations once again become the resources and aesthetic for artistic value, such as in Figure 23, while other art forms display and exploit only parts of the body, showing some of the most private fragments of anatomy in objectified or blatant ways.

Donna Haraway describes the Cyborgian Body as the Post-Human Body, and in her text '*Cyborg Manifesto*', she simply describes the concept of the cyborg as a "cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction."[18] In this, there is a rejection of rigid boundaries, so that there is no separation between human and machine, human and animal, natural and artificial, male and female, etc. creating a new existential condition where there is an unstable identity.

Projects in the resulting form of the Cyborgian Body in current practice reveal the building as a cybernetic organism that responds to physiological bodies moving through them; the body literally merges with its surroundings. For example, Philip Beesley's work (Figure 24 & 25), whose installations respond to the audience's presence, heat, breathing, and movements.

Figure 25. *Philip Beesley, Sentient Chamber, 2015, Cultural Programs of the National Academy of Sciences, Washington, D.C*

Figure 25

Figure 26.A

Figure 26.B

3.3 The Soft Body

In addition to Cruz's catalogue of bodies, there comes the current body; the Soft body. At once, the Soft body is composed of three selves; a physical self which follows Cruz's taxonomy, but in addition, a perceptual self and a virtual self.

The physical self is defined physiologically in its own specificity. It sits anthropomorphically as a physical object, with measurements that are derived from its particular body rather than predetermined. Without extrapolating information from a matrix and the Golden Section, these measurements create a harmonious whole based on beauty in differentiation. These measurements are not only height, width, and lengths of limbs, but active dimensions and measurements used in dress-making.

Yet there is a move away from the physiological view of the body, one that extends beyond the physical limitations of the corporeal skin and into the perceptual self: energies that surround the physical body. The perceptual self may be described as the interstitial moment that exists between the physical body and the environment outside of it, moderating invisible forces, and bringing an awareness of one's presence in time and space.

In the Soft Body, the physical and perceptual self are not separated but together are one entity. Often, we perceive our skin to be the limiting boundary between where our physiological bodies end and the external environment begins. Our selves do not exist on the opposite side of the flesh. The danger in seeing our physiological body as a container with a strict boundary creates a discontinuity between ourselves and surroundings. Rather, the body extends outwards in multiple layers of behaviours and energies, with the gaze that reads and feels various surfaces, textures, and spatial depths, identifying the experience as pleasant or disagreeable. "Even as the eye touches; the gaze implies an unconscious touch, bodily mimesis and identification."[19] The perceptual self is enriched by dreams and memories, conceiving of spatial experiences from the past and future, although not all feelings and memories are stored in the brain and nervous system, but in muscles and organs too, determining and facilitating movement.

Figure 26. *A. Irving Penn, Nude 57. B. Irving Penn, Nude 67. The Metropolitan Museum of Art, New York*

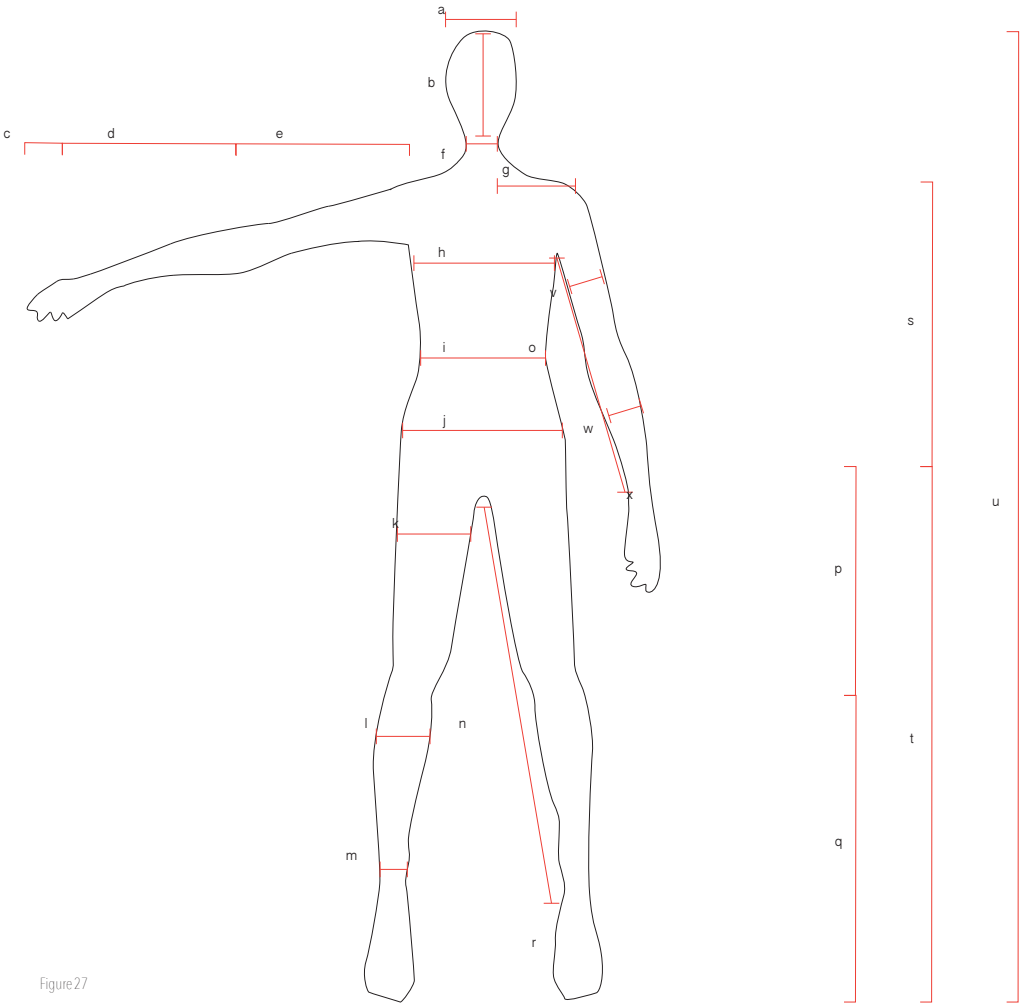


Figure 27

Measurements

all in mm

a	head circumference	54.5
b	forehead - chin	21.7
c	hand	19.2
d	forearm	25.5
e	upperarm	33.5
f	neck circumference	31.1
g	neck - shoulder	14.5
h	bust	78.1
i	waist	64
j	hip	87.3
k	thigh	53.5

l	shin	35.5
m	ankle	25.3
n	leg inseam	78.5
o	arm inseam	55.5
p	hip - knee	53.5
q	knee - ankle	44.5
r	foot	25
s	shoulder - hip	57.6
t	hip - ankle	98
u	total height	1778
v	bicep	24
w	tricep	23.4
x	wrist	14.3

The Soft Body is contextualized by its immediate personal environment that can pull, interchange, and work within a changing physiology that expands into different material boundaries. These boundaries may be physical or imaginary and energy based, yielding questions of, “how do I move within this space?’, ‘how does this space move me in return?’

Our body is an active region of negotiation with the environment, and the sensory systems of the body are that which negotiate the relationships and experiences of the inner workings of the Soft Body, conceiving of softness in varying ways, with such indicators as depth, smoothness, rigidity, intimacy, balance or tension.

The Soft Body is in constant dialogue with its world — forming, shifting, and shaping in response. Bruno Labour recalls a premise made by Vinciane Desperet, describing that “to have a body is to learn to be affected, meaning, ‘effectuated’, moved, put into motion by other entities, humans or non human.”[20] If the body is not learning to be effectuated continuously, then the body becomes dead.[19] The Soft Body is ever forming and being formed, learning to be affected according to the world around it, so that ways of knowing the world require a body that interacts and connects to create differences and discriminations.

Learning to be effectuated also resonates in the muscles of the physiological body. Before the Neufert 'orders' and Le Corbusier’s diagram of the Modulor, "primitive man used his own body as the dimensioning and proportioning system of constructions."[22] By building to his own body specificity, movements, and needs, the essential knowledge and skill "was stored in his muscular and tactile senses […] incorporating the sequence of movements refined by tradition, not through words of theory."[23] Memories and feelings are not always stored in the nervous system and brain, but also in the muscles and organs. Rene Descartes asserts that there is no division between mind and body; we think through our body, learning to make decisions and take action.[24]

Figure 27. *Diagram of specific body measurements*

The last part of the Soft Body is the Virtual Self, which refers to one's 'Data body'. There is a corporeal detachment from the physical social life to the online internet society. It pushes for a liberation of the contained physiological self, discarding the regulations or limiting manipulations and exploitations that may normally apply to it. Like the Perceptual Self, it does not have the weight nor density of a physical body, and is not conditioned by particular laws. The Virtual Self allows the physiological body to extend into a new sensory apparatus: the internet, and therefore a new sensory reality: artificial and virtual realities. One can physically exist in one world, but feel as though one is experiencing something else, so much that the body is no longer tied to its skin. New forms of power can be exercised with a new totalitarian potential of the data body rendering it a deeply problematic phenomenon.[25]

Certainly, the Soft body finds value in all five categories of Cruz's taxonomy. From the Classical Body: the value is in harmony and balance of physiological proportions; the Grotesque Body: that it is a body of touch and has a permeable boundary, blurring inside and out; the Bourgeois Body: an understanding of anatomy, inner flesh expressed on the exterior, and sense perception; the Modern Body: learning from a variety of styles and attributes; and lastly, the Cyborg Body: embedded intelligences, that it is a networked organism, and a new blurring of dualities. Perhaps the most influential historical period for the Soft Body is the Baroque era, which coincides with the Bourgeois Body. The Baroque period, from approximately the early 17th century to the late 18th century, valued contrast, movement, and exaggeration in detail and grandeur in architecture to achieve a heightened sense of emotion, as well as illusion to perplex an audience. Movement and an interest in reactionary emotion are particular to the Soft Body.

Where Cruz's anthropocentric taxonomy of bodies seemed to understand the physiological self and the understanding of the inner workings of the anatomical body, the Soft Body seeks to further itself and understand the layers extending outwards into the environment. Inhabitation is not just understood as physical, but also a phenomenological and even virtual act, experienced through different selves.

Figure 28. *Various body types of Olympic Athletes in Howard Schatz's book, Athlete*

Figure 28

Notes: Chapter Three

1. Vitruvius. *Vitruvius: The Ten Books on Architecture.* Translated by Morris Hicky Morgan. (New York, N.Y. Dover Publications, 1960).
2. Kagis McEwan, Indra. *Vitruvius: Writing the Body of Architecture.* (Cambridge: MIT Press, 2003), 197.
3. Le Corbusier. *Modulor: A Harmonious Measure to the Human Scale and Universally Applicable to Architecture and Mechanics.* (London: Faber and Faber. 1961), 46.
4. Ostwald, Michael J. *The Modulor and Modulor 2 by Le Corbusier (Charles Edouard Jeanneret), 2 Volumes.* Nexus Network Journal 3. (Basel: Birkhäuser, 2000), 145.
5. Le Corbusier, *Modulor*, 56.
6. Ostwald, *The Modulor and Modulor 2 by Le Corbusier (Charles Edouard Jeanneret), 2 Volumes,* 56.
7. Cruz, Marcos. *The Inhabitable Flesh of Architecture.* (Surrey: Ashgate Publishing, 2013), 5.
8. Cruz, *The Inhabitable Flesh of Architecture,* 10
9. Cruz, *The Inhabitable Flesh of Architecture,* 10
10. Cruz, *The Inhabitable Flesh of Architecture,* 11
11. Cruz, *The Inhabitable Flesh of Architecture,* 11
12. Cruz, *The Inhabitable Flesh of Architecture,* 12
13. Cruz, *The Inhabitable Flesh of Architecture,* 16
14. Cruz, *The Inhabitable Flesh of Architecture,* 16
15. Mayo-Clinic: Diseases and Conditions. *Agoraphobia.* https://www.mayoclinic.org/diseases-conditions/agoraphobia/symptoms-causes/syc-20355987
16. Cruz, *The Inhabitable Flesh of Architecture,* 18
17. Cruz, *The Inhabitable Flesh of Architecture,* 20
18. Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century". *Simians, Cyborgs and Women: The Reinvention of Nature*, 149-181. (New York: Routledge, 1991), 150.
19. Pallasmaa, Juhani. *The Eyes of the Skin: Architecture and the Senses.* (Chichester: John Wiley & Sons Inc, 2014), 17.
20. Latour, Bruno. *How to Talk About the Body?.* The Normative Dimension of Science Studies. Body & Society. SAGE Publications. Vol 10 (2-3): 205-229. (2004), 205.
21. Latour, *How to Talk About the Body?*, 205
22. Pallasmaa, *The Eyes of the Skin: Architecture and the Senses,* 60.
23. Pallasmaa, *The Eyes of the Skin: Architecture and the Senses,* 60.
24. Descartes, Rene. *Principles of Philosophy*. Translated by John Veitch. (Blackmask Online, 2002) P 10.
25. *The Virtual Body and Data Body.* http://world-information.org/wio/infostructure/100437611761/100438659695. Retrieved January 22, 2018.

Figure 29

section two

space becomes dress.

Figure 30

Figure 31

4.0 On Dressology

To address this thesis' questions of 'what is an envelope?', and, 'how to envelope?', the world of dressology enters the conversation. The discipline of designing, organizing, and constructing garments for the human body will be described as dressology or dress throughout this thesis, and its prevailing studies and theories surrounding it. Outcomes of dressology are envelopes for the body, and are most often understood as garments, or standardized clothing for generic fit, consumed in mass for uniform, everyday wear. Other extensions of dressology manifest in ready-to-wear lines, or even haute couture, a bespoke, custom made product to fit one person specific to their dimensions. Dressology is a discipline that seeks to understand the body; its movement throughout space, the identity one wants to project, and most importantly, how to fit and form around the physiological body by creating an envelopment.

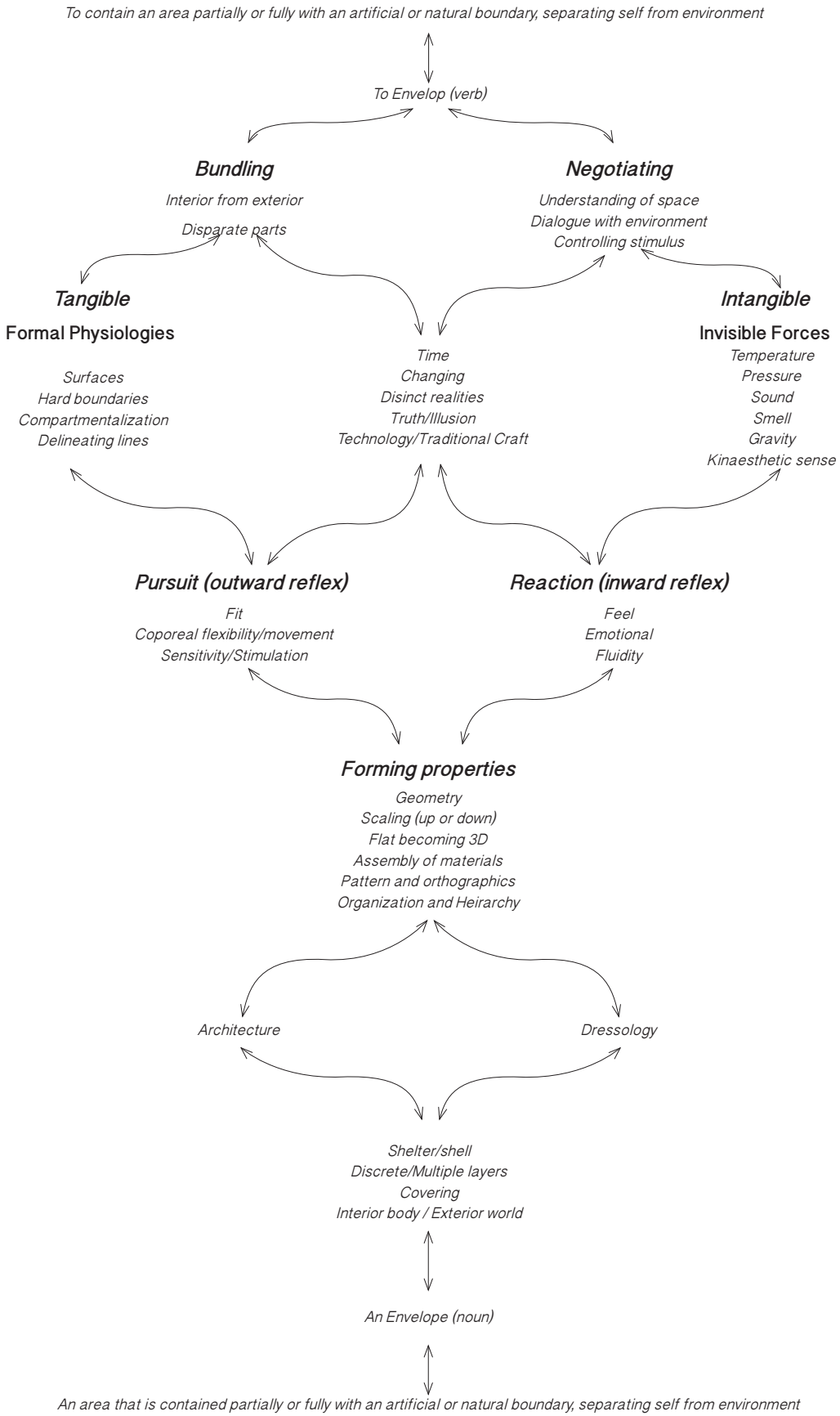
This is not about fashion; dressology evinces itself into tangible material products. It is a discipline of organization and thought, just in the way that architecture as a discipline manifests itself in buildings and projects. Fashion is a symbolic cultural product, a popular trend that may rise to the peak of desire and dissipate just as quickly, even defined as a manner of doing or fabricating something. When we think about dress and dresology, it is to understand the body being enveloped, moving through and taking up space, organizing the world around it and the happenings beneath. The construction of dress should be taken as seriously as architecture in terms of its abstract formal qualities, symbolic content, and technical intelligence.[1]

For Peter Eisinmen, to legitimize an architecture, choosing an outside agent, almost a 'deus ex machina'[2], which here is dressology, allows the blurring of the relationships between form and function, meaning and aesthetic, to enter into the realm of Deleuze and Guattari's idea of the machinic: where architectural form is not subordinate to function or laws of resemblance and utility, and that architecture emerges into an ontological plurality, new processes and possibilities for architecture.[3]

Figure 29. *Sanaa, Factory Building, Vitra Campus, Weil am Rhein, Germany, 2013*

Figure 30. *Gérard Grandval, Les Choux de Créteil, Paris, 1966-1974*

Figure 31. *Rianne von Rompaey in editorial by Richard Bush for Document Journal, September 2014*


To contain an area partially or fully with an artificial or natural boundary, separating self from environment
To Envelop (verb)
Bundling
Interior from exterior
Disparate parts
Negotiating
Understanding of space
Dialogue with environment
Controlling stimulus
Tangible
Formal Physiologies
Surfaces
Hard boundaries
Compartmentalization
Delineating lines
Time
Changing
Disinct realities
Truth/Illusion
Technology/Traditional Craft
Intangible
Invisible Forces
Temperature
Pressure
Sound
Smell
Gravity
Kinaesthetic sense
Pursuit (outward reflex)
Fit
Coporeal flexibility/movement
Sensitivity/Stimulation
Reaction (inward reflex)
Feel
Emotional
Fluidity
Forming properties
Geometry
Scaling (up or down)
Flat becoming 3D
Assembly of materials
Pattern and orthographics
Organization and Heirarchy
Architecture
Dressology
Shelter/shell
Discrete/Multiple layers
Covering
Interior body / Exterior world
An Envelope (noun)
An area that is contained partially or fully with an artificial or natural boundary, separating self from environment

4.1 The Essence of Envelop(e)-(ing)

> "The building envelope is possibly the oldest and most primitive architectural element. It materializes the separation of the inside and outside, natural and artificial and it demarcates private property and land ownership (one of the most primitive political acts). When it becomes a façade, the envelope operates also as a representational device in addition to its crucial environmental and territorial roles. The building envelope forms the border, the frontier, the edge, the enclosure and the joint: it is loaded with political content… The envelope is the surface and its attachments."[4]
>
> *Alejandro Zaera Polo, The Politics of the Envelope, A Political Critique of Materialism.*

In dressology, the concept and construction of an envelope is derived from a human body, contouring and moulding directly to one's physical self. It is in this envelope where we assert ourselves through: our social identity, comfort, perhaps political and economical expression, etc. The envelope is a tactile, tangible object that we choose to wrap ourselves in for protection, projection, and expression of self, allowing the body to stretch, swell, expand, contract, or relax. This could also be said of architecture as an envelope; as envelopes shelter the body in the most intimate matter, they extend the body into the outside world, mediating the experience and sensations of the relationship to surroundings and the body's immediate environment.

The diagram on the facing page is a representation of moving from the careful thought of an envelope as a noun, and what it is, to questioning it as a verb. The chart works in both directions, moving back and forth between noun and verb, through questions of how to form around the body — how formal physiologies are crafted, and how the senses are engaged, how the envelopes exist in single or multiple layers, and the hierarchy in which they are organized, showing the parallel of dressology and architecture as vehicles of the same investigation.

Table 01. *"From 'To envelop' (verb) to 'an envelope' (noun): A visual diagram to outline the flow of information of how to create, or what defines the terms. The diagram flows in both directions.*

Figure 32

4.2 Envelope Epithets: Clothing and Housing

Marshall McLuhan states that 'clothing and housing are near twins'[5]. Suffixed on this proposition is how to keep in heat and energy. A new approach to seeing clothing and housing as near twins is to understand them as envelopes, a cover that protect the body from the harsh realities that surround it. However, they can also serve to express the body's activity, exaggerating or hiding its mutations, finding appropriate time, space, and position for the body to truly feel. The envelope is a boundary line, containing space in discrete bundles, defining what is public and private, inside and out.

> *Georg Simmel recounts Adolf Loos on his explanation of the exterior of the house in the same terms that he writes about fashion... [he] seems to establish a radical difference between interior and exterior, which reflects the split between the intimate and the social life of the metropolitan being: outside, the realm of exchange, money, and masks; inside, the realm of the inalienable, the nonexchangeable, and the unspeakable. Moreover, the split between inside and outside, between senses and sight, is gender-loaded. The exterior of the house, Loos writes, should resemble a dinner jacket, a male mask; as the unified self, protected by a seamless facade, the exterior is masculine. The interior is the scene of sexuality and reproduction, all the things that would divide the subject in the outside world.*[6]

'Clothing is an extension of our skin'[7], Mcluhan also states. It is a dynamic envelope that extends the body's form and movement out into the world, perhaps limiting sensations and information passing from the body beneath the envelope, to the world outside. Without the structure of the body beneath it, dress lies flat, lacking three dimensional spatial qualities. The body animates dress and keeps it alive, just as people using and moving through buildings keep them alive.

Figure 32. ***To envelope/ an envelope. Diagram***

4.3 Dressology, in Detail

Dressology, is its primary position, is the ways in which we conceive an envelope of dress for the body, that not only concerns itself with the aestheticisation of the body, but also concerns itself with fit, contour, shaping and moulding directly to one's physical self. It is within clothing that we assert our physical selves* and mark our identity, of who and what we align ourselves with. Garments are tactile, tangible objects that we choose to envelope ourselves in for protection, projection, and expression of self.

The design process of dressology is a display of scientific and mathematical strategies to configure and create envelopes for the body. It begins with studying the body, finding form through the draping of fabrics and textiles, to be later cut, graded, and stitched together. The annotations on the flat two dimensional fabric alludes to the future body that will one day wear it; axes of symmetry, gridlines, baste lines, facing lines, fabric direction, stitch line and type, seam allowance, placement of interfacings, placement of yoke or pleats, selvage allowance, where to lengthen or shorten, and indicates whether the tailor should cut the pattern with the fabric facing up or down. The garment emerges from mathematical specificity, with numerical values associated with the human form for which it is conceived. Couturiers are even further sculptors of the body and its spatial occupation, finding technical solutions to masterfully construct pieces that seem to defy physics and enter into an indelible, enchanting world, despite their often heavy weight.

*Index note: Nakedness, in the Western civilized world, is not a "socially acceptable" option, and often feared, resulting in embarrassment.

4.4 Dressology and Architecture / Clothing and Buildings

Dress and architecture have been compared before. For centuries fashion and architecture have been linked, always markers of class and wealth. Those graced with privilege, taste, education and affluence had access to the most desirable clothing available, and spaces to live in. Haute Couture was only worn by the social elite. Castles, cathedrals, and other cultural buildings were only accessible physically to a certain class, both affirming a hierarchy in society — even in supposedly neutral realms such as universities. Only those with a mastery of the code with which to decipher a work of art or architecture could make the successful transition to the cultural aristocracy. The work of architecture as an avant-garde art object serves, like a couture design, as a marker of difference, making visible the patron's membership in the cultural elite.[8]

In 1924, Walter Gropius published "*Wonhaus-Industrie*" (Housing - Industry), arguing that architecture should follow the standardization of clothing, both in construction with modular pieces, and with dissemination of ideas across the world.[9] Perhaps architecture could look to clothing's means of mass production to espouse unification, regularity, and sameness, suppressing unnecessary individuality so that there is an efficiency in manufacturing. This was in part due to fashion trends, which continue to emerge, respond to, and propel some of the biggest movements in cultural society, charging immediate reaction and change in return; it constitutes and constructs the identity of the contemporary, transforming the ongoing present. Because it changes so closely with the identities in time, it is perhaps one of the most important aspects of study in the formation of identity: clothing is the most immediate presentation of who we are. What we wear and what clothing we choose to consume categorizes into the culture we choose to participate in, and as such is essential to our definition of self. The Modern Movement in architecture relied on many of the same impulses of identity shaping as the fashion industry did in promoting trends. Modern architecture's absorption into culture was dependant on an individual's concerns — both unconscious and conscious — about pubic appearance.[10]

Charles Wilhelm Meredith Van de Velde posited that "a dress should be thought of as a building, whose basic structures should remain visible and be articulated by the ornamental surfaces added to it, whose own construction should remain visible".[11] A man's suit, for instance is nearly immutable over the last few centuries, unmistakable as a model of social distinction and layering of organization.

The following sub-chapters uncover comparisons between clothing and building throughout history.

4.4.1 Private Powers

> "Monumentality... always embodies and imposes a clearly intelligible message. It says what it wants to say – yet it hides a good deal more: being political, military, and ultimately fascist in character, monumental buildings mask the will to power and the arbitrariness of power beneath signs and surfaces which claim to express collective will and collective thought." [12]
>
> *Henri Lefebvre, The Production of Space*

Henri Lefebvre characterizes monumental space as "determined by what may take place there, and consequently by what may not take place there".[13] While this may immediately call upon images of massive government buildings, those that are nationalistic, statuesque and bellicose, this type of space may be exemplified in a single garment: the Islamic veil. A veil, or chador and hijab, in Islamic culture is a large, loose covering of the body to enable or disable a woman from her dealings and interactions with men. It essentially describes an extended boundary or skin, that assures that she always occupies a private space away from the gaze of forbidden eyes. This envelope is architecture, a shadow and screen swept around her body; it is a black tent that absorbs light, and implies a multiplicity of meanings and inscriptions, it is a negation of space; a a black hole that is saturated with intention, memory, and meaning. [14]

It is also an example of a monumental architecture, an identifying mark of a strong political position about boundaries of space, the social practice of separation, and extension, or the lack thereof, of the body into its surrounding environment. Just as Lefebvre outlines conditions for monumental space, the hijab also generates a spatial code based on moral, familial and sexual relations, implicating which activities and event may or may not take place on either side of the covering. Mahram and namahram indicate who and what is allowed. Mahram, is an immediate or intimate family member who the woman is not allowed to marry, but is permitted to appear unveiled around; while Naharam refers to all others, in which the woman must observe hijab.[15] While the hijab may be the physical representation of an envelope, it is the moral code that structures the concept of who is allowed to be present in a space, those who are forbidden, and that the power of the envelope and space, is in the wearer.

Figure 33. *Alfred Yaghobzadeh, Iranian Women in Black Chador, 1980*

Figure 34. *Women in Chador*

Figure 33

Figure 34

4.4.2 Pornament is Crime

Pornament is a term that refers to the array of naked human figures decorating architecture in positions of eroticism, flirtation, shame, boredom, apathy, etc. Particularly predominant on buildings designed and constructed in Europe during the Rococo and late Baroque periods, where bodies were intertwined with the architectural surface. These periods are synonymous with pornament, in where Alina Payne suggests that:

> *...an increasingly integrated wall corporality took place; Figures started inhabiting walls and facades in which the architectural details belong to the sculpture in the same way that the geometry of the bodies placed along pyramids and diagonals suggest that they belong to architecture.* [16]

In a way, architecture looked to the body for creative inspiration, but not in the context of the body meeting space but rather with figural ornaments becoming architectural motifs inhabiting the architecture.

Adolf Loos' famous proposition that 'Ornament is Crime' is an homage to modernist architecture pronouncing that its evolution must renounce decoration and eliminate ornament. And in the 20th century, buildings themselves became naked; modernism stripped architecture, baring structure as the new ornament, the new, preferred body. Where architecture once hosted naked bodies, it itself was now nude, lacking an essential covering.

Figure 35. *Naturhistorisches Museum at nightfall, Vienna, Austria*

Figure 36. *Palace of Versailles, France*

Figure 37. *Unknown building in Vienna*

Figure 35

Figure 36

Figure 37

4.4.3 Veils and Masks

What are normatively costume components become metaphors for building facades. Each, as extensions of textile underpinnings, respond to the question of 'how to envelope?', differently through ways to build upon the surface and skin to transform the interior atmosphere, spatial possibilities, and outward form.

Veils convey a sense of concealment but are not an opaque shroud, operating in a way that the body or building beneath is exposed and vulnerable. The veil acts and reacts to the structure beneath it, often having little decision in its final form, disclosing its interior and truth unbrashedly, only hiding through its impermeability. A mask, however, is a covering, guarding the body with a layer of opacity, operating as a protective shell. This cover transforms the body beneath it by providing an image that replaces the original with a new one. It has a structure. It maintains shape and form and geometry that are distinct from the body beneath, disallowing visual access to the happenings on the other side.

These two examples relate to a text by Eric L'Hereux titled "*Deep Veils*", featuring different building projects that respond to questions of envelope, surface, skin, form, atmosphere, and perception; and they define in various ways how a deep veil in architecture may manifest itself. In simple terms, a deep veil is a screen transformed into a thickened spatial envelope and enclosure that merges optical, sensorial, and atmospheric qualities through interface.[17]

The exterior envelope has the power to transform the activities within. Where the veil reveals but implies seduction, softness, curiosity, oscillating between truth and deceit; the mask is hard and ambiguous, performing on behalf of the body. Each separate interior and exterior into discrete parts, yet a "deep veil, [however] is a spatial and material concept for modulating... view, structure, and experience through layered and thickened surfaces"[18]. At once closed and open, manifesting a new relationship with the body, creating an operable third environment between interior and exterior.

Figure 38. ***A, Example of Thin Veil: OMA, Seattle Public Library, Seattle Washington, 2004, Photograph by Philippe Ruault , and B, a Mask: Ministry of Government and Consumer Service of Ontario, Toronto, Ontario, Jack Landau***

Figure 39. ***Vladimir Ossipoff, IBM Building, Honolulu, Hawaii, 1962***

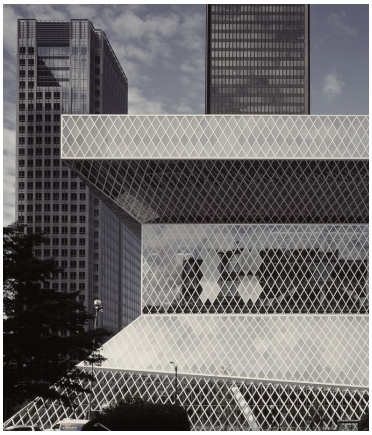


Figure 38.A

Figure 38.B

Figure 39

4.4.4 Archigram's Suitaloon & Cushicle

The Cushicle (1964) and Suitaloon (1967) were conceptual design projects by Micheal Webb of Archigram. Cuchicle, a mobile structure composed of a chassis with appliances and personalized apparatus that fit within an inflatable envelope — a sort of inhabitable bubble with the function of a home. It was envisioned as a future system for urban environments where individuals could plug themselves in anywhere, so that they may remain social beings. These personal enclosures were imagined to replace typical residential dwellings.[19]

The Suitaloon was a more complex wall surrounding the technologies of various apparatuses, and more fitted to the body. It was intended to be worn directly on the skin of a person as if the nervous system could simply plug into the covering. It was inspired by the space suit, in where all necessities of daily life could be carried on the body — it was clothing for living in.

Both are instances in which the functional building has been adapted to fit a personal body, becoming clothing itself with a list of amenities included in the form.

4.5 Clothing will not be Buildings. Buildings will not be Clothing.

The danger in adapting buildings and what is normally conceived of as spatial dimension to become clothing is the transition from one to another — if one instance is already established then there is function and form already inherent in the project (such as the transition from taking a mobile home to a wearable suit). This literal transformation does not consider the body and its extensions of kinaesthetic sense as a primary design application.

Rather, the ontology of dressology, based in materiality and technical construction for fitting the body, offers generative conceptual grounds for inventing new ways to conceive and create envelope.

Figure 40. *A, B, C: Archigram's Suitaloon & Cuchicle.*

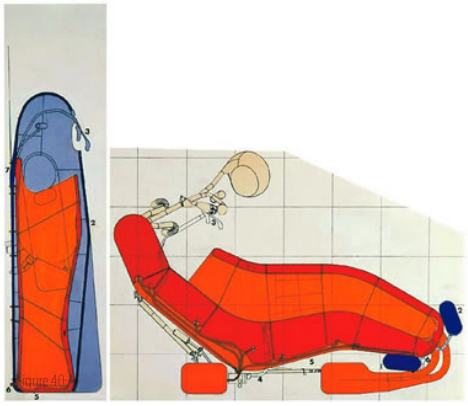


Figure 40. A

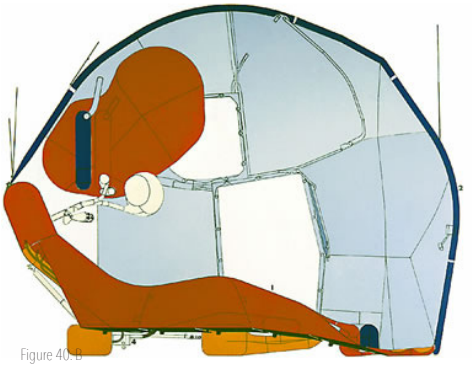


Figure 40. B

Figure 40. C

Notes: Chapter Four

1. Hollander, Anne. *Seeing Through Clothes.* (New York, NY: Viking Press. 1978), Xiii.
2. Eisenman, Peter. "Processes of the Interstitial: Notes on Zaera-Polo's idea of the Machine". *Deleuze and Guattari on Architecture: Critical Assments in Architecture.* Edited by Graham Livesey. (New York, NY: Routeledge. 2015), 179.
3. Eisenman, "Processes of the Interstitial: Notes on Zaera-Polo's idea of the Machine". *Deleuze and Guattari on Architecture: Critical Assments in Architecture.* 178
4. Alejandro Zaera-Polo as quoted in L'Heureux, Eric. *Deep Veils.* (Novato, California: ORO Editions. 2014), 7.
5. McLuhan, Marshall. *Understanding Media: The Extension of Man.*(New York: McGraw-Hill, 1964), 163.
6. Wigley, Mark. *White Walls, Designer Dresses: The Fashioning of Modern Architecture.* (Cambridge: MIT Press. 1995), 91.
7. McLuhan, *Understanding Media, 168.*
8. Simitis, Matthew J. and Zeynep E. Celik. *Thresholds* vol. 22. (MIT Department of Architecture. 2007), 16.
9. Wigley, *White Walls, Designer Dresses 102.*
10. Wigley, *White Walls, Designer Dresses 124,*
11. Wigley, *White Walls, Designer Dresses 131.*
12. Lefebvre, Henri. *The Production of Space.* Translated by Donald Nicholson-Smith. (Cambridge: Blackwell. 1974), 143.
13. Lefebvre, *The Production of Space,* 224.
14. Simitis, *Thresholds,* 16.
15. "*Defining Those Who are Mahram*". https://www.al-islam.org/hijab-muslim-womens-dress-islamic-or-cultural-sayyid-muhammad-rizvi/common-questions-about-hijab-and#10-defining-those-who-are-mahram. Retrieved March 28, 2018.
16. Payne, Alina. "Reclining Bodies: Figural Ornament in Renaissance Architecture." *Body and Building.* Edited by R. Tavernor & G. Dodds. (Cambridge: MIT Press. 2002), 105.
17. L'Heureux, *Deep Veils*, 11.
18. L'Heureux, *Deep Veils*, 25.
19. Unknown Author. *The Cushicle and Suitaloon.* http://architecturewithoutarchitecture.blogspot.com/p/cushicle-and-suitaloon-were-conceptual.html

Figure 41

chapter five

forming, shifting, shaping

This chapter inquires into the constructional methods and production of dressology into garments, clothing, envelopes. Various systems of fabrication and composition native to drsesology are investigated in design research experiments to configure a symbiotic zone between dressology and architecture.

5.1 Geometry

5.1.1 Pattern

Most garment construction begins with a pattern: the template from which the parts of a garment are traced onto fabric before being cut out and assembled. They are essentially planar orthographic and construction drawings that indicate various lines to cut, fold, pleat, notch, etc., and outline diagrammatic instructions for assembly, with opportunities to lengthen or shorten certain details or alter the geometries for specific desired fit. Patterns are incredibly mathematical and technical, based on calculations to accommodate allowances for body measurements.

A sloper pattern (home sewing) or block pattern (industrial production) is a custom-fitted, basic pattern from which patterns for many different styles can be developed. The process of changing the size of a finished pattern is called grading.

5.1.2 Scaling up; Scaling down

> "(When I say) Alice is growing, I mean that she is taller than before. By the same token, she's also gotten smaller than she is not. Not at the same time of course; although it does happen concurrently. She is taller now, she was shorter then. All at once we will grow taller than before and make ourselves smaller than we've become)."
>
> *Gilles Deluze, Logic of Sense.* [1]

Figure 41. ***Architectural textile***

Pattern grading is the process of proportionally shrinking or enlarging a finished pattern to accommodate it to bodies of different sizes, while maintaining shape, fit, balance, and scale of style details. This is a mathematical and technical problem: specific rules and equations determine how patterns increase or decrease to create different sizes by extending seam lines to match specific body measurement. The resulting concept allows the singular original pattern to accommodate a number of body types, becoming more inclusive rather than discrete, becoming a factor of speciation — new formations in the evolution of a species — or here, garment.[2] Fabric type also influences pattern grading standards.

> *"Mysteriously, the speculative fiction I Must be Growing Small Again takes precisely the opposite stance: it undifferentiates the pattern into a continuum of varying sizes and shapes. The undifferentiated pattern is designed to expand and contract on demand, thus eliminating the need for individualized outfits of fixed scale and dimension. When, following a complex arrangement of secant folds, the pattern contracts, the extra material is 'pleated away' into the recesses of a thickened surface; when it expands, the uncleared material is brought back to the other surface.*
>
> *In, I Must be Growing Small Again, undifferentiation causes the boundary between pattern and garment, never a rigid one to begin with, to erode even further: one pattern becomes every garment; one pattern becomes every body."*[3]

This is an architectural concern, as architecture cannot physically shrink and swell on demand to match the differences of singular bodies, but perhaps there are other ways to allude to this concept. Pattern grading led to an experiment in identifying new typologies that could swell and contract with the body all at once, folding away extra space when not in use, as well as fabrication and formation methods to challenge a normally commercial construction that transforms into a specific manufactured end piece.

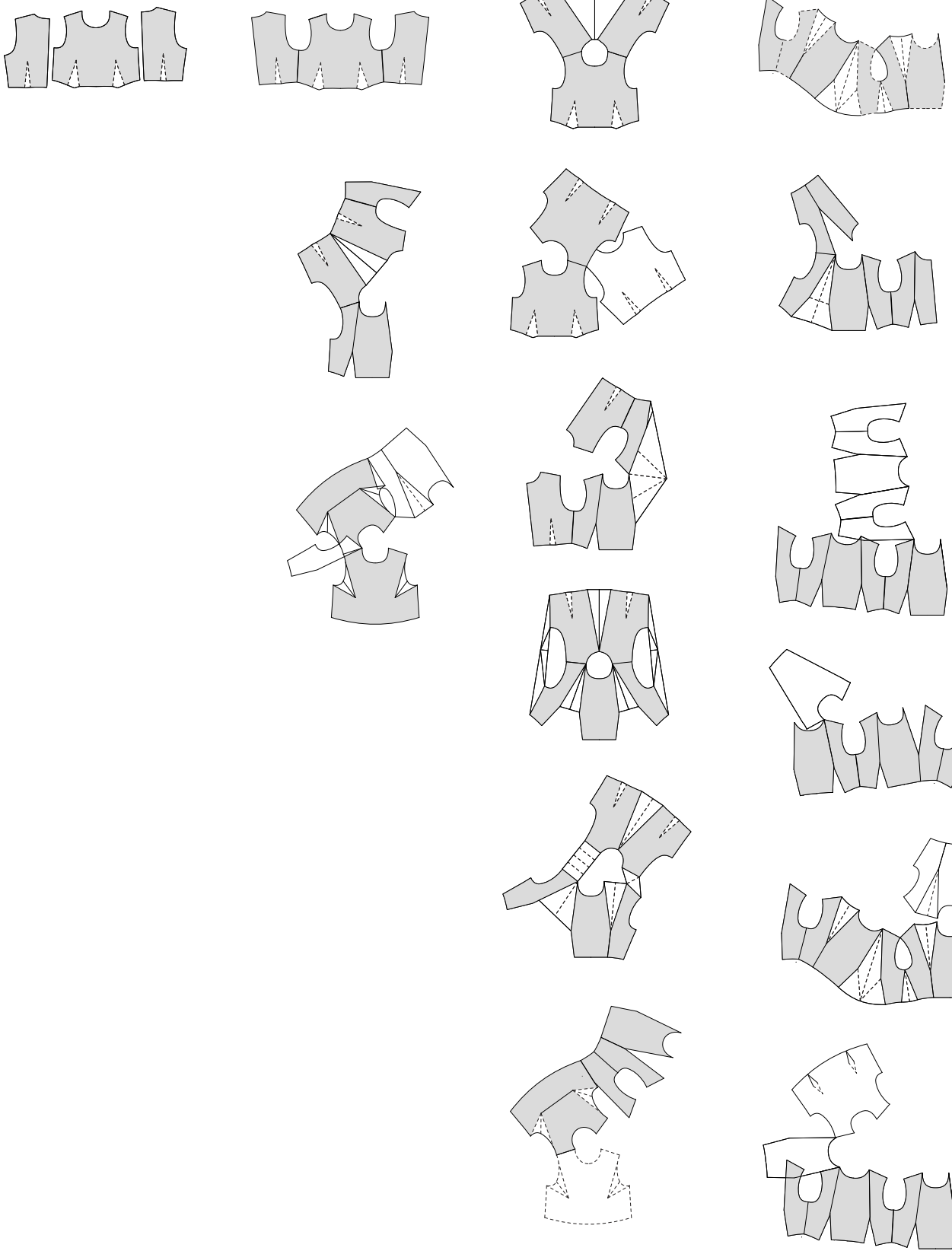
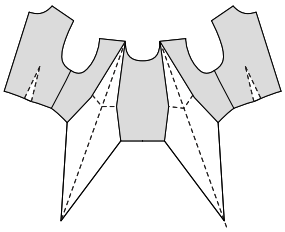
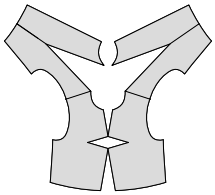
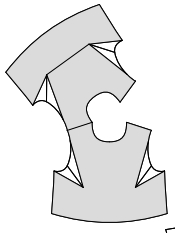
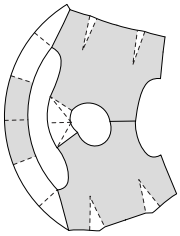
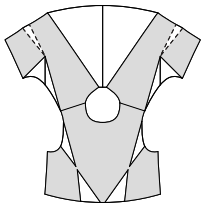
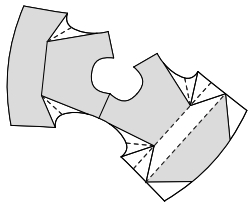
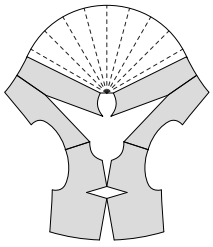
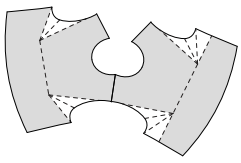
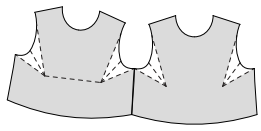
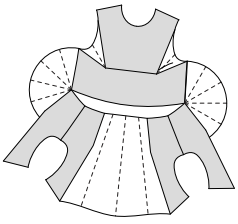
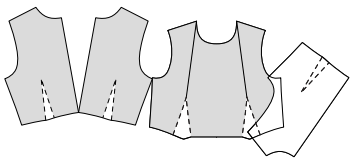
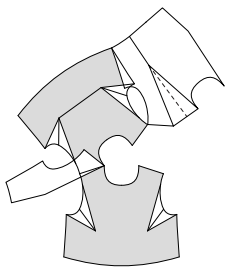
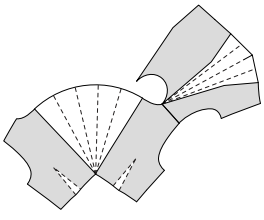
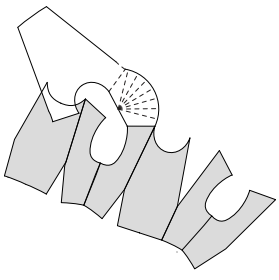
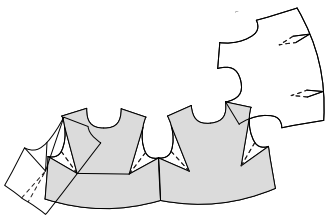
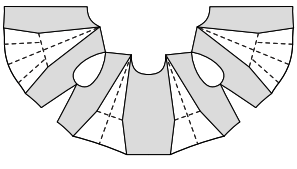
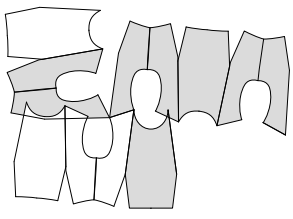
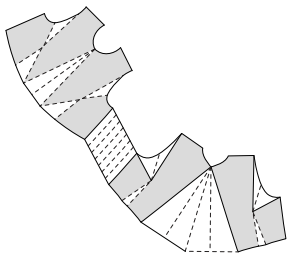


Figure 42

5.2 Design Research: Patternatosis

Moving from the two dimensional drawing to forming in three dimensions is a spatial act. This experiment began with the most basic pattern to create a top part of a clothing piece. Although simple and easy, this pattern provides a basis for more pattern drafting to be developed or for extravagant designs. This particular style was from a popular manufacturer, BurdaStyle, and had preset measurements that generated typical sizes for flat bodice blocks to be cut out and used.

By reorganizing the bodice patterns in various arrangements the experiment aimed to uncover new ways of forming flat surface typologies into three dimensional spaces.* The original sloper maintained proportional relationships from bust to waist circumference, or length of bodice, etc., but with the inclusion of new darts, folds, or seam lines, various spatial embodiments were produced. Other practices included lengthening or shortening certain parts, changing seam allowances, and connecting non-matching notches.

This began an iterative process to look for new ways a body could inhabit space and envelope, challenging how fit, unfit, or fitness of certain spatial arrangements could be achieved. Some productions ask the body to contort in uncomfortable ways, to shrink, or gave way to new breathing room.

Five selected patterns were printed onto bond paper (a common material used to design and determine patterns in garment design) at a scale of 1:2, and then assembled at their 'seams' using pins and tape. These assemblages investigated what kind of spaces these configurations would create at a larger scale, becoming more easily inhabitable. Seven patterns were made into full scale prototypes for the final defense presentation and are showcased in a later chapter. These iterations also evolved into the experiment in design research, 'Dissident Tailoring'.

Figure 42. ***Series of 23 Pattern Configurations. Digital Drawings***

Figure 43. ***A, Bodice for singular body. Digital Drawing. B, Series of 6 different configurations of inhabitation, canvas..***

Figure 44. ***Bodice for singular body. Digital Drawing. B, Series of 6 different configurations of inhabitation, canvas.***

Figure 45. ***Bodice for Multiple bodies. Digital Drawing. B, Series of 5 different configurations of inhabitation, canvas.***

*Index note: Gabrielle Printz is an artist and architectural researcher in New York. She once performed operations on different patterns to extract different realizations. I came upon her work after outlining the intentions of the design reserach and parts of her work are visually refrenced.

Singular Body

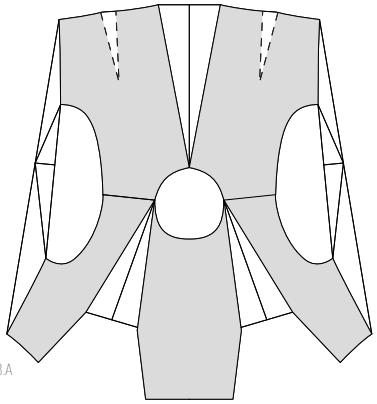


Figure 43.A

Figure 43.B

Singular Body

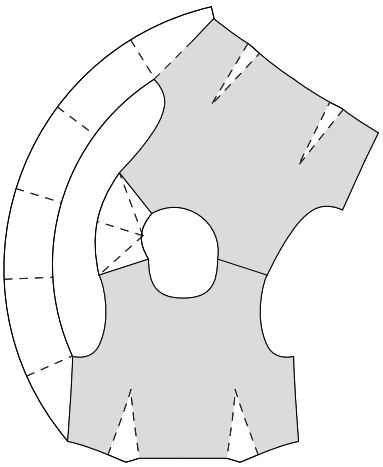


Figure 44.A

Figure 44.B

Multiple Bodies

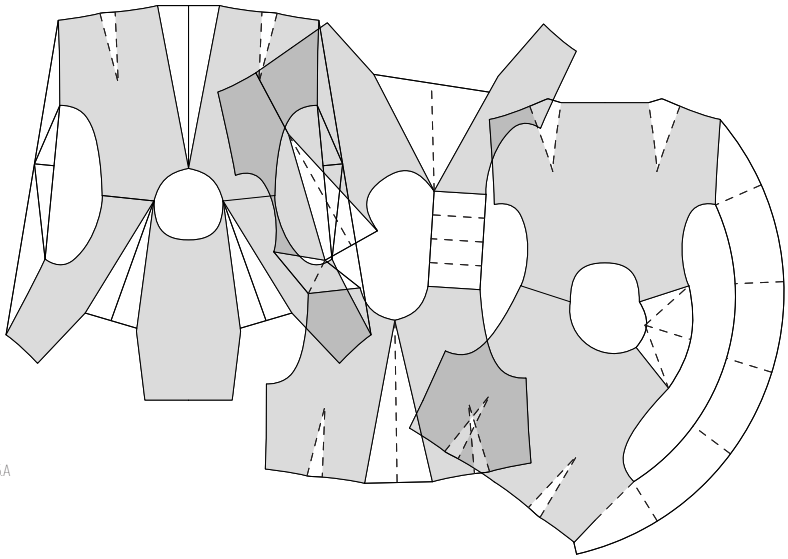


Figure 45.A

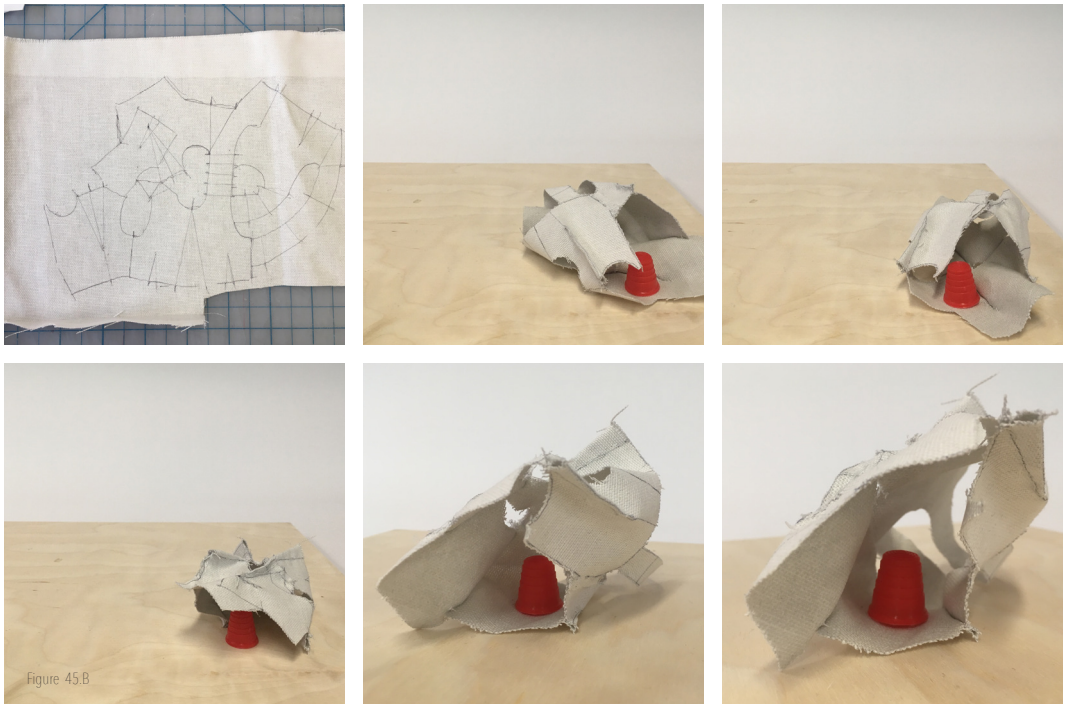


Figure 45.B

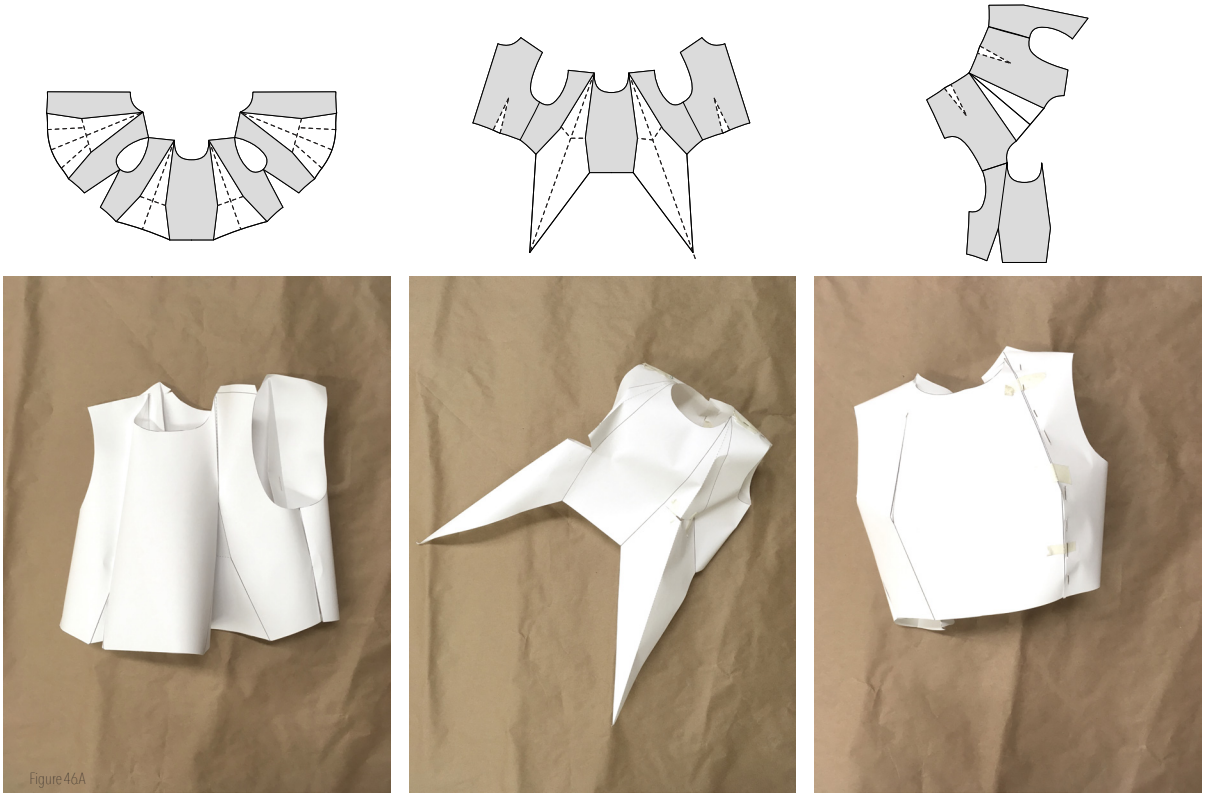


Figure 46. *(A) Series of 3 bodices for singular bodies assembled with bond paper: Scale: 1:2. (B) 2 Images of bodice for multiple bodies assembled with bond paper: Scale: 1:2*

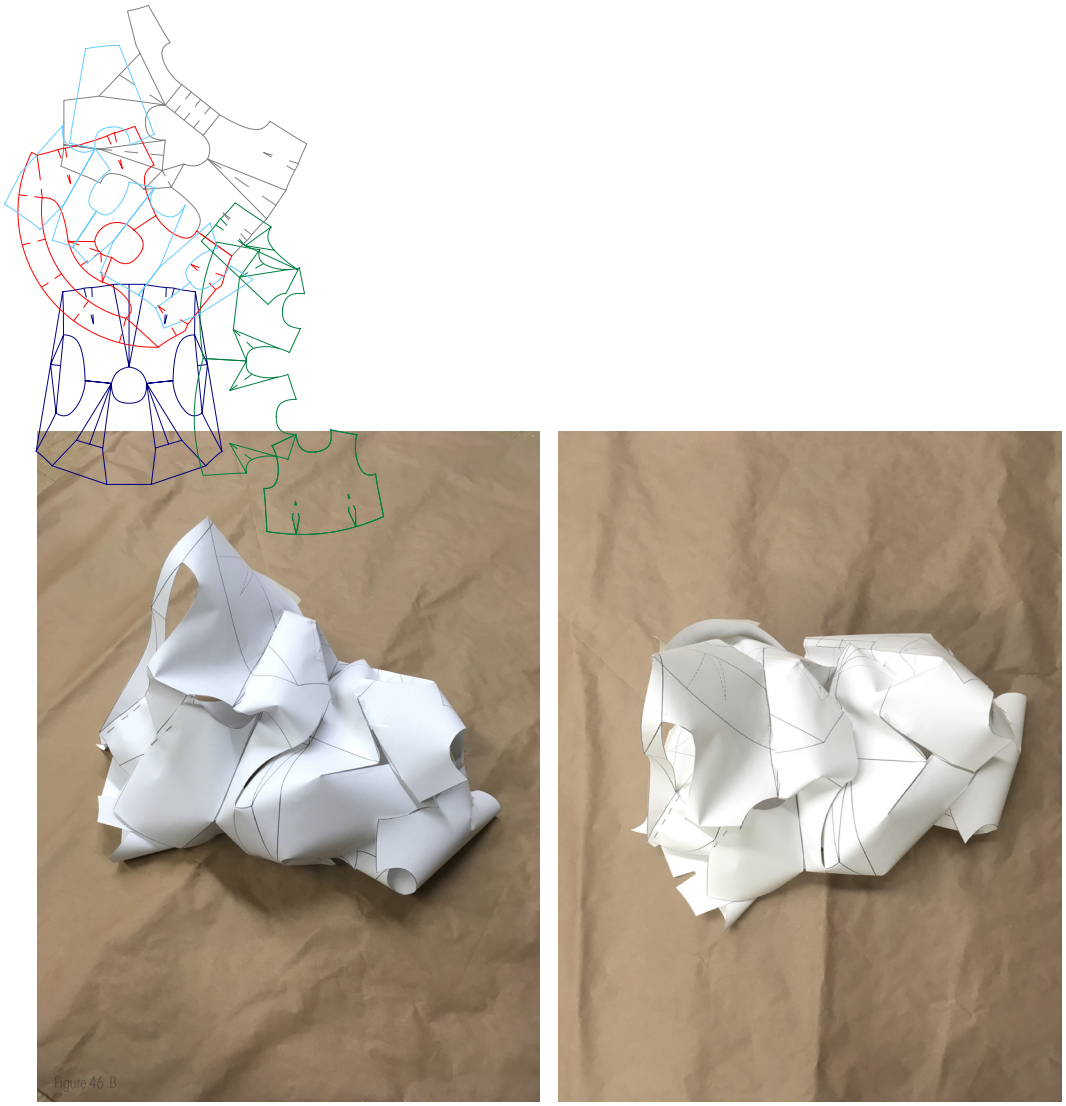


Figure 46_B

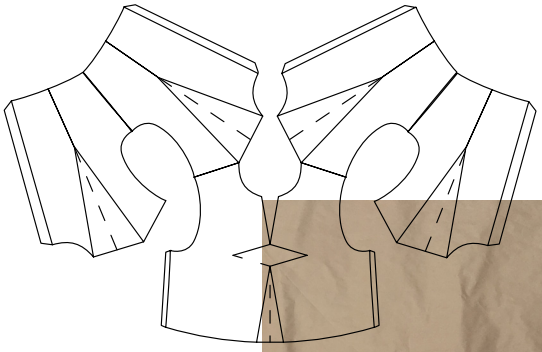



Figure 47.A


Figure 47.B

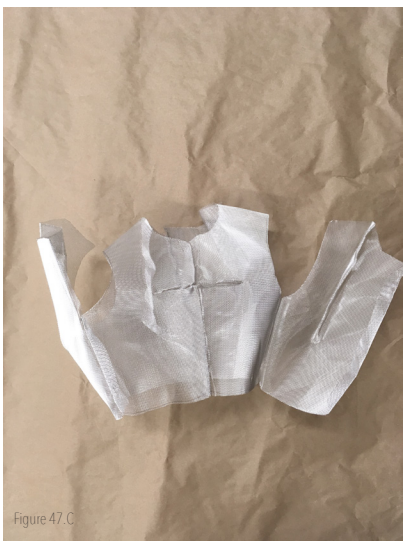


Figure 47.C

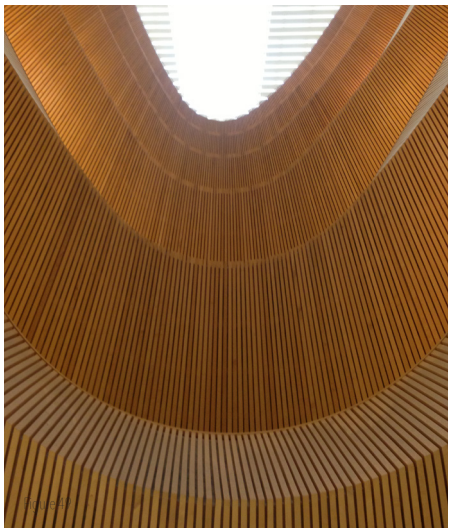

Figure 47.D

Figure 47. *A&B: Bodice pattern for singular body assembled with bond paper. Scale 1:2. Same bodice pattern for singular body assembled with wire mesh (C) and plastic (D). Scale 1:2*

Figure 48. *A: Pattern drawing for print reference ; B: Selection of bodices made at scale of 1:1 in muslin, corresponding pattern on trace paper behind.*

Figure 48.A

Figure 48.B




WRANGLER
MERECE LA PANA
o lo que es lo mismo, tu vaquero de pana merece ser Wrangler.
Wrangler
resiste si tú resistes

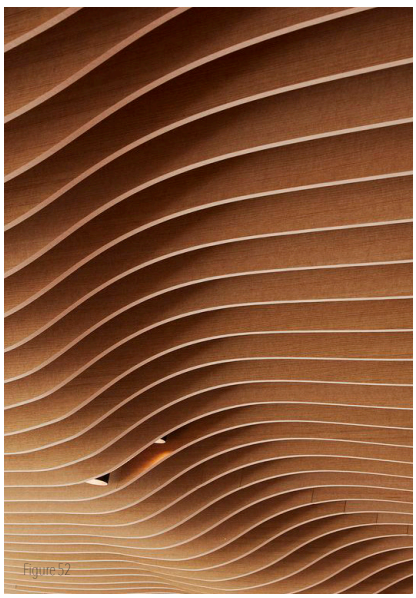


Figure 52

5.3 Repetition and Rhythm

Forms of clothing defined as elaborate or extravagant are actually composed of very straightforward things: folding, pleating, gathering, smocking, etc. They create very strong statements by the repetition of simple techniques, and when they come together, they become very volumetric and complex. The elegance and exaggeration is achieved by producing the maximum effect with a minimum of means.

Repetition can provide harmony or unity, unifying disparate parts into a whole, reinforcing a visual echo, or opposingly can be disorienting. This is largely dependant on the scale and organization of the elements. Both in architecture and in clothing, repetition and its rhythm refer to or provide an illusion of movement that may be regular or inconsistent.

5.3.1 Folding: Pleating, Smocking

"A pleat is a type of fold formed by doubling fabric back upon itself and securing it in place."[4] It is used to gather a wide piece of fabric to a narrower circumference. They are often pressed, meaning that they are treated with a heat-set or iron, to maintain a sharp crease , or left unpressed so that they fall in soft, rounded folds.

Figure 49. *Santiago Calatrava, University of Zurich Law Library, Zurich, Switzerland. 1989-2004*

Figure 50. *Issey Miyake, Pleats Please*

Figure 51. *Wrangler Campaign, 1978*

Figure 52. *Atmosphera Analog 3D acoustic system by Arktura*

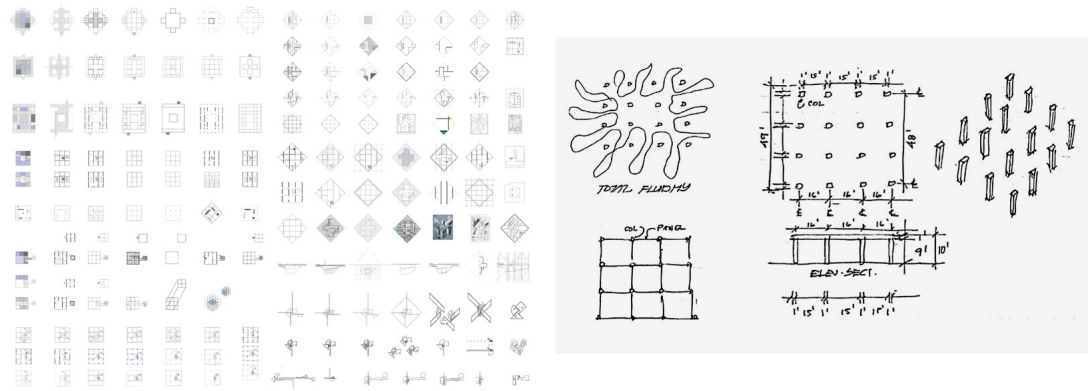


Figure 53

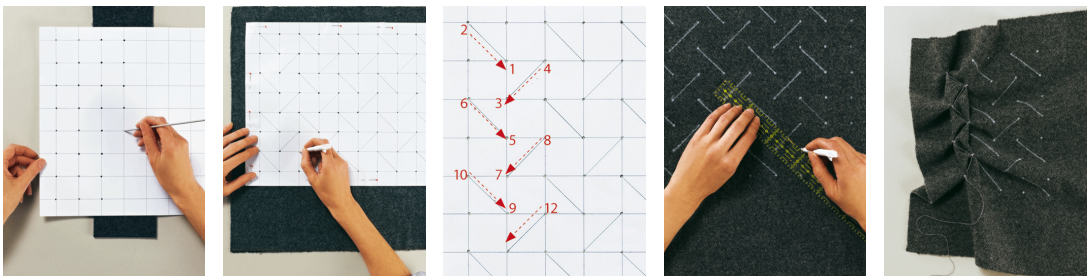


Figure 54

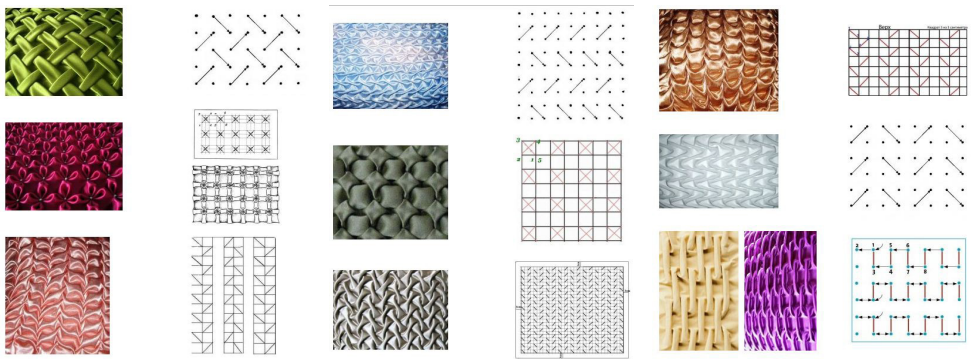


Figure 55

Figure 53. *A. John Hejduk drawing exercise. B.John Hejduk drawings, 9 square grid*

Figure 54. *Processes of smocking using grid*

Figure 55. *Different smocking types*

Fullness describes the thickness or depth of the pleats in relation to the width of the original fabric. If a piece was sewn at *zero fullness*, it would have no pleats and lie flat; fabric sewn at *100% fullness* is pleated so that it takes up exactly half as much width as it would if it were not pleated at all (i.e., 24 cm would be pleated down to 12 cm); if sewn at *150% fullness*, the unpleated fabric would be two and a half times wider than the final pleated piece (i.e., an unpleated 30 cm would end up as 12 pleated cm of fabric: 12+1.50(12)=30); if fullness were to be *50%*, the original fabric would be one and a half times the width of the pleated (i.e., 18 cm of width would end up as 12 pleated cm: 12+0.50(12)=18), etc.[5]

5.3.2 Grid Guidance

John Hejduk's investigation into grids and a theory of spatial relations resulted in his 9 square house; an exercise in architectural elements that was abstracted, intended to make compositional decisions focusing on spatial figures — whether physical or implied, with a series of walls. Spaces were not defined by complete and unambiguous enclosure but rather suggested by the correspondence of the edges of elements. The definition of space through inference encouraged minimal means for creating a spatial figure, and permitted the simultaneous definition of several interpenetrating spaces.[6]

Smocking is technique used to gather fabric from different points at varying degrees of tightness, so that it can stretch, being both fitted and flexible at one time.[7] Before elastic, smocking was commonly used in cuffs, bodices, and necklines in garments where buttons were undesirable. This work is done before the overall garment is assembled, and, like pleating, requires reducing the dimensions of the original fabric to a fraction. Most often, the pattern for smocking techniques begin with a grid, infilled with lines and dots to indicate corners of the grid to be gathered and connected to each other, producing a textural pattern, to be presented on the opposite side. One corner of the grid acts as an anchor while the others initiate depth.

The patterning of the smocking can be scaled up or down, with varying density, where this and the choice of stitch type, relates to the amount of flexibility available. Smocking and pleating produce a new texture on top of the existing fabric, with deeper expressions of shadows and exposure.

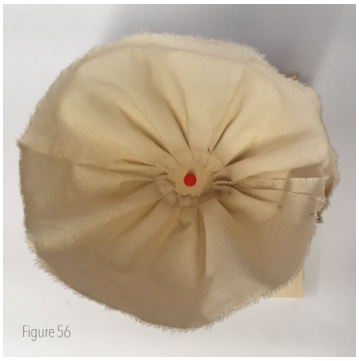
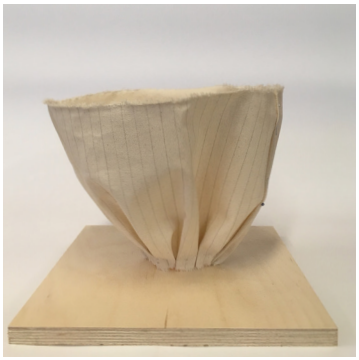


Figure 56



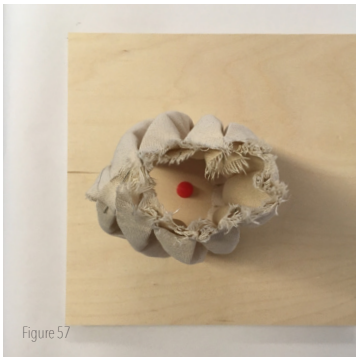


Figure 57

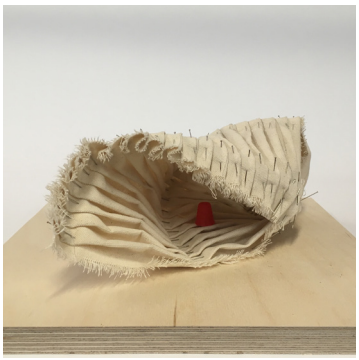


Figure 58

5.4 Design Research: Pleating a Third Dimension

In the pleating experiment, various pleat typologies were formed to create envelopes that formed simple rooms. The only requirement was that they provide an enclosure of space for the body within. Three variations were created using the same type of fabric (canvas) and the same dimensions for both overall material swatch and gridlines for pleat distances.

1. Using the box pleat technique, with only one edge in which the fabric gathered.
2. Using the box pleat technique, with two opposite edges in which the fabric gathered.
3. Using the knife pleat technique, connect the fabric at three points along the edge of the fold.

Once pleated, the three typologies had varying levels of flexibility to form a 'room', offering different occasions to let light in and shift or shape the body within. The creases, in the case of #3 were quite severe, but suggested an opportunity for the body to assume more positions rather than standing. For instance, depending on scale, a body could sit or lie down on one of the creases in #3, but not in #1.

Pleating and smocking immediately brings a two dimensional surface into a new three dimensional spatiality; the fabric in pleating begins to warp on the folded side, wrapping around itself suggesting enclosure. There is a dynamic shift from one scale to another — what begins as a flat sheet of a certain dimension, scales down to be much smaller, yet deeper in surface. If the pleating or smocking is anchored with an elastic thread, the fabric may oscillate between the two poles, swelling and contracting with the same amount of fabric.

Pleating and smocking comprise a new expression of light and shadow, clarity and mystery, a fluid geometry of space to be inhabited. Accordion pleats in particular, are the most magical; at its tapered beginning, the pleat is a precarious and tight enclosure, in the middle, an expanse of multidirectionality, and at the end, a loose zone that unfolds to a seeming infinity.[8]

Figure 56. ***Box pleat, one edge. 50% Fullness. Series of 3 views.***
Figure 57. ***Box pleat, attached at opposite edges. 50% Fullness. Series of 3 views.***
Figure 58. ***Knife pleat, connected at three points along surface. 50% Fullness. Series of 6 views.***

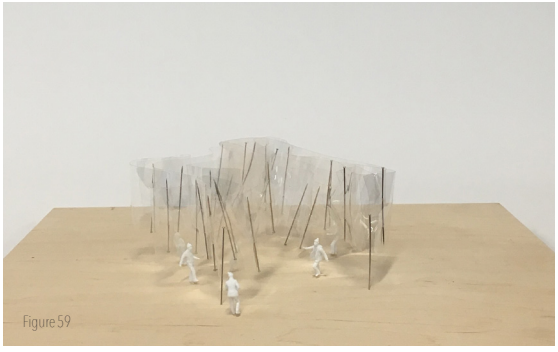


Figure 59

5.5 Material Vocabulary

Just as traditional building materials such as wood, metals, concrete, glass, etc. have their appropriate uses for building components, textiles have different uses and applications more appropriate or specific to them based on their genetic makeup.

Textile membranes are most often flexible and fluid, responding sensitively to the external forces being applied to them. Yet textiles extend far beyond the realm of garment design and serve so many different purposes in our lives. They can be incredibly utilitarian, such as furniture upholstery, toothbrush bristles, surgical fibres that gradually dissolve as wounds heal, even insulation in traditional buildings may contain glass textile fibre, or ornamental in what we normally conceive of as decoration. Yet this thesis concerns itself with the fabrics more closely related to garment design and construction; those that drape closest to the body. A quick introduction to types of fabrics will aid in the later decision-making of design research.

5.5.1 Fibre to Fabric: Woven Fabrics

The structure of a fabric is most often made of components. The fabric of garments are either woven or knitted, and are subject to a number of variations that will contribute to its appearance, drapability, luster and sheen, texture, wrinkle recovery, durability, feel, and many other qualities and performance characteristics.[5] The overall sheet of fabric is composed of yarns, and those yarns can be unravelled into fibres. Fibres are the primary materials and basic units that are twisted together to create longer strands (yarns), and compose the majority of textile products.

Figure 59. *An experiment in the repetition of folding a material onto itself to generate physical, but not necessarily visual, space. Series of 3 views.*

There are two main classifications of textile fibres, natural fibres and manufactured fibres. Natural fibres are defined as "any fibre that exists as such in the natural state"[9], and are taken from animal, vegetable, or mineral sources – most commonly wool, silk, cotton, flax, and (formerly) asbestos.

Manufactured fibres are created through technology, and defined as "any fibre derived by a process of manufacture from any substance which, at any point in the manufacturing process, is not a fibre"[10], and is further divided into two groupings. Regenerated fibres are from natural polymer materials that cannot be used in their original natural form, but can be re-produced or re-formed through chemical processing or treatment into something usable. An example is rayon, which is a cellulose fibre regenerated from wood pulp. Other regenerated fibres have been created from corn, soybean, peanut and milk proteins, but are not as popular. The other grouping is synthetic fibres – those that are completely artificial and made through a chemical process. The most generic name for this classification is Nylon.

Knitted fabrics are technically woven yarns, but result in interlaced loops and knots of a single, rolled up thread that curls around itself. It is different form the typical perpendicular warp and weft yarns that compose woven fabrics.

Hessian Fabric is another woven cloth made from the skin of the jute plant or sisal fibres, often combined with other vegetable fibres. The fibres are uneven, loosely combined with large apertures between warp and weft.

5.5.2 Non - Woven Fabrics

Non woven textiles are usually composed of short fibres that are matted and compressed together as a somewhat structural tangle or web. They are produced by bonding or interlocking the fibres (or both), using mechanical, chemical, thermal, or solvent methods. Many non-woven fabrics are disposed of after a few uses because they are not durable or structurally weaker because of their random and non-continuous fibres. Felt is a common non woven fabric that uses short fibres of wool, laid and webbed at 90º angles. Steam, friction, and pressure are used as a bonding agent to interlock the fibres – which can be done severel times to the desired thickness.

Leathers, despite their heavy presence in the garment industry are not technically textiles. Skins (from smaller animals), and hides (from larger animals) are tanned and treated to avoid decomposition and putrefaction. It is a fibrous material composed of tightly meshed collagen fibres. The tensile strength of leather varies between animal – dependant on the animal's age, gender, diet, etc. – and is also dependant on the treatment of the tanneries. However, leather is often very durable and will not tear easily. It is not elastic and does not stretch nor recover easily.

Table 02. *The following taxonomy cateqorizes properties of various worven fabrics and their potential for application in an architectural framework, setting up for future experiments in design research.*

Figure 60. *A: Image of ' assorted fabrics from list.B: Fabrics from list cast in design research experiment with fabric formwork*

	Silk	Wool	Cotton	Linen
Fibre Composition	Produced by caterpillar: the silkworm. Domesticated silkworms is most common, but wild silkworms yield stronger, shorter fibres.	Sheep	Cotton flower/plant	Flax plant
Fibre Type	Natural filament fibre	Natural filament fibre. Made from a protein of Keratin	Cellulosic (plant based: seed hair fibre)	Cellulosic (plant based: bast fibres)
Cross section fibre	Triangular - it is smooth and transparent, rodlike with occasional swelling or irregularities along its length. their diameter is often 9-11 microns, but filaments can be as long as 1000 metres in longitudinal section.	Oval or elliptical; Composed of 3 parts: the innermost (medulla), then the cortex (most of the fibre), and then a layer of overlapping scales.	The cross section has a U-shape, or kidney bean shape, with a hollow central canal that carries nutrients throughout growth	Very irregular many sided shape - yet has a similar central canal for nutrients. Long section: resemble bamboo stalks
Strength	Very strong	Relatively weak because of the degrees of crystallinity and orientation of the fibre	Medium - stronger than rayon but weaker than flax. Longer cellulose chains increase strength.	Stronger than cotton - one of the strongest natural fibres. Is about 20% stronger wet than dry
Colour	Cultivated silk: off white/ cream. Wild silk: brown	Depends on sheep: white, yellow, brown, black	White to tan	light cream to dark tan
Modulus/Elasticity	Moderate modulus, it resists forces and does not stretch easily.	Low. Wool fabrics stretch easily because of low modulus of fibres.	Inelastic and rigid - moderately high modulus.	High modulus, resists strong forces without deformation
Elongation and Recovery	Elongation is moderate, and will often recover unless the extension is high Breaking Elongation: 24%	Wool is easily extended, but does not recover. Once stretched, bagginess will remain. Breaking Elongation: 30-40%	Low elongation and recovery. May not recover from stretch and wear. Breaking Elongation: 5-7%	Breaking Elongation: 3%
Resilience	Moderate - creases will hang out, but wrinkle recovery is slow.	The bilateral structure of the cortex creates a 3D crimp in the length of the fibre - making wool fibres springy and very resilient. Wrinkles will easily hang out of garments in a damp atmosphere.	Wrinkles easily, and the hydrogen bonds between chains are broken and reformed in a new position - therefore they hold the deformation in place	Linens crease and wrinkles easily; has low resilience

5.5.3 Taxonomy of Woven Fabrics

Rayon (Viscose)	Nylon	Spandex Lycra	Polyester
Wood pulp and other regenerated cellulose fibres; named the 'artificial silk'	The first synthetic fibre eve produced, it is a long chain polyamide synthesized from adipic acid and hexamethylene diamine (ref)	A long chain synthetic polymer comprised of at least 85% of a segmented polyurethane. Or, and elastic fibre: one that may stretch up to 2 its original length and recover fully.	The starting materials for polyesters are an organic acid and an alcohol - both derived form petroleum (and more recently renewable agricultural resources)
Manufactured: Regenerated	Manufactured: Synthetic	Manufactured: Synthetic : Elatrometric Fibre	Manufactured: Synthetic
Circular/oval with serrated edges because of long striations run longitudinally.	Circular; longitudinally it is long and smooth	Round and smooth in longitudinal view.	Variety: round, tribal, pentalobal, and hollow shapes.
Low, because of its lower polymer chain length and structure.	Excellent. Can be produced in a variety of tenacities: from seat-belts, luggage, and hoisery.	High in tensile strength	Varies with the type of fibre - although generally very strong
White	White	White	White
Low modulus. Stretches easily	Low, despite being a strong fibre. Stretches easily with little force.	Low modulus: stretches incredibly easily; up to 500-600% without breaking.	High modulus
Low elastic recovery so rayon tends to remain stretched and may become distorted	High elongation before breaking. Will recover well . Breaking Elongation: 20-40%	Excellent elongation with recovery to original shape.	Will stretch a moderate amount before breaking. Recovers well from stretching, but inferior to nylon.
Poor. wrinkles and does not recover on it's own easily.	Recovers well from stretching and compression.	Excellent	High. Often blended with other fabrics to make them more easy to care for.

Information in this table was compiled from: Collier, Billie, Martin Bide, and Phyllis Tortora. ***Understanding Textiles. Seventh Ed.*** (New Jersey: Pearson Education Inc. 2009

	Silk	Wool	Cotton	Linen
Flexibility	Very flexible because of thin filaments	Fairly flexible. Some resistance to flexing because of rough cuticle on exterior.	Fairly flexible	Generally feel stiff because of bamboo-stalk like brittleness of fibres, and resistance to bending.
Absorbency (moisture)	Good Regain: 11-12%	Extremely absorbent - moisture is held inside of the fibre rather than on the surface. Yet wool is also water repellent, and liquids may run off the fabric. Wool performs well when wet, and will insulate the wearer from cold. Regain: 15%	Very absorbent - comfortable in hot weather, but dries slowly. Regain: 7-11%	Very good moisture wicking ability - water will travel along the fibre before being absorbed. Regain: 11-12%
Luster	High, but manufactured fibres with round cross sections increase luster	low because of scaly, rough surface	Low	low, but more luster than cotton.
Specific Gravity	1.25	1.32	1.54	1.54
Conductivity of Heat & Electricity	Heat conductivity is low; electrical conductivity low, silk tends to build up static electricity.	Both heat and electricity: low	Heat: High. Electricity: High Conducive to electricity and does not build up static electrical charges	Heat: High. Electricity: High Conductive of heat even more so than cotton. Makes it even better for hot weather
Effect of heat & combustibility	Silk will burn, but will self extinguish once the flame is removed.	Wool will burn slowly; it can be treated for fire retardancy to be used in upholstery.	Will not melt, however, exposure to high heat like in ironing, will cause cotton to scorch or turn yellow. If exposed to flame, cotton will burn (even after flame is removed)	Performs better and is more stable in high heat than cotton. Similar burning properties.
Chemical Reactivity	Like most protein fibres, silk is sensitive to the action of bases. It is also sensitive to acids, as bleaching will deteriorate the fibre.	Wool are damaged easily by strong basic solutions (such as laundry detergents with alkali added to increase cleaning power).	Strong acids degrade fibres and produce holes. Reacts well to strong bases.	Destroyed by mineral acids. Reacts well to strong bases.
Abrasion resistance	Not resistant: silk's fineness makes them vulnerable to wear.	Not resistant to abrasion, but will resist because fibres absorbs the energy from abrasions	Low; garments will show wear at hems, cuffs, etc	Because of high bending stiffness, has a low abrasion resistance

Rayon (Viscose)	Nylon	Spandex Lycra	Polyester
Very flexible	Very flexible and drape able; can be folded or flexed repeatedly without showing wear	Very flexible	Very flexible
Very absorbent - more so than more so the most cellulosic fibres. Moisture regain: 11-15%	Moderately hydrophilic and dry quickly. Moisture regain: 4 - 4.5%	Moderately low - water will run off but eventually absorb into fabric. Moisture regain: 1.3%	Low. they are non absorbent and have good wicking ability. Moisture regain: 0.2-0.8%
High, but can be modified in production	Naturally high	Dependant on manufacturing process	Dependant on manufacturing process
1.51	1.14	1.21	1.38
Heat: High. Electricity: High	Heat: Poor. Electricity: Poor It is a good insulator but will build up static electricity		Heat: Poor Electricity: Poor
Must be ironed at lower temperatures since high temperature exposure will deteriorate the fibre.	Nylon will burn, but often self extinguish once the flame is removed. However, Nylon fibres do melt and could stick to skin or cause serious burns. Melting point is 500^0 F	will burn; melting temperature at 450^0	Easily moulded with heat. The melting point of Polyester ranges from 480^0 F to 550^0 F. Polyester will burn if exposed to a fire, leaving a hard, black residue with a strong odour.
Poor resistance to both strong acids and bases.	Because it is synthetic, Nylon remains chemically stable and most solvents will not harm it. However, treatment with hydrochloric acid at high temperatures will break down the fibres in to the substance it was made	Not harmed by most solvents; although does turn yellow in contact with chlorines and oils.	Because it is synthetic, Polyester remains chemically stable and most solvents will not harm it. Alkalinity in detergent encounters do not harm the fabric
Low - rayon is not durable.	Extremely resistant: it is a tough fibre		Good resistance.

Information in this table was compiled from: Collier, Billie, Martin Bide, and Phyllis Tortora. ***Understanding Textiles. Seventh Ed.*** (New Jersey: Pearson Education Inc. 2009

Figure 60.A

Figure 60.B

5.5.4 Fusing fabrics

In garment making, if the fabric you wish to use does not have the stability you need, interfacing, or fusables, can be used. Fusing fabrics or textiles together borrows properties from the two different fabrics. It is most often used to strengthen, provide durability, or stabilize another fabric, concealing one while retaining a preferred appearance. In garments, they can be either sewn or ironed to the wrong side of a fabric, resulting in an enhanced hold or structure commonly found in the collars, cuffs, waistlines, plackets, etc., any place that needs reinforcement. Fusing can be done thermally, with pressure, or in the manufacturing process. Post manufacturing, two fabrics are attached by using a transfusing web, which is a web of fibres that when heated, creates a thermal bond.

5.5.5 What is an 'Architectural Textile'?

Geotextiles are versions of polysesters – woven polyethylene and polypropylene fabrics – that have been manufactured for use in landscape and road construction. They are incredibly strong and durable, able to filter, separate reinforce, and protect as necessary. They are robust enough to withstand tear and many other forces. Since it is part of the polyester family and can contain a thermoplastic woven through, it is easily mouldable with heat treatments However, they come in large rolls and quantities, and are rigid in comparison to typical *garment* textiles.

Durable Nylons are also common in architectural practice, often in the form of tensioned, lightweight membranes supported by another structure resulting in tent-like or umbrella-like forms. Used as a cladding on other projects, but usually this is restricted to warm climates or temporary installations.

Figure 61. *Tessellated veneer triangles fused to Lycra, laid flat.*

Figure 62. *Tessellated veneer triangles fused to Lycra, folding into spatial dimensions .*

Figure 63. *Tessellated veneer triangles fused and sewn to Lycra.*

Figure 64. *Tessellated veneer herringbone patter fused to muslin, gentle folds.*

Figure 65. *Tessellated veneer triangles fused and sewn to Lycra.*

5.6 Design Research: Multiple Personalities

This experiment in design research engaged a material typically found in architectural and building construction and questioned the implications of fusing it with a fabric textile, to coat a composite material with an inherent capacity to respond to mobile shifts. This considered the ways in which both materials can be bonded, so that the final fused material can be flexible and responsive, fitted to the body, while retaining stability from rigid surface pieces.

Sheets of birch veneer were laser-cut into small pieces — diamonds, triangles, and parallelograms — that could be arranged in a tessellated pattern. Different fusing methods were used: first, the veneer was glued to a thin canvas fabric (chosen for its porous fibres, and plasticity), then, veneer was stitched onto Lycra in hopes that the fabric would retain its elastic properties, and be able to stretch and mould to various forms.

The supple nature of the fabric responds to the ever-changing motion of the moving body while retaining a percieved *architectural* identity on its outer shell. This research went further by returning to the pattern of the bodice; asking, 'how could this new textile be worn and fitted to the contours of a body?' The pattern of the sloper bodice was edited to fit specific measurements of a body, rather than the typical manufacturers linework. As the pattern was fitted, contour lines were drawn to show the curves of the silhouette and where the triangulation pattern needed to accommodate a protrusion or depression of the body. This evolved and was drawn digitally in Rhino, where the pattern of tessellated triangles continued to evolve in ways that would respond to the specific figuration of a body.

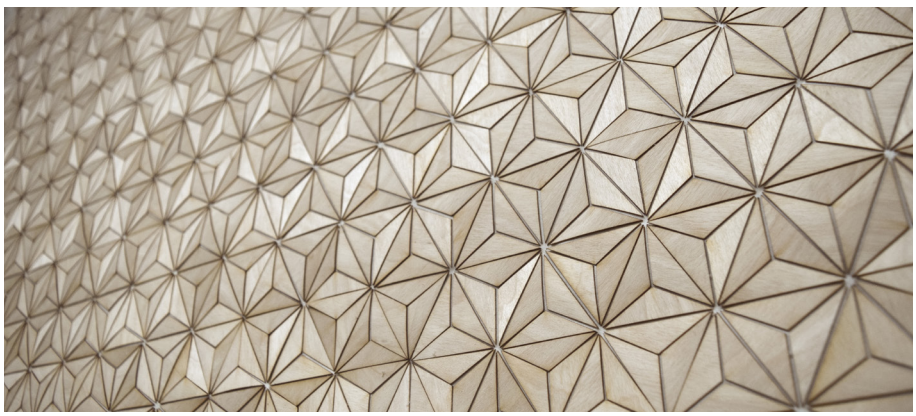


Figure 61

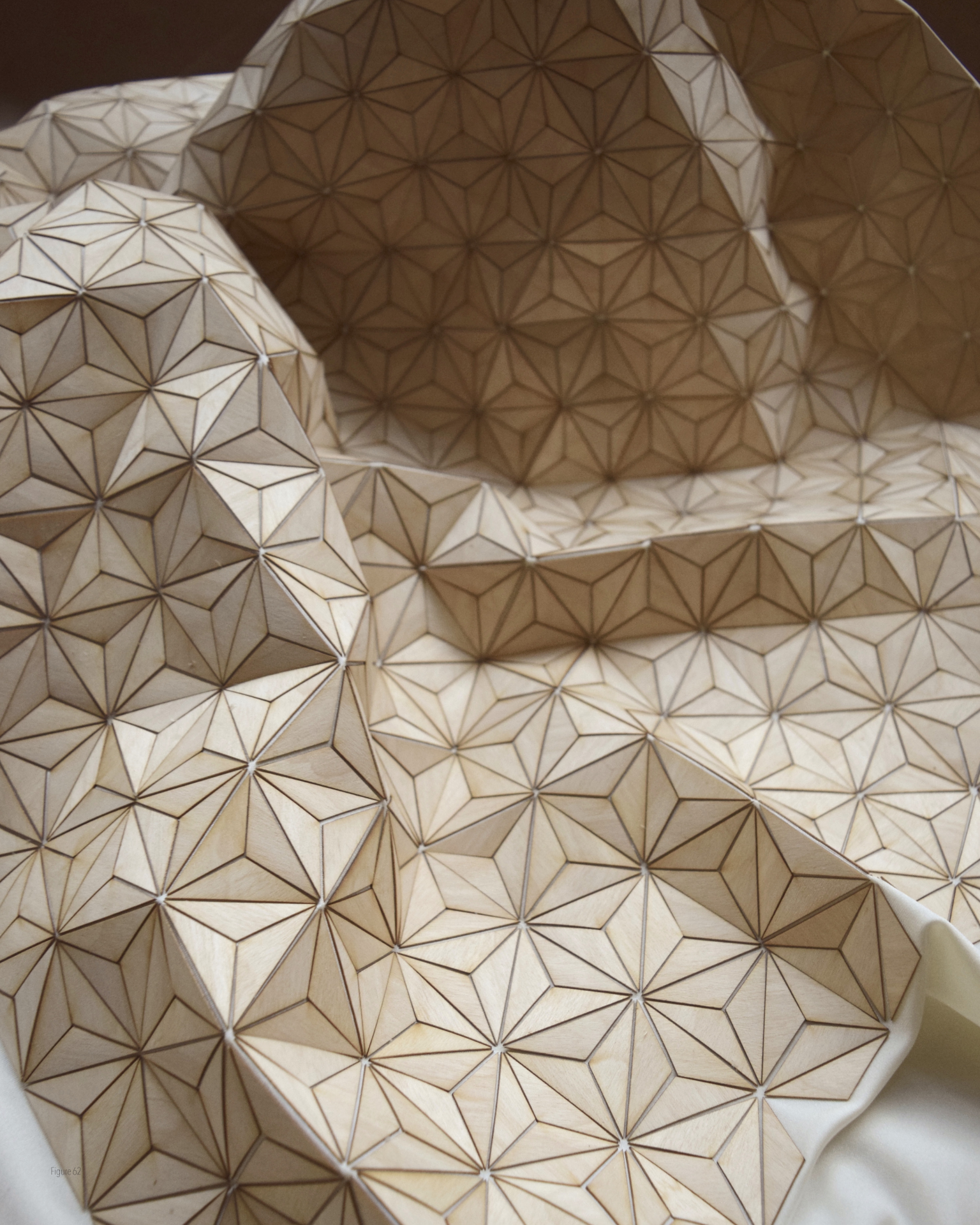


Figure 62

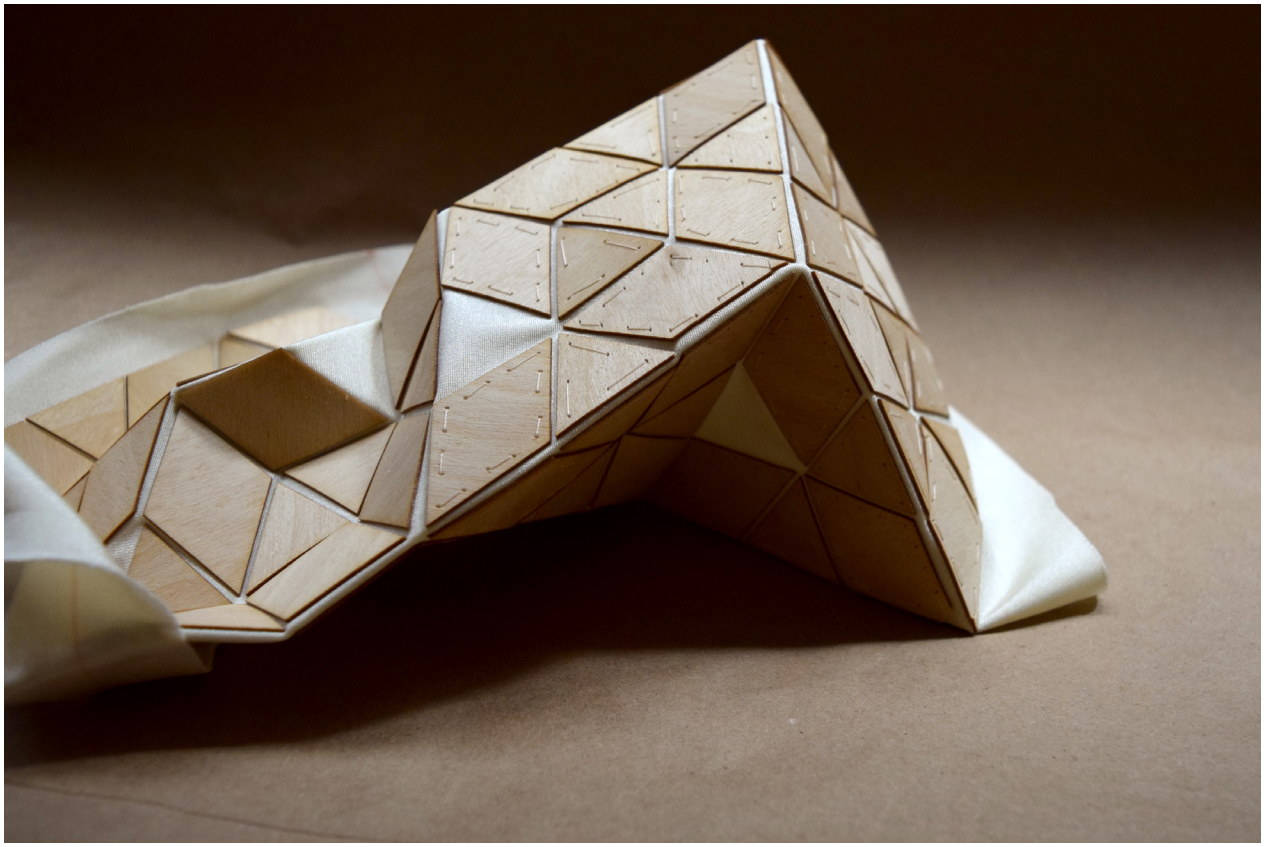


Figure 63

Figure 64

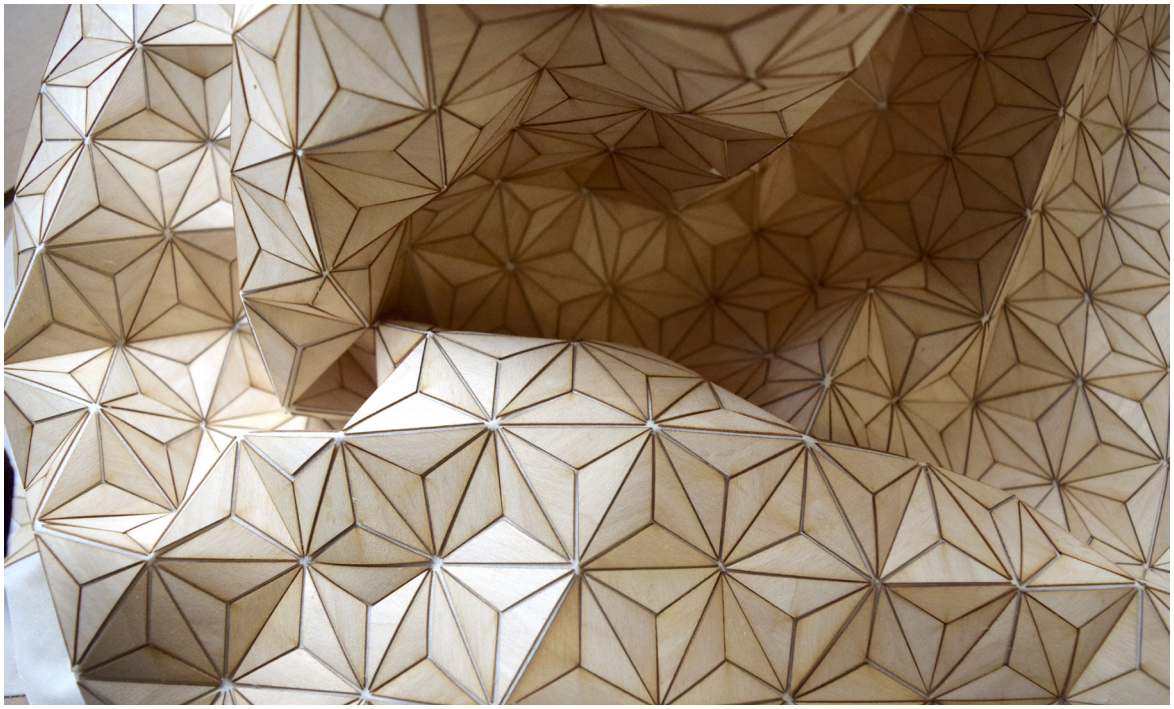


Figure 65

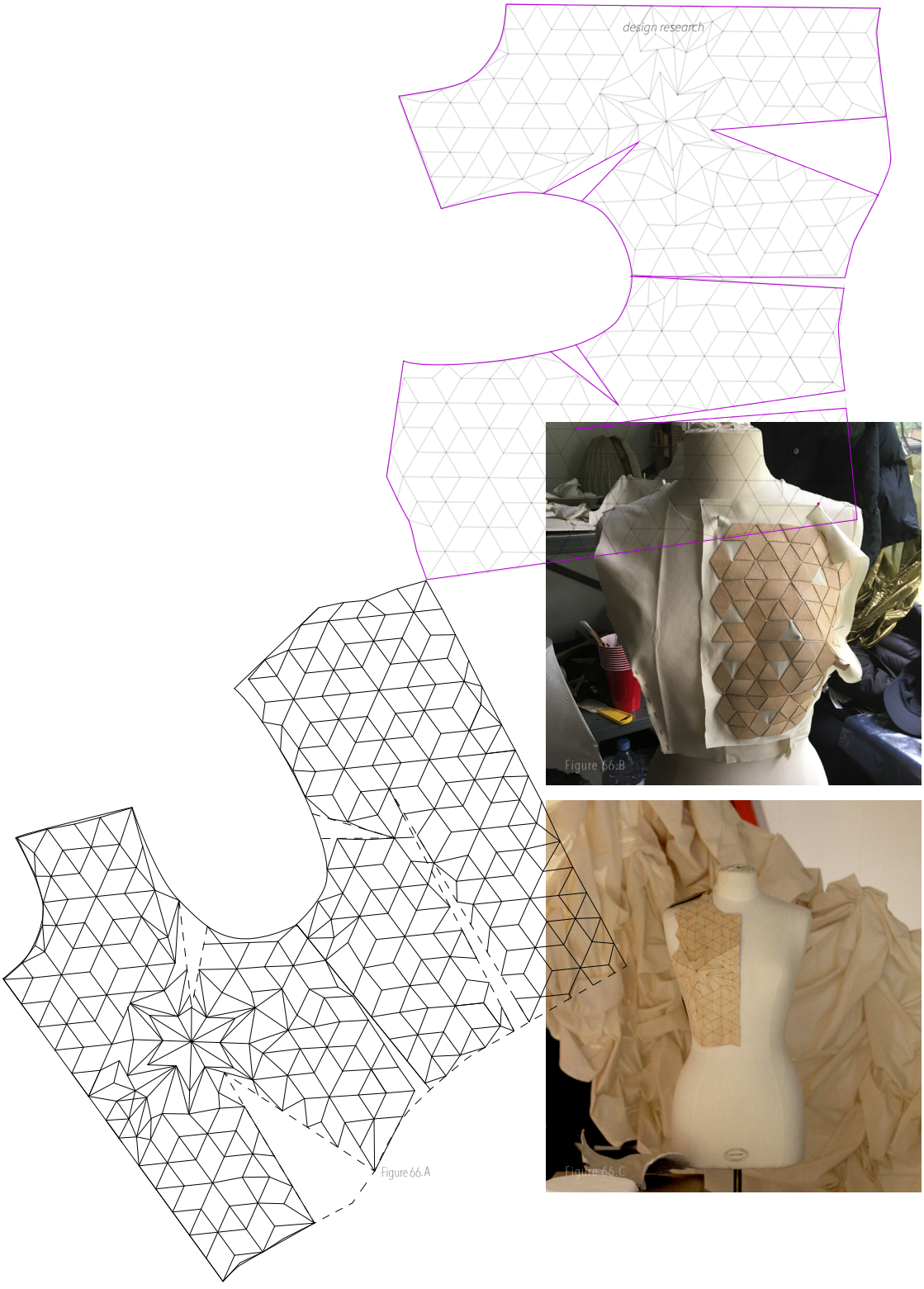


Figure 66. ***Architectural fabric applied to bodice fitting A: Digital plan drawing, B: Fitting to mannequin body, using previous flat sample piece C: Final bodice in wooden textile, showcased at final defence presentation.***

5.7 Extension Through Envelopes

Architecture traditionally embodied meaning derived and legitimized by function.[12] This meant that, in addition to its form, it primarily served function, and furthermore also had to look like its function, which, unfortunately, disregards intimacy and hapticity, resulting in corporeal detachment.

Despite social and collective spaces, architecture, like the garment, is created for the individual through modes of experience. And in the case of the individual, there is only one, our own experience. We can live in social circumstances because we, through empathy and certain signifiers, begin to understand others, but will never be able to feel others emotions nor circumstances. We can perceive and acknowledge what people are going through to some extent, but my personal experience cannot be felt by you, hence why a singular envelope is investigated through design research.

Figure 67.A

Figure 67.B

5.8 Design Research: Dissident Tailoring

This exploration in design research began with observing typologies and their classification according to a general function, questioning 'what makes a typology?'. Often in architecture, typologies are taxonomic classifications that prescribe a certain number of characteristics commonly found in buildings, relating to scale, program, school of thought, etc. When we envision a typology, a single-family home perhaps, we automatically associate a set of characteristics that are normally found within it: a one to two storey rectilinear form, with a peaked roof, set back with a front lawn, windows with shutters and perhaps a front porch or ornamental plantings of trees and shrubs. Yet, if a typology did not look like its function, or anything we have imagined before, but could still be defined by a certain number of parameters, does it still belong to that typology?

This was investigated with a garment that hovers between simple and complex, special yet everyday: a white collared button up dress shirt. This singular item is an emblem of civilized dress, common in corporate and elegant wardrobes. The parameters of a white collared button up dress shirt include just that: it must be white in colour, include a collar, cuffs, a back, and buttons to fasten the enclosure of the body.

Elizabeth Diller previously performed an experiment on the white collared button up dress shirt in which she ironed the shirt in several mutated configurations, and is titled, '*Bad Press*'.[13] This aims to extend those operations into more permanent ones. By challenging the typical definition of a white collared shirt, '*Dissident Tailoring*' exercised an unconventional response to traditional tailoring. Divorcing the normative aesthetics, ways we dress, and efficiency found in a typical men's white collared button up shirt, it conceived of new alternative ways to button, wear, move, trading an image of normative, orthogonal logic of the dress shirt for one of the unexpected, special, even perhaps dysfunctional.[14] Here, the envelope frees the body from a hallmark of corporate and elegant refinement, conventional notions of fit and beauty, and disrupts the accepted characteristics of the fashionable body.

Figure 67. ***A & B, Collection of white shirts before experiment***

Figure 68

Eight generic white collared button up dress shirts were deconstructed and reconstructed to explore and reevaluate the relationship of the parts of the shirt. By slicing and stitching, this motion of detachment and attachment continuously redefines the boundaries of interior and exterior to the wearer, reconfiguring the territory of the body, as well as its fit and feel of space. What follows are instances of pre-made and manufactured typologies, created for a generic population, made special through various architectural operations, becoming distinct and unparalleled in their search of how to envelope the body.

The way envelopes are traditionally imagined and conceived could not have anticipated these results. The unexpected nature of these garments are still classified as a white-collared button up shirt, and each, in their own unique way, extend or limit the body to challenge its normative ways of interacting with the environment around it, and responding to various forces. Disrupting the genealogy of the definitive anticipations of a typology, allows us to wonder and accept, that there are more possibilities of ways to envelope and house a body which are not normally prescribed, and that may seem unusual, ambiguous, and illogical.

Figure 68. ***Dissident tailoring, aftermath***

Figure 69. ***Dissident tailoring, process***

Figure 70. ***Dissident tailoring, process of sewing 'Scale'***

Figure 71. ***Dissident tailoring, aftermath***

Figure 69

Figure 70

Figure 71


Figure 72.A


Figure 72.B


Figure 72.C


Figure 72.D

Operation	Description
Shear	Sliced horizontally into 50mm strips, each section was rotated 50 mm to the left, and reattached. The buttons still match and connect in the same way, unchanging the way one gets dressed.

Figure 72. ***A, B, C & D: Dissident tailoring elevations: 'Shear'***

Operation

Mirror

Description

The lower two thirds of this shirt were cut off and reattached to the shoulder, creating a new collar from the body. The shirt still has sleeves, a collar and pocket, yet operates more as a facial covering, limiting sight sound senses.

Figure 73. *A, B & C: Dissident tailoring elevations: 'Mirror'*


Figure 74.A


Figure 74.B


Figure 74.C

Operation	Description
Invert	This shirt inverted sleeves and cuffs to compose the body, and what used to be the body of the original shirts became the sleeves. The buttons along the front are made from the cuffs of sleeves, and sleeve fabric was patched together to create a body. This inversion disassociates elements that would typically be understood as out of place.

Figure 74. *A, B & C: Dissident tailoring elevations: 'Invert'*

Operation	Description
Repetition	Composed of many necks repeated down the shirt to compose a body, a collar is not normally where it should be, but, is rather cut into a 'boat-neck' style collar, reversing the association of gender: a white collared button up shirt is typically associated with a man's wardrobe, yet the boat neck is a feminine cut.

Figure 75. *A, B & C: Dissident tailoring elevations: 'Repetition'*


Figure 76.A


Figure 76.B


Figure 76.C

Operation	Description
Subtract	The panels of this shirt were removed, yet the main essence of the shirt remained at its most minimum: collars, buttons in the front, cuffs, and a pocket. This still envelopes the body

Figure 76. ***A, B & C: Dissident tailoring elevations: 'Subtract'***


Figure 77.A


Figure 77.B


Figure 77.C

Operation

Extrude

Description

This shirt was sliced vertically in the front from breast to bottom of the front panel, along the inseam from armpit to hip, and three times along the back from shoulder blade to bottom panel. Muslin triangles were pleated and inserted becoming infinitely volummetric. The sleeves were cut from shoulder to wrist along a bias, and again inserted with a triangular muslin panel. The volume of this shirt may make it somewhat difficult to operate daily functions because of its mass of extra fabric, but there is opportunity to extend oneself outwards in the depth of the folds.

Figure 77. *A, B & C: Dissident tailoring elevations: 'Extrude'*

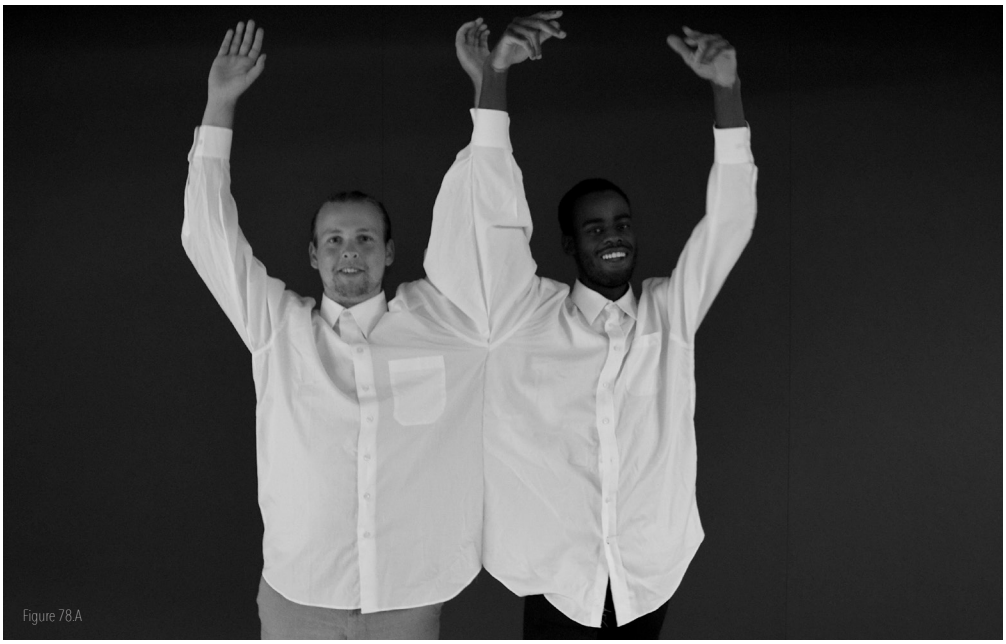


Figure 78.A


Figure 78.B


Figure 78.C

Operation	Description
Union	What was once discrete parts join into one whole; sewn from base of the side inseam to the end of the cuff. Operations in this envelope may be either difficult or tasks will get finished twice as quickly.

Figure 78. *A, B & C: Dissident tailoring elevations: 'Union. D: Dissident tailoring elevation: 'Scale'*

Figure 78.D

Notes: Chapter Five

1. Giles Deleuze as quoted in Legendre, George L. *Bodyline: The End of Our Meta-mechanical Body: Studies of Diploma.* (London: Architectural Association Publications. 2006), 20.
2. Roland Barthes, as quoted in Legendre, *Bodyline: The End of Our Meta-mechanical Body*, 20.
3. Roland Barthes, as quoted in Legendre, *Bodyline: The End of Our Meta-mechanical Body*, 20.
4. Wikipedia: The Free Encyclopedia. Pleat. https://en.wikipedia.org/wiki/Pleat
5. Wikipedia: The Free Encyclopedia. *Pleat.*
6. Love, Timothy. *Kit-of-Parts Conceptualism: Abstracting Architecture in the American Academy.* Harvard Design Magazine Issue 19. http://www.harvarddesignmagazine.org/issues/19/kit-of-parts-conceptualism-abstracting-architecture-in-the-american-academy.
7. Wikipedia: The Free Encyclopedia. *Smocking.* https://en.wikipedia.org/wiki/Smocking
8. Nyanin, Natasha. *How to Literally and Figuratively Take Up Space With Your Style.* https://www.manrepeller.com/2018/07/layering-for-3d-maximalism.html
9. Collier, Billie, Martin Bide, and Phyllis Tortora. *Understanding Textiles. Seventh Ed.* (New Jersey: Pearson Education Inc. 2009), 5.
10. Collier, Bide, and Tortora, *Understanding Textiles*, 5.
11. Collier, Bide, and Tortora, *Understanding Textiles*, 7
12. Ibid, 33
13. Elizabeth Diller of DillerScofidio + Renfro. *Bad Press.* https://dsrny.com/project/bad-press
14. Diller, *Bad Press.*

Figure 79

chapter six

soft architecture

6.1 Soft Architecture: an Introduction

Soft Architecture is the interstitial moment between architecture and dressology, a hybrid category and distinct area in design created to understand the relationship between the two ways of enveloping the soft body. Recalling the diagram in Chapter 5, this questioned 'how to envelope' and 'what an envelope is and composed of?' It is in Soft Architecture where space becomes dress; questioning how boundaries are defined by the layers extending out from the soft body, the flexibility of giving space while taking up space, swelling and protruding beyond hard surfaces. Soft Architecture goes beyond traditional architectural understandings, realized through experimenting with forming and shaping materials in non-traditional ways, asking them to become something other than how they are conventionally understood.

A Soft Architecture is designed for the soft body, responding predominantly to the physiological and perceptual selves of the soft body; the virtual self is considered less because soft architecture asks the body to be present in a physical reality rather than existing in a virtual world. Although there is liberation found in an artificial digital reality, soft architecture is derived from experiencing space as an individual with a high-quality sensory experience extending from kinaesthetic sense, emotions, and forming a relationship with surroundings the body can touch.

For the physiological self, as a body, rather than subject oneself to an architectural tradition that has reduced all bodies to a series of normative dimensions, categories, and genders, a Soft Architecture considers the specificity of each subject and their embodied perceptual subjectivity as a new architectural modality. The construction of such an architecture begins in being guided by the specific physiological body — its motions and specific measurements, almost "in the same way that a bird shapes its nest by movement of its body",[1] which then further asks the question, 'what are the spatial implications of muscle memory?'.

Figure 79. *Blomé, an interactive installation with fabric, 2015. Group project by author for ASC 755.*

The layering in a Soft Architecture recalls the interstitial moments that exist between dressology and architecture. As mentioned, processes of designing architecture has been traditionally been done using on and off procedures, and choosing between binary oppositions. Alternatives like figure and ground, solid and void, light and dark, etc, create a word where we exist in either one or the other. But there are incredible amounts of variations in between; a gradient of interstitial moments where one can exist in both systems at once, and in many zones in between. Those systems are embedded in one another, and form new interstitial zones. The binary dissolves, and a symbiotic relationship emerges.

By denying the process of designing within traditional binary oppositions, a Soft Architecture does not need to necessarily contain nor legitimize an already given or embodied sign system, like the Vitruvian triad of commodity, firmness, and delight. Rather, there is a significance placed on the fit and feel of space, which are common signifiers in dressology, where 'fit' refers to the tailoring of the garment; and, 'feel' refers to the perceived senses of being in the garment. With 'feel', touch is important because it has direct contact with the skin, 'feel' is also hearing how the materials move with the body, and the emotional outcome of wearing the garment. 'Feel' asks the imaginative questions of, 'who am I when I wear this?', 'what worlds/possibilities can I inhabit while wearing this?', etc.

We experience buildings through our physiological senses and extended self, but it is also through this 'feel', and imagination where another quality of architecture emerges. Unable to fully describe the emotional and poignant effects a space has on us, it is in this ineffable quality of spatial experience where Soft Architecture affects the perceptual self; the reading of the environment and a cognitive awareness of light, sound, heat, and other non visible forces that inform our surroundings and heighten an emotional connection.

Traditional architecture organizes space by compartmentalizing it through the use of hard boundaries – as a property lines, as a building envelope, as the walls of a room. Its two dimensional representation is a line that demarcates a discontinuity between adjacent entities.[2] These impose limitations, fixing a container in a conventional framing of space. In the process of creating a soft architecture, boundaries are not fixed, but rather negotiated and transitional, creating a fluid relationship and gradient of undecidability between spaces, solids and voids. This subversion of preconceived notions of conventional boundaries suggests an amorphous and mutable space, so that when the body moves through it, it does so in a zone that contains conditions that are not one or the other, but somewhere that contains both and moves fluidly between them.

6.2 Finding Softness

6.2.1 Le Corbusier

> "The softness in Le Corbusier's architecture occurs in the form of his projects, with a moulding hand, and a tremendous sense of materiality, plasticity and gravity, all to which prevented his architecture from turning into sensory reductivism."
>
> *Juhani Pallasmaa, The Eyes of the Skin*

Ronchamp at Notre Dame du Haut, in particular, has a heightened sense of tactility in the sculptural walls, experienced even from the spinning approach to the building as one walks up the hill. It continues in the first entry through the two small chapel towers, "a most carnally and forceful presentation between muscular curves".[4] The uniqueness of the spatial experience lies in the incredible depth of these concrete and masonry walls of the Catholic church, whose curvaceous thresholds mysteriously hint at secret programs and interstitial spaces hidden in shadows, slowly revealed or found when walking through.

The light infiltrating the interior through the stained glass windows evokes expressive and sensual qualities, is decadent but not extravagant. It is pensive and pure. The building is mostly white and simple — unadorned with ornament and fixtures, which often signified sterility, hygiene, and cleanliness, yet the monochromeness is not mechanical, and the ornament is found in the form. Despite having many straight walls, the building somewhat slumps irregularly, with its sloping floor and a main roof that is all at once plunging into the pews and exhaling outwards towards the heavens.

The thick concrete and masonry walls are powerful and defined; although massive, yet become particularly soft when they are articulated by sporadic openings and differing window shapes and sizes. There is rarely direct light, and the walls appear to be illuminated, speckled with light and shadow in the speckled finish of the plaster.

Figure 80. *Le Corbusier's Ronchamp at Notre Dame du Haut, France.*

Figure 81. *Interior of Le Corbusier's Ronchamp at Notre Dame du Haut, France.*

Figure 82. *Ground plan of Le Corbusier's Ronchamp at Notre Dame du Haut, France.*

Figure 80

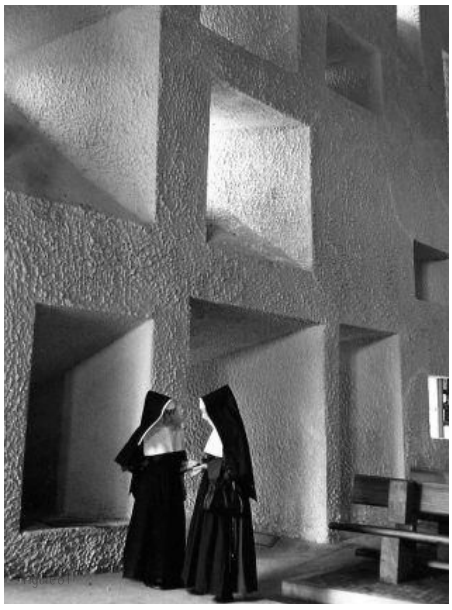


Figure 81

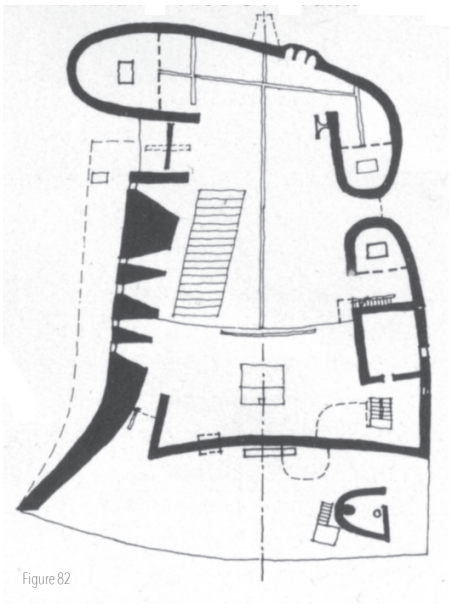


Figure 82

6.2.2 Ludwig Mies van der Rohe

Perhaps the work of Ludwig Mies van der Rohe may not be immediately striking as soft, but a critical look at the materiality of projects like the Barcelona Pavillion and Tugendhat House communicate otherwise.

The Barcelona Pavillion finds a visual and haptic softness in three ways: the material palette of marble, red onyx, and travertine; a fluid space that blurs the interior and exterior; and the presence of water - a tranquil pool and small water basin. This project was designed without function — it was to remain bare and free of exhibits or information, only showcasing a sculpture and furniture that were part of the spatial design process to help define and interpret the architecture. In this sense, it did not ask the body to do anything, but just to be. Moving through the spaces which flowed into each other can be defined as fluid space rather than discrete rooms.

Similarly, in the Villa Tugendhat, Mies repeats these materiality choices: curved wood paneling to surround a dining space, and a stairwell composed of a stone floor and tread, with a frosted glass wall curving gently allowing diffused light to guide one to the second level.

Figure 83. ***A & B. Mies van der Rohe, Barcelona Pavillion, Spain. Photographs by Gili Merin***

Figure 84. ***Mies van der Rohe, Villa Tugenhat, Brno, Czech Republic. Photograph by Alexandra Timpau***

Figure 83

Figure 83.B

Figure 84

6.2.3 Friedrick Kiesler

> "All ends meet in the "Endless" as they meet in life. Life's rhythms are cyclical. All ends of living meet during twenty-four hours, during a week, a lifetime. They touch one another with the kiss of time. They shake hands, stay, say goodbye, return through the same or other doors, come and go through multi-links, secretive or obvious, or through the whims of memory." [5]
>
> *Friedrick Kiesler*

The elastic spatial form of Kiesler's Endless house has no corners. The drawings demonstrate a fluidity of space, with various rooms and functions transitioning into the next, a blur of space, boundary, and interiority and exteriority. Despite labeling program in the drawings, there is no further outline of built-in program or furniture to specify the differences from a kitchen or bedroom, rendering the plan seemingly devoid of function and ambiguous in its inhabitation. The softness of carved out cave-like excavations of void space and the spheroid shape of the design contrasts a conventional building in that there are no hard corners that swallow light. The curvatures are not rigid, they are free flowing and dream like, imagining an environment designed for the energetic flow of the body.

The project defies any attempt at logical/practical construction and remains in the realm of theoretical possibility. However, his ideas concerning the relationship and continuity between space, people, objects and concepts, was explained in his '*Manifesto of Correalism*'. The are expressive of "the dynamics of continual interaction between man and his natural and technological environments."[6] Kiesler thought that humans lived in an environment governed by networks of dynamic forces, and these forces traversed the world with entropy being in a constant interaction with one another.[7] The Endless House was a means to capture these dynamic practices, "[channelling] the relationships of environmental forces to produce interactive sites rather than traditional buildings and objects."[8] Kiesler also pioneered a multimedia architecture in which environments spoke to all the human senses.

Figure 85. *A. Model of Endless House, B. Plan of Endless House, C. Interior of model for Endless House.*

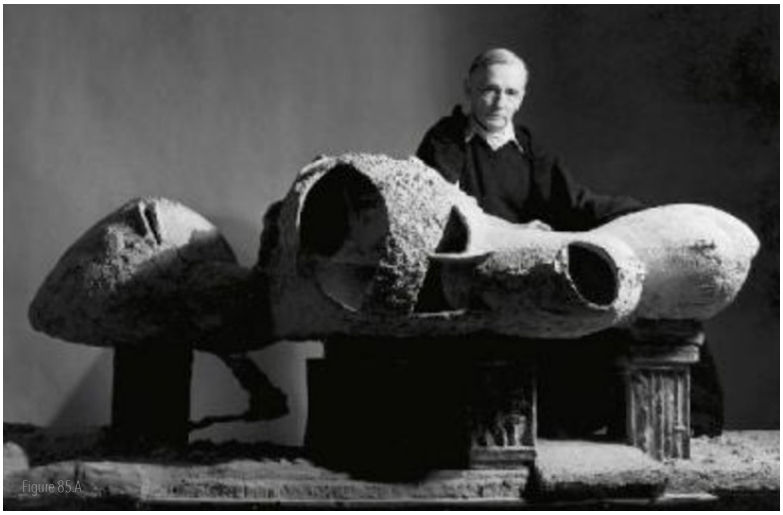


Figure 85.A

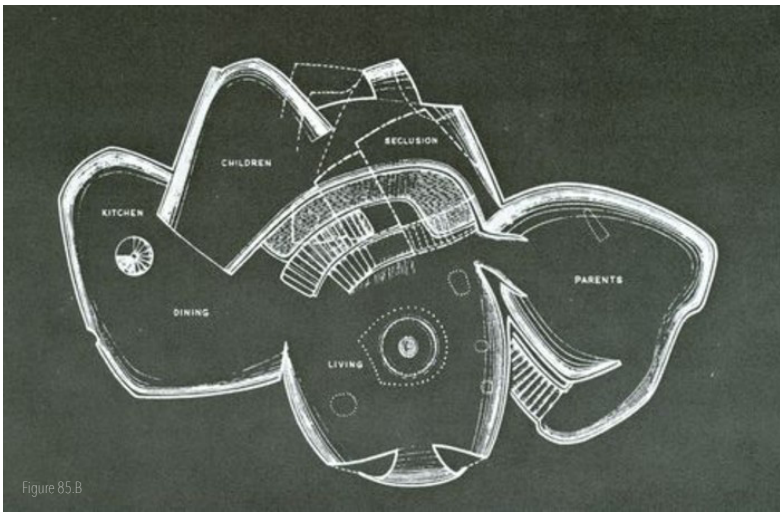


Figure 85.B

Figure 85.C

6.2.4 Richard Neutra

Many of Richard Neutra's houses have a visual fluidity from inside to outside, creating a relationship between an interior and a natural landscape extending far off into the distance. Rather than enclosing the body in a space that is introverted and interiorly focused, Neutra expanded the body through an extroverted membrane, engaged intimately with the environment around it.[9] Most houses were designed and built for a California climate. Large glass walls and windows were employed frequently, creating a field of view to project oneself outward and potentially inhabit. Most particularly in the house designed for Constance Perkins in Pasadena, there is an exceptional example of blurring, where a small pool flows beneath a glass boundary, appearing inside and outside.

Neutra's 'spider legs', where parts of the building structure stuck out of the envelope (perhaps similar to buttresses), created an intermediary zone - almost an arcade - mediating the passage of inside to outside of the house.

Figure 86. *Richard Neutra, Constance Perkins House, Pasadena USA, 1952-55*

Figure 87. *Richard Neutra, Palos Verdes High School, Los Angeles, USA 1959*

Figure 86

Figure 87

6.2.5 The Baroque Period

Baroque Architecture, of the seventeenth and early eighteenth centuries in Europe, was initiated by the Catholic church in a move to create an overtly emotional and sensory appeal to the faithful through art and architecture. [10] Curvaceous forms — especially in the oval-based plan of a crossed dome and nave, illusionary perspectival depth, grandeur and drama enhanced by contrasts in lighting — were some design moves which intended to heighten the feeling of motion and sensuality within buildings. There is a dynamic rhythm of columns and pilasters, with a central massing that increases in height dramatically.

With motion and movement being a primary consideration of Baroque Architecture, softness is found both in the visual illusionary effects, and the emotional reaction of the weight of the sculptural flamboyance. In Baroque artworks, the axis and main character in focus is normally asymmetrical, with considerable contrasts of light and shadow to make the image itself appear as if it is moving, as the reader's eye reads the work. Similarly in the architecture, illusions that exaggerate perspectival depths and heights aim to make it appear that there is motion in the building — for example in the Palace of Versailles, the columns reduce in height to overemphasize the length of the corridor.

Figure 88. *Francesco Borromini, San Carlo alle Quattro Fontane, Rome, Italy,1638. Photograph by Adam Eastland*

Figure 89. *Palace of Versailles, France, 1682*

Figure 90. *Bernini Staircase, St. Paul's Cathedral, London, UK, 1675.*

Figure 88

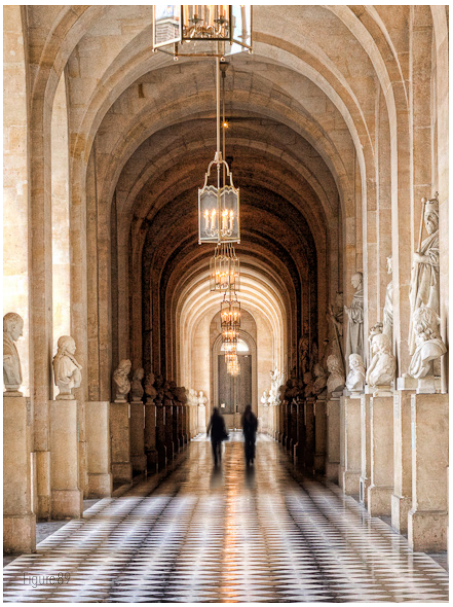


Figure 89

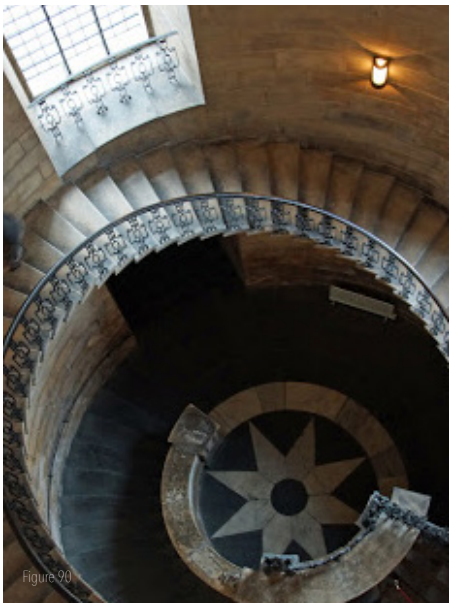


Figure 90

Figure 91.A

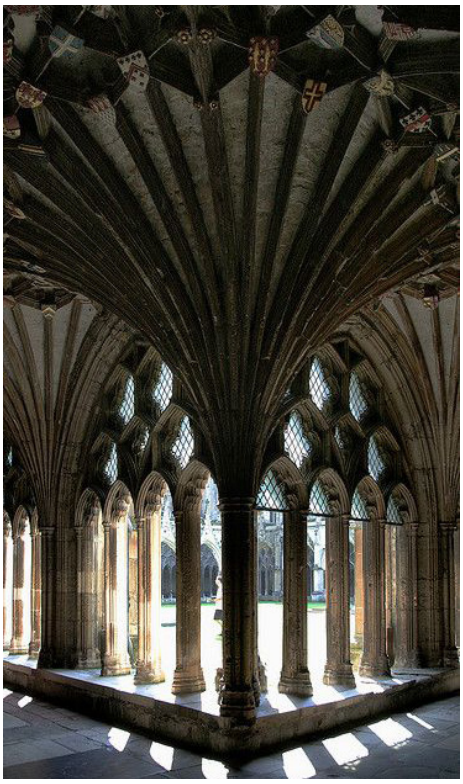


Figure 91.B

Notes: Chapter Six

1. Pallasmaa, Juhani. *The Eyes of the Skin: Architecture and the Senses*. (Chichester: John Wiley & Sons Inc, 2014), 26.
2. Addington, Michelle. *"T*he Phenomena of the Non-Visual *". Softspace: From a Representation of Form to a Simulation of Space*. Edited by Sean Lally and Jessica Young. (London: Routledge. 2014), 41.
3. Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 27.
4. Jencks, Charles. *Architecture 2000: Predictions and Methods*. (New York: Praeger Publishers. 1971), 120.
5. Megan Sveiven. "*AD Classics: Endless House / Friedrick Kiesler*" 11 Apr 2011. ArchDaily. Accessed 31 Jul 2018. <https://www.archdaily.com/126651/ad-classics-endless-house-friedrick-kiesler/> ISSN 0719-8884
6. Duvernoy, Sophie. "*Endless Houses or Vast Potatoes? The Impossible Architecture of Frederick Kiesler.* "LA Review of Books. May 26, 2017. https://lareviewofbooks.org/article/endless-houses-or-vast-potatoes-the-impossible-architecture-of-frederick-kiesler/. Accessed: May 30, 2018.
7. Duvernoy, "*Endless Houses or Vast Potatoes? The Impossible Architecture of Frederick Kiesler."*
8. Duvernoy, "*Endless Houses or Vast Potatoes? The Impossible Architecture of Frederick Kiesler."*
9. Lavin, Sylvia. *Form Follows Libido. Architecture and Richard Nuetra in a Psychoanalytic Culture*. Cambridge: MIT Press. 2004.
10. Encyclopedia Brittanica. "Baroque Architecture." https://www.britannica.com/art/Baroque-art-and-architecture. Accessed July 21, 2018.

Figure 92.A

chapter seven

soft housing

Soft Housing is an example of Soft Architecture, developed in this thesis to explore the tangible possibilities of a Soft Architecture. Where Soft Architecture outlines the theoretical position, soft housing proposes a particular set of design inquiries to demonstrate soft architecture through a project. Numerous design research explorations were replete with answers as to how to manifest a palpable idea of Soft Architecture, and each experiment yielded many observations and lessons on how space becomes dress. In making the soft housing, questions arise to ask, 'Is space diametrical and absolute or revealing, oversized, shrunken, or fitted to perfection?'; 'How are the signifiers of value, fit and feel, apparent in this architecture?'; 'How can traditional architectural materials become soft, flexible, and responsive?' ; 'How can this challenge our configuration of space, and our relationship with, and interpretation of architecture?'.

These questions have been researched through manipulating flexible fabrics with constructional techniques that have been developed and refined in garment design to create the artful fabrication of deep surfaces, structure, and spatial experiences for the body to inhabit.

Figure 92.B

7.1 Anatomy of Soft Housing

Soft Architecture is found through experimenting with forming and shaping flexible materials to become permanent, while their history of malleability remains visible and comprehensible. Manipulating flexible fabrics with constructional techniques that have been developed and refined in garment design create the artful fabrication of deep surfaces, structure, and spatial experiences for the body to inhabit. Various layers of envelope extend outward from an individual soft body.

In a Soft Architecture, the edges of the enveloping boundary create loose enclosures, with their edges not always determinate or definite, blurring one space into another. The envelope in a Soft Architecture is felt deep within the architectural space. It is not just a shallow prop or surface that can be removed, nor the skin of architecture like a designer facade.[1]

Mark Wigley, throughout his text, '*White Walls: Designer Dresses*', defined architecture and fashion in opposition: Architecture should be timeless, fashion meant changeability. Architecture should be determined by its bones, its structure; fashion, by its clothed surfaces. Architecture should be strong, masculine; fashion is frivolous. Yet a soft architecture exists between these oppositions, creating new spaces between these polar opposites.

In determining an appropriate built design vehicle to operate, a 'house', or, 'housing' became most accessible to explore ideas of a Soft Architecture. The term housing is often understood as a functional typology, with a preconceived program for sleeping, cooking, playing, etc. But in this context, the housing in a soft housing does not follow the inventory of programs typically associated with residential architecture: it is not a condominium or single family dwelling with a kitchen, living room, two bed two bath and garage, but a housing, a case or cover, a shelter for the soft body. The soft housing is fitted to it, accommodates it and allows it to settle in it, providing sufficient space for different characters, circumstances, and parts of human life. It is a new typology, with a range of spaces oscillating in and between indoor and outdoor spaces; wet and dry spaces; light and dark spaces; and many other characteristics.

The soft housing is a series of moments derived form leassons in design reserach. The soft housing is composed of layers and surfaces that surround the body: beneath, to the sides, and above. Three different planes enclose the body, searching for the ineffable quality of space. Each plane connects to a traditional architectural element, openings, or circulation. These fragments are all thresholds, they are permeable boundaries separating distinct spaces, allowing the body to exist in between them: the conceived interstitial zone.

Figure 93

7.2 Constructing Soft Housing

The experimental mode of making led to the exploration of flexible form-works. Playing with fabric and the techniques of garment making throughout the early stages of the thesis design research prompted ways of thinking to bring them closer to more traditional architectural materials. Typically, when we consider 'architectural materials', hard, rigid surfaces immediately come to mind: woods, steel, plastics, concrete, glass etc. These surfaces become walls, floors, structural beams and columns – even smaller components, such as doors, yet all the time remain hard and permanent. We think of ways they can be manipulated to have less rigid forms – treating wood and plastics with steam or heat will bend them; concrete, taking any form its mold determines is more malleable, yet is always shored with straight formwork of plywood or cardboard spiral ducting in traditional construction or industrial practices. This yields a very '*hard*' look - solid, firm, with a great deal of strength embedded into the material. It is reliable in that it appears as though the form could not easily break.

Yet fabric is the opposite – it reacts and moves with every force, sensitive to the environment around it.

The exchange between typical materials belonging to both architecture and clothing cannot be interchanged so simply; to make a building out of fabric would not lend it permanence, and wearing a uniform of concrete and steel would be incredibly heavy, uncomfortable, and disallowing of everyday human activities.

These final configurations contain little resemblance to traditional and known figurations. These pieces, frozen in time, "thus from seemingly value free or [from] arbitrary origins, a series of interstitial conditions were produced that contain both a memory trace of their processes as well as an object, the final form of which could not have been predicated from the beginning."[2]

Figure 91. ***Fabric Formwork, Interior***

Figure 92. ***Fabric Formwork Cast***

Figure 93. *Robert Winston Play Sculpture, Lake Merritt in Oakland, CA 1961*

7.3 Design Research: Flexible Formwork

The experiment was simple: replace a conventional rigid mould (like plywood) with a flexible system (fabrics typically used in garment making) so that a flexible formwork takes advantage of the fluidity of state-changing materials like plate or concrete to create new highly optimized, architecturally interesting, soft forms. The level of complexity grew through each experiment; what began as a series of simple shapes that were hung, folded, draped, and weighted, evolved into a series of manipulations traditionally found in the garment making industry. Some of these techniques were recalled form earlier experiments: the pleat, smocking, repetition, gathering, folding, manipulation of seams and darts, etc. Working only with fabric in previous chapters informed the construction and configuration of the casts. There was an anticipated exception or ideal shape that would yield from the cast — yet that was not always the case, just as a clothing does not look the same on a hanger and the body.

The hard, flat, rectilinear world of traditionally cast plaster/concrete is now replaced with softness, swelling, lightness and a new delicacy introduced by use of textile membranes. The construction detail and method is a production of ornament that is inherent in the structure because the mould material is a sensitive network — everything on the fabric will be felt in the final product. These techniques formed one layer of the soft house; bringing the world of dress-making into the world of space-making and architecture.

Nearly any fabric could have been chosen for the moulds and plaster models — each material's characteristics contributed to each piece in different ways, with different results. Historically, the earliest fabric formwork construction was by James Waller, who used Hessien Fabric (burlap), first in 1934 and throughout World War II. Waller noted that the hessian fabric shrinks due to the moisture of concrete, creating more tension in the form.[3] As well, it is difficult to work with because of the large apertures between the warp and weft of the woven structure, short strands easily break, causing the rest of the fabric to tear, and will adhere and embed in casts, making it difficult to repurpose and release the cast. A current precedent is the work of Mark West at C.A.S.T, who uses geotextiles and woven polyolefin textiles, coupled with further plywood formwork to solve engineering inefficiencies and explore new forms in construction.

In the following experiments, the fabric's strength and structural performance was an important concern, as was its absorption and release of water, resistance to tear (elongation and breaking point), and the surface texture of the fabric, considering if the cast will stick to the mould or release easily. Often, secondary moulds or exoskeletons were not involved in the formation of the casts, as the formwork was reliant on the seams and sewn manipulations of the fabric. In some cases, the question of reuse arose, but was dependant on the design and intentions of the mould. All textiles were simultaneously considered on a two part basis; how would they perform as a structure for the cast and as a material themselves – how would they release the mould? What texture, if any, would remain? How would they act when wet from the plaster? Some fabrics, despite being inherently strong, will fail completely and catastrophically if a tear propagates.

The knowledge from Chapter 5.5.2 concerning properties of textiles, fabrics, and fibres informed which fabric to use in the casting process. The decision to utilize a woven fabric was straightforward: knitted fabrics had too many apertures in their chains, and non woven fabrics were either structurally unsound (like felt), or too expensive (leather). Although many woven fabrics were tested (at least one from each column on Table 02), two were chosen to create the majority of formwork; the first, a two sided Nylon (orange in images) – often used in raincoats for its water repellent surfaces, the face of the fabric was smooth, while the back was slightly sticky and abrasive. This fabric was chosen because there was a high percentage of plasticity in the fabric – it would 'hold' the sewn shape without distortion, was durable and could hold in the water of the plaster without leaking, was easy to sew with a simple straight stitch, and would mend holes easily if torn.

The second fabric was a Spandex Lycra (pale beige in images) - and was chosen because it would absorb water within its thick surface while also shedding the excess. This was especially good for the moulds which had a lot of folded surfaces and crevices; because the lycra would hold in the moisture from the plaster. When the cast was being released the Spandex Lycra was often still moist in these crevices, and allowed the material to be stretched more, therefore thinning the fabric. The curves of the plaster would remain intact; yet in comparison to the Nylon, if the nylon fabric was embedded in a fold, the cast would not release it easily or at all – the plasticity of the fabric made it difficult to pull out of cracks and crevices, often breaking the cast in delicate areas. Other attributes of the Spandex Lycra that were considered in choosing was that it would stretch and expand up to 500% its original length – this was intriguing in that it would create very 'swollen' forms, and the results were unexpected – the conversation was strictly between the fabric formwork and plaster, so that I, the controller, despite sewing some seams, often had to let the materials decide the final form. However, sewing Spandex Lycra required a specific needle and more complex stitch type – a straight stitch would 'jump' and skip stitched, leaving many holes along the stitch.

Figure 94

Figure 95

The replacement of a single technical change — using fabric in lieu of traditional plywood for example, opens up a new range of architectural possibilities and a new language of form. Techniques which have been mastered by the garment design industry are now expressed in architecture. Although they may not be immediately read through the final form — the pleated shell on page 138 and 139 does not specifically look like the knife pleat it is, but a unique form that exists in between a hard architectural component and a dress-making detail.

The models shown throughout are a record of the history and the forces acting upon it while it finalised in form. What is poetic about casting is that the final object is the negative space of the initial object. The memory of seams that connect the interior and exterior fabrics through apertures, the folds and bends, where the model buckled under its own weight, and the arts and contours of a liquid material taking shape, composing its form in an equally flexible material all act as artefacts retained in the cast, all at once being paradoxically hard and soft; the bones, flesh, and skin of the soft housing.

Figure 94. *Fabric Formwork Cast*

Figure 95. *Kaedi Regional Hospital, Islamic Republic of Mauritania, Africa, 1995.*

Figure 96. *Fabric formwork investigation with multi materials*

Figure 96

There were two variations of models. First, enclosed models — those that are tailored and sewn in a full envelope. The fabric pressurized the cast in a closed framework that compresses the plaster in a vessel, and began to look more like bodies or parts of bodies in movement. The best examples are the 'Pillow' and 'Y's' on page 140 and 144. In these models, despite sewing a certain formwork, the fluid plaster expanded in unexpected places and ways. The shape of the envelope conformed to the body of plaster rather than the body of plaster conforming to the envelope.

Then, open models — those that are open at some edge or surface, hung, or if the casework of the fabric is slack at any point. These non-pressurized moulds look more like clothing. Open pan formwork: The flat lays, 'Rosette' and 'Clothespin', which were essentially a horizontal piece of fabric tensioned between an additional framework that is a more rigid container, such as in the figures on the facing page.

Figure 97. *A, B, C, D, E: Casting process of open models.*


Figure 97


Figure 97.B

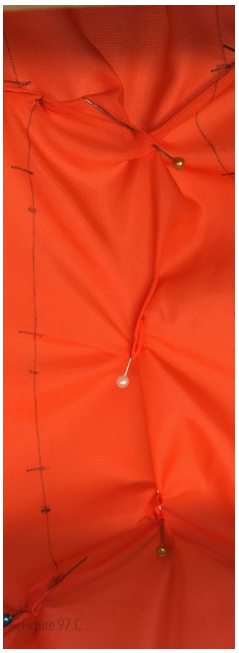


Figure 97.C


Figure 97.D

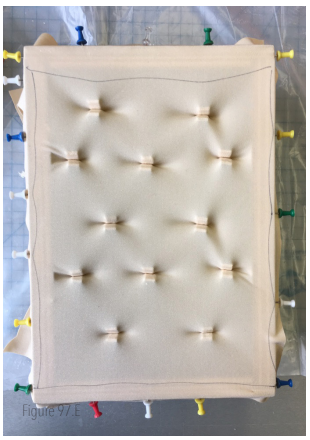


Figure 97.E


Figure 97.F

Operation	Fabric	Description
Tent	Spandex Lycra	Sewn square, with no additional tailoring; hung at corners and centre. 1cm loop of thread knotted in the middle to control thickness of mould.

Figure 98. ***A, B, C, D, E: Casting process of model. Date: 02 22 2018***


Figure 99.A


Figure 99.B


Figure 99.C


Figure 99.D

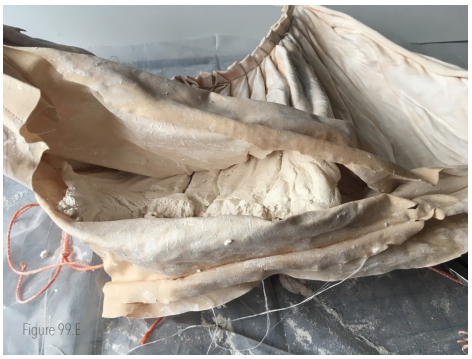


Figure 99.E

Operation	Fabric	Description
Pleat	Spandex Lycra	Rectangle, pleated 1/2 fullness at base. Mould was going to be hung at edge, but the plaster to water ratio was miscalculated, resulting in curing and drying too quickly in the funnel. This cast failed.

Figure 99. ***A, B, C, D, E: Casting process of model. Date: 02 24 2018***


Figure 100.A


Figure 100.B

Operation	Fabric	Description
Pleat	Nylon	Rectangle, pleated 1/2 fullness at base, 'control joints' for width sewn 1/4h and 1/2h of mould. Mould was hung at edges with a steel light gauge wire threaded through perimeter to control shape. Initially this cast failed upon releasing the mould, but was glued together.

Figure 100. ***A, B, C, D, E, F: Final form of model. Date: 02 25 2018***

Figure 101. ***: Final form of model. Date: 02 25 2018***

Figure 100.C

Figure 100.D

Figure 100.E

Figure 100.F

Figure 101

Figure 102.A

Figure 102.B

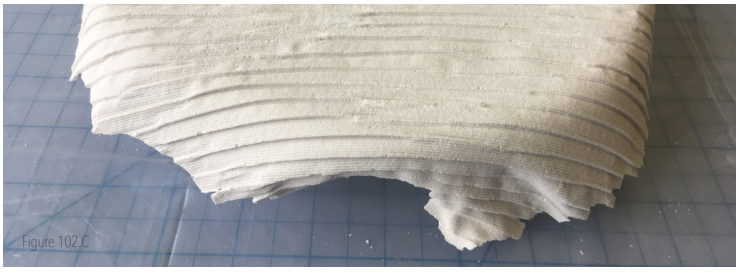
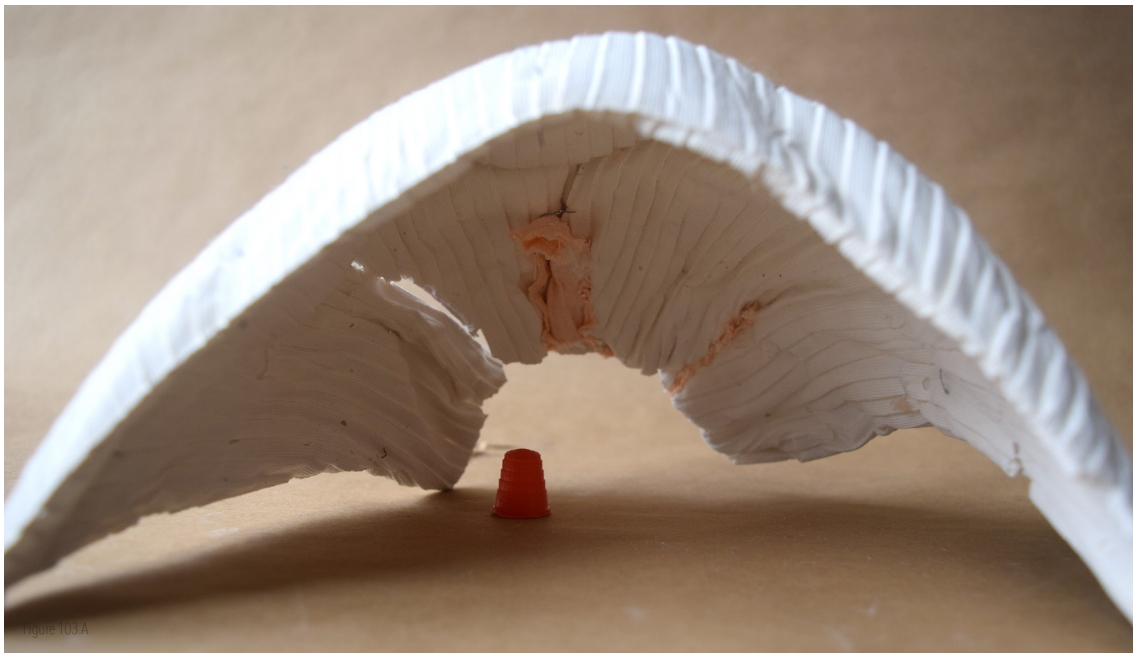


Figure 102.C

Operation	Fabric	Description
Flat Pour	Polyester with Heat Treated Pleats	Laid flat fabric in box. Poured plaster over top Surface treatment

Figure 102. ***A, B, C: Final form of model. Date: 02 25 2018***



Operation	Fabric	Description
Pleat and Hang	Polyester with Heat Treated Pleats	Square, hung at corners and box pleated at base.

Figure 103. *A & C: Final Form; B: Casting process of model. Date: 03 01 2018*

Operation	Fabric	Description
Bending / Repetition	Spandex Lycra	Series of 4. Some were hung at different points, some were laid over other objects.

Figure 104. ***A, B, C, D, E, F, G, H , I: Final forms of model. Date: 03 06 2018***

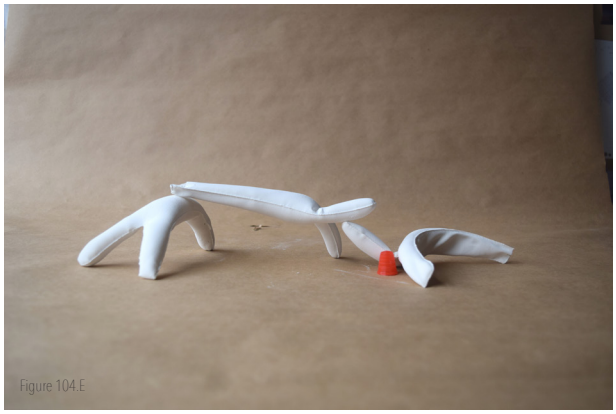


Figure 104.E

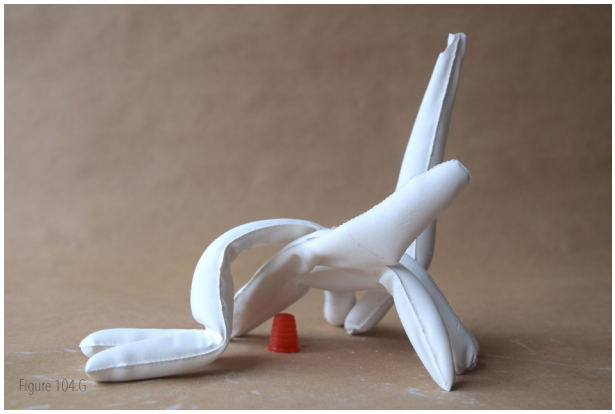


Figure 104.G

Figure 104.H

Figure 104.I

Figure 105.A

Figure 105.B

7.3.1 Outcomes

The scale of these models were determinant on materials, methods and the space available. They were all cast around my desk in studio and were kept on studio shelves for the most part. About one third of the casts that I attempted did not work out – sometimes the plaster did not set properly and the cast would break when I tried to release the fabric formwork, this could have been that the formwork was to complex with too many tight folds or some parts of the cast were too thin. Sometimes the fabric burst at the seams.

And so beyond the technical parts of working with fabric formwork and plaster, I have learned a lot of the spatial implications and opportunities with the models – realizing how the folds and bulges in contrast to the tautness and pulling in some areas speak to the fit and unfitness of the piece. I've extracted from the experiences that the atmosphere of the architecture is in the organization and relation of the surfaces and objects and the energies that they exert. I try to insert myself into the space and feel the softness of surrounding surfaces, and when new materials are introduced, how those new gravities transform the space. And so as the experiments unfolded, I was always questioning what is an envelope and how to envelope which helped inform the making my design project, a soft architecture, and specifically a soft housing. This term is particular to my thesis and I've found no precedent or architectural project which has used it specifically or singularly to describe their work.

Figure 105. ***A, B, Casting process of model: Gathering***

Operation	Fabric	Description
Sewn Apertures / Bend	Nylon	Circular apertures sewn to control expanding width. Hung at 4 corners. Swelling of different points resembles bodies in motion

Figure 106. ***A, B, C: Final forms of model. Date: 03 11 2018***

Figure 106.B

Figure 106.C


Figure 107.A


Figure 107.B

Operation

Sewn apertures

Fabric

Nylon

Description

Irregular 'bean' like aperture sewn to control expanding width. Hung at 2 corners and bent at centre to rest on object. Broke, glued together.

Figure 107. ***A, B: Final form of model. Date: 03 12 2018***

Operation	Fabric	Description
Various	Nylon	Series of 6: 1. Wire embedded into fabric, twisted 2. Weight put on top of half while other half rested on a flat object. 3. Rope tied around 4. Bent over a cylindrical object 5. Wire embedded into fabric, curved. 6. Wire embedded into fabric, curved and twisted

Figure 108. *A, B, C: Final forms of model. Date: 03 13 2018*

Operation	Fabric	Description
Smock	Nylon	Smocked pattern onto one side of fabric formwork; poured on other side. Unable to release.

Figure 109. ***A, B: Casting process of model. Date: 03 14 2018***

Figure 110.A

Figure 110.B

Operation	Fabric	Description
Place object beneath	Nylon	Buttons sewn to underside of formwork. Sewn in circular shape to avoid sharp corner condition that has broken other casts.

Figure 110. *A, B: Final form of model. Date: 03 19 2018*

Operation	Fabric	Description
Encase	Spandex Lycra	Secondary structure to the formwork was introduced: Wire mesh. A square cube of 2.54 cm wire mesh held a open top cube of spandex fabric. First, a water bottle was half-submerged into the mould, secondly a bundled piece of fabric was submerged, both intending to carve out a space. Both fabric and wire mould can be re-used, and were.

Figure 111. *A, B, C, D, E, F: Casting process of model. Date: 02 22 2018*

Figure 112. *A, B: Final Form of model. Date: 02 22 2018*

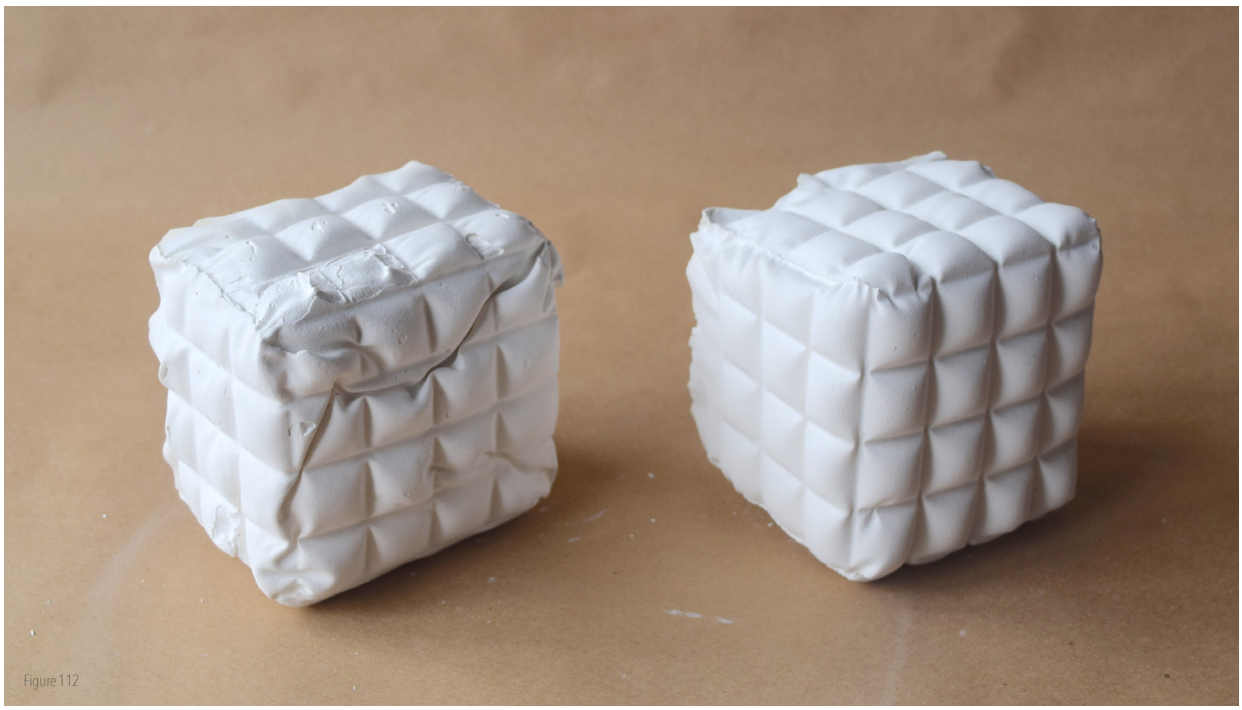


Figure 112

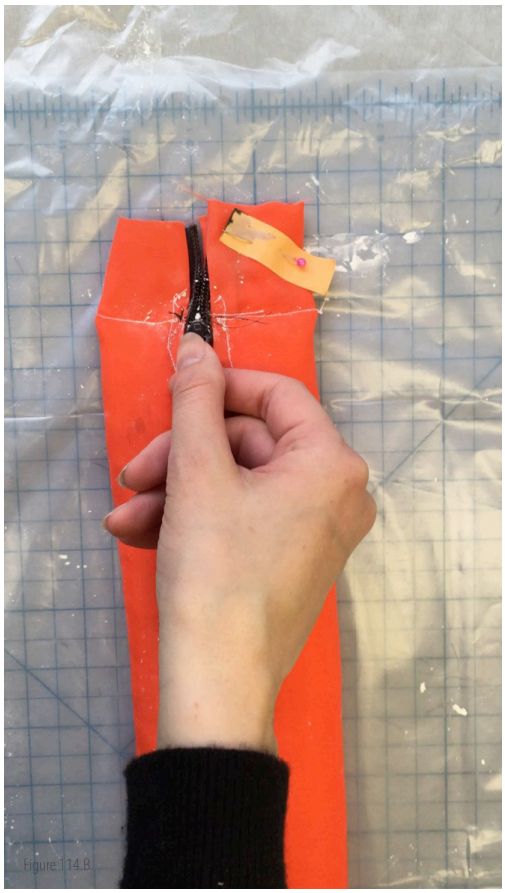

Figure 113.A


Figure 113.B


Figure 113.C

Operation	Fabric	Description
Pinch: 'rosettes'	Nylon	Using a secondary structure again; a flat fabric was manipulated with five twisted 'rosettes' pinned on the underside of the fabric. The frame was clamped together,, sandwiching the sheet of fabric in between, and plaster was poured on top with a thickened of 1cm - 3cm

Figure 113. ***A, B, C: Final cast of model. Date: 03 20 2018***



Operation	Fabric	Description
Zipper	Nylon	In attempt to find a new way to unwrap the formwork, a zipper was sewn into the fabric, unzipping and letting the form come out easily. This formwork can be reused

Figure 114. ***A, B: Releasing formwork process of model. Date: 03 20 2018***

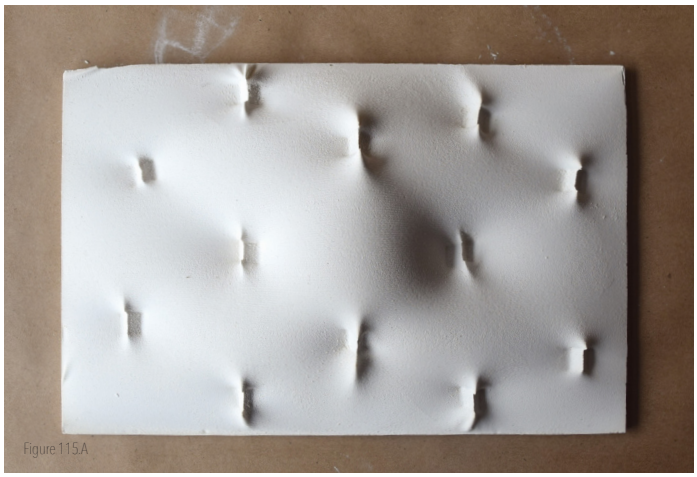


Figure 115.A

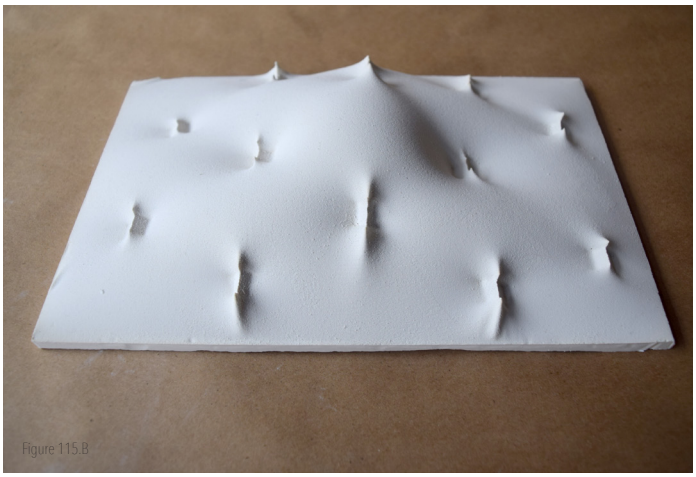


Figure 115.B

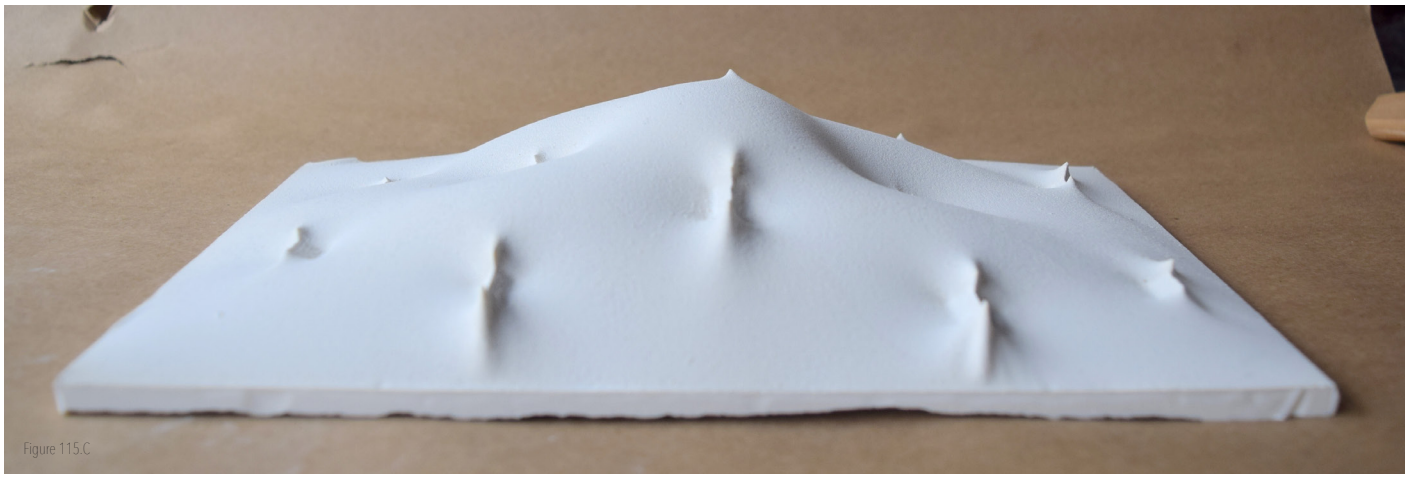


Figure 115.C

Operation	Fabric	Description
Pinch with clothespins	Spandex Lycra	Using a secondary structure again; a flat fabric was manipulated with 12 typical wooden clothespins clamped to the underside of the fabric. The frame was clamped together, sandwiching the sheet of fabric in between, and plaster was poured on top with a thickened of 1cm - 4cm

Figure 115. ***A, B, C: Casting process of model. Date: 03 21 2018***

Figure 116.A

Figure 116.B

Operation

Reinforce

Fabric

Nylon and Mesh

Description

A single piece of fabric was slightly crumpled and plaster was poured overtop. Another layer of flexible, mesh fabric was places overtop of that with another layer of plaster.

Figure 116. ***A, B: Final form of model. Date: 03 22 2018***

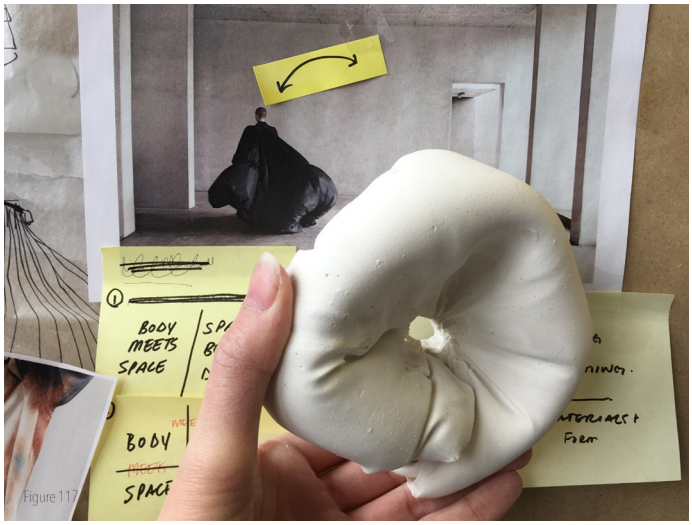


Figure 117.A


Figure 117.B


Figure 117.C

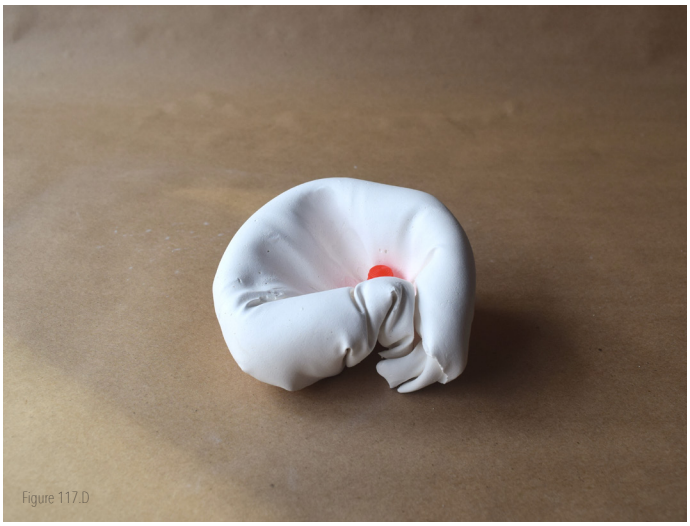


Figure 117.D

Operation	Fabric	Description
Gather / Tuck	Spandex Lycra	Fabric was gathered and then surrounded by itself - making a donut-like void in which the plaster was poured into. The Spandex Lycra works with both tensile and compressive forces.

Figure 117. ***A, B, C, D: Final form of model. Date: 03 22 2018***

Operation	Fabric	Description
Gather with Stitch	Nylon	Fabric was gathered by sewing technique: a running stitch where the bottom thread was pulled to decrease the surface area of the fabric, bunching it up and creating a ripple effect.

Figure 118. *A, B, C: Casting process of model. Date: 03 22 2018*


Figure 119.A

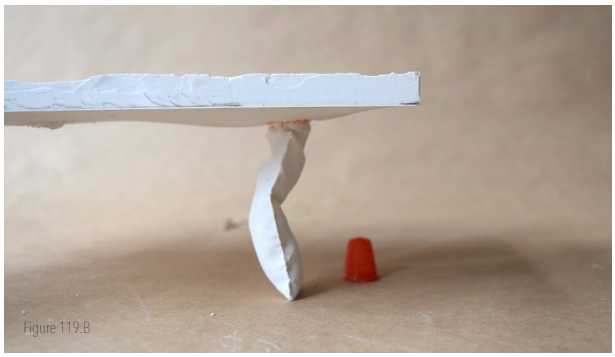


Figure 119.B


Figure 119.C

Operation	Fabric	Description
Attach structure	Nylon	Vertical support sewn to a horizontal plane, so that when poured, the plaster would sink into the legs of the piece. However, the apertures/connection points were too small and 3/4 of the components broke off.

Figure 119. ***A, B, C: Final form of model. Date: 03 23 2018***


Figure 120


Figure 120.B


Figure 120.C


Figure 120.D

Operation

Cast around object

Fabric

None

Description

A model's physiologiical body was used as formwork for clay to shape itself around.

Figure 120. ***A, B, C, D: Final form of model. Date: 03 23 2018***

Operation	Fabric	Description
Gather 2	Nylon	Fabric was gathered and then surrounded by itself - making a donut-like void in which the plaster was poured into. This piece was larger and did not turn out as well.

Figure 121. *A, B: Casting process of model. Date: 03 22 2018*

Figure 122. *C, D: Final form of model. Date: 03 22 2018*


Figure 123.A


Figure 123.B


Figure 123.E


Figure 123.C

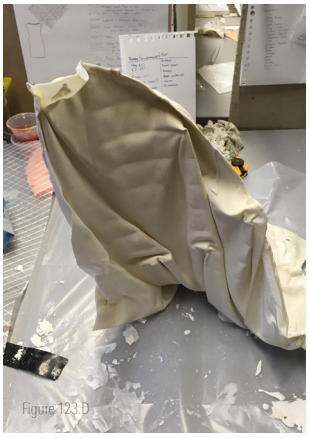


Figure 123.D

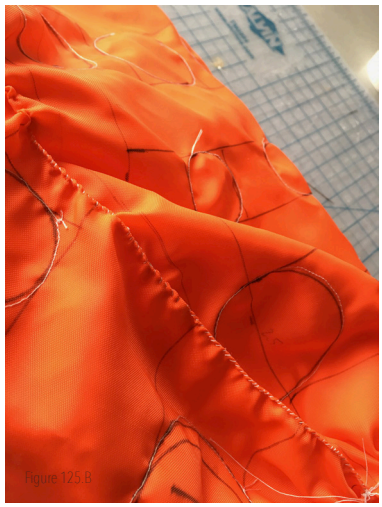

Figure 124.A

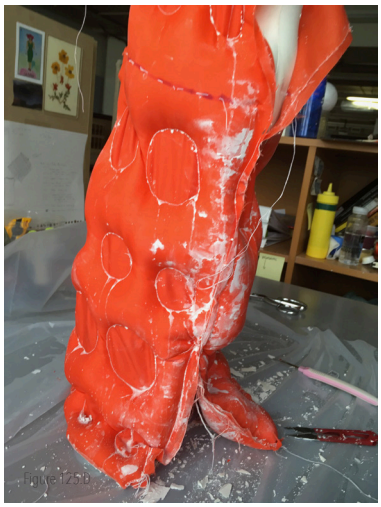

Figure 124.B

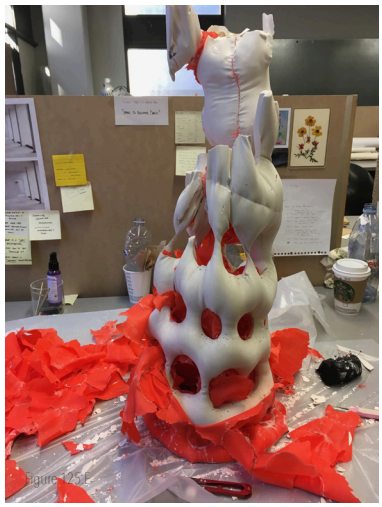
Operation	Fabric	Description
Drape	Spandex Lycra	Draped spandex was pinned to a cylinder of chicken wire, and folded as preferred. plaster was 'painted' onto the fabric 6 times over.

Figure 123. *A, B, C, D, E: Casting process of model. Date: 03 26 2018*

Figure 124. *A, B: Final Form of model. Date: 03 26 2018*







Operation

Apertures

Gather

Enclose

Fabric

Nylon

Description

Most ambitious cast yet - 5 hours to sew the mould and 6 to take it off. Circular apertures were regularly sewn into the double walled fabric, which was then sewn to itself to enclose. The mould was stitched to gather about 2/3 high up. Although this did not work as planned, it still turned out in an interesting form.

Figure 125. *A, B, C, D, E, F: Casting and release process of model. Date: 03 25 2018*

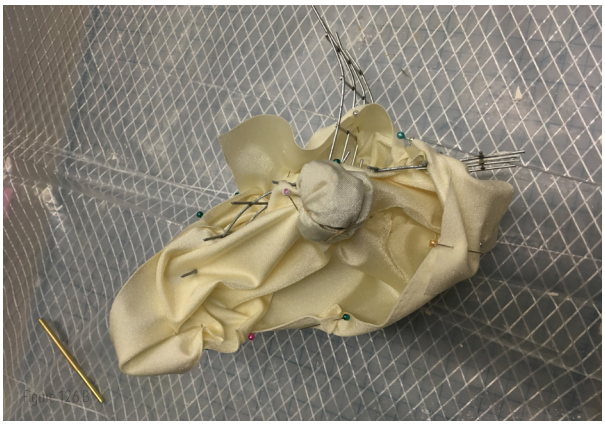
Figure 126. *A, C, D: Final form of model. B: Inside the model. Date: 03 25 2018*

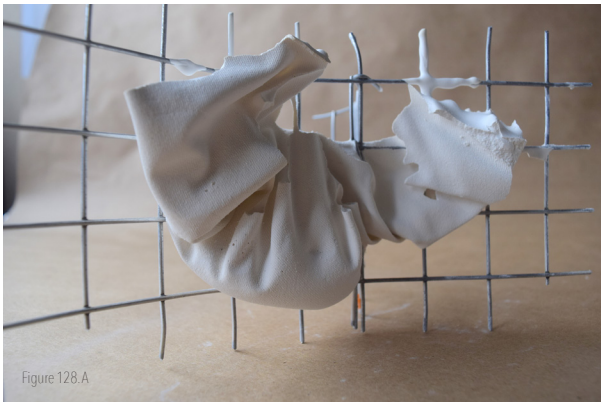
Figure 126.A

Figure 126.B

Figure 126.C

Figure 126.D





Operation	Fabric	Description
Gather around wire grid	Spandex Lycra	Wire grid was shaped into a 'T' formation. Fabric was gathered at top and then sliced, pulled, threaded through the grid as if to surround the 'T' structure. Releasing the model created a 'sectional' view of the interior of the cast.

Figure 127. ***A, B: Casting process of model. Date: 03 27 2018***

Figure 128. ***A, B, C, D, E , F, G: Final form of model. Date: 03 27 2018***

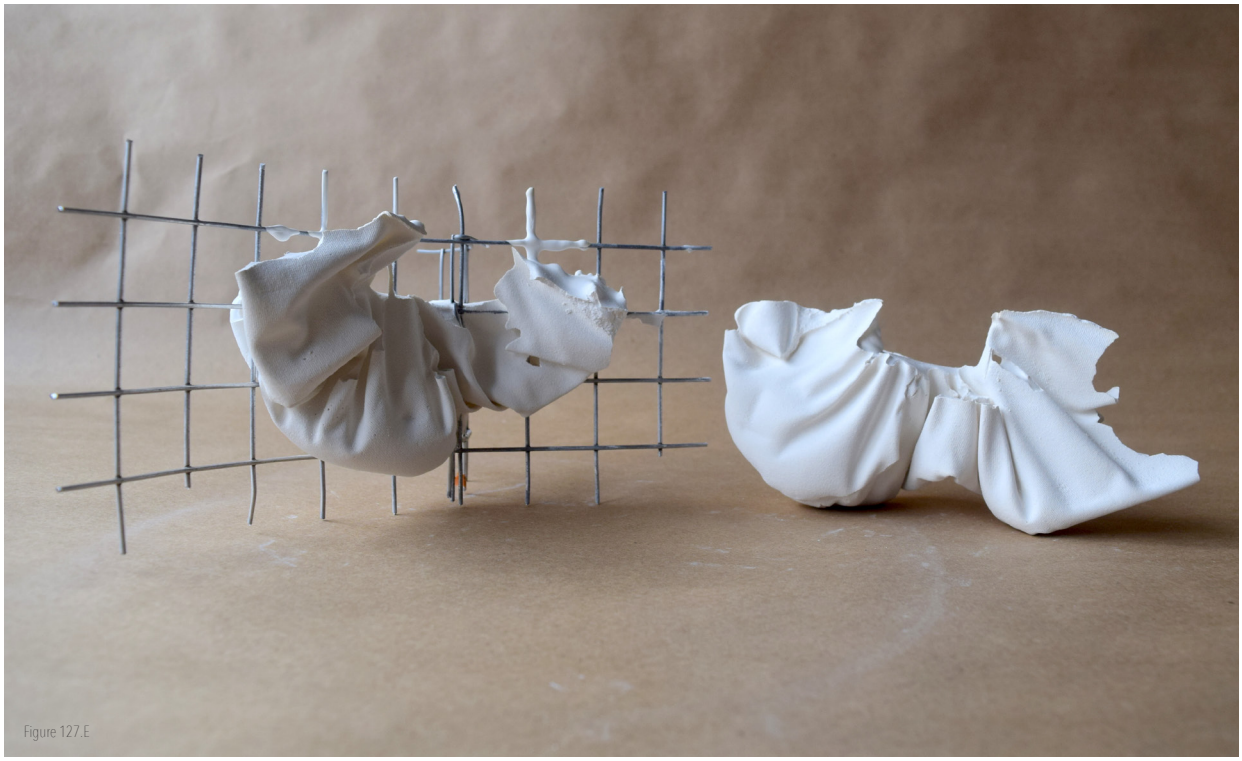


Figure 127.E

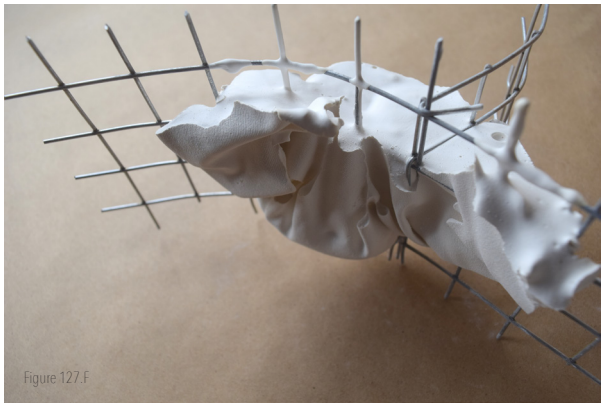


Figure 127.F

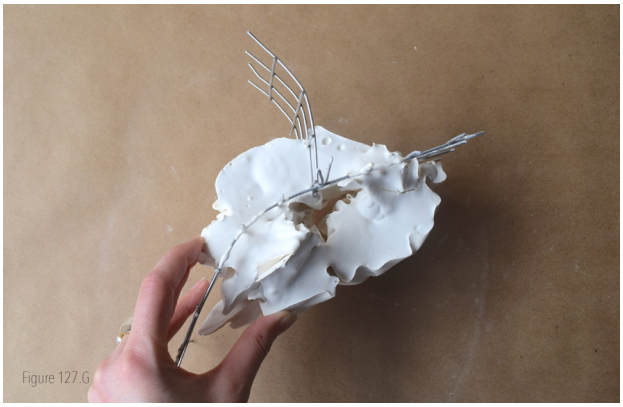


Figure 127.G

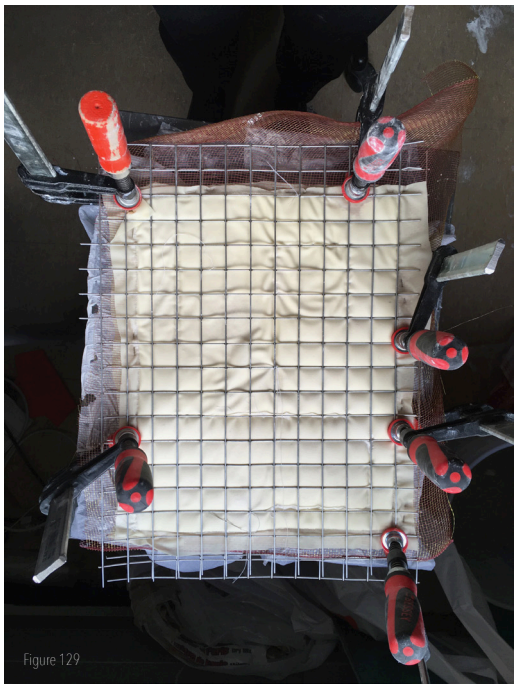


Figure 129

Figure 130.A

Figure 130.B

Figure 130.C

Operation	Fabric	Description
Make flexible	Spandex Lycra, Wire mesh	Mesh was sandwiched btween two panesl of Spandex Lycra and sewn closed. The plaster was poured into this and quickly sewn closed. Then, wire mesh with 25.4 cm apertures was sandwiched arounf the Lycra and clapmed down to create breaks in the plaster. The final form is a flexible fabric: a new potential 'Achitectural Textile' for Chapter 5.6

Figure 129. ***Casting process of model. Date: 04 21 2018***

Figure 130. ***A, B, C, D: Final form of flexible model.***

Figure 130.D

Operation

Seam structure
Pleat
Aperture

Fabric

Nylon

Description

A large cast as an iteration to the final design of a Soft Housing. A pattern was created for this, sewn and notched so that the cast would form in a particular way, with seams providing structure and balance the fluidity of plaster.

Figure 131. ***A, B, C: Final form of model. Date: 034 19 2018***

Figure 131.C

Operation

Corner connection
Mix materials

Fabric

Nylon
MDF
Brass
Elastic

Description

Creating a corner detail to showcase connection of different materials to the plaster moulds. Brass was cast into the plaster and tennoned into the joints of the horizontal surface of the MDF; Elastic knots cast in to vertical plaster mass to button onto the buttons sewn to the vertical MDF surface.

Figure 132. ***A, B: Final form of model. Date: 04 20 2018***

Figure 132.B

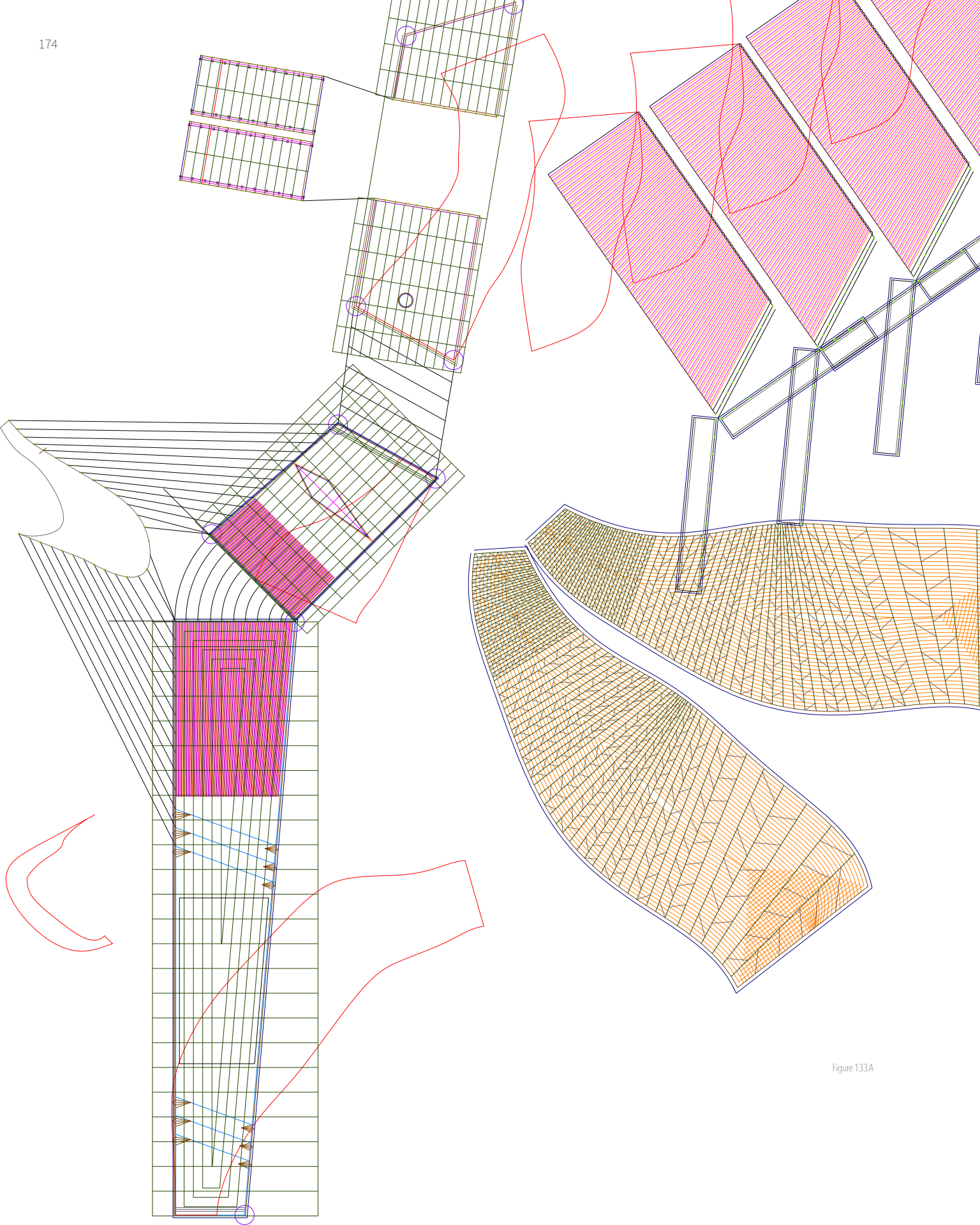
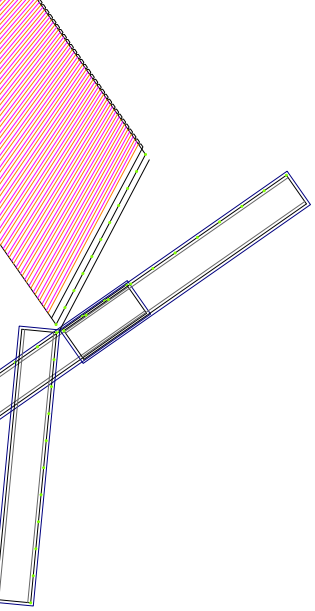
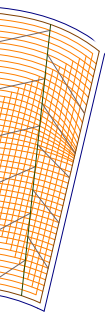


Figure 133.A



7.4 A Design Project

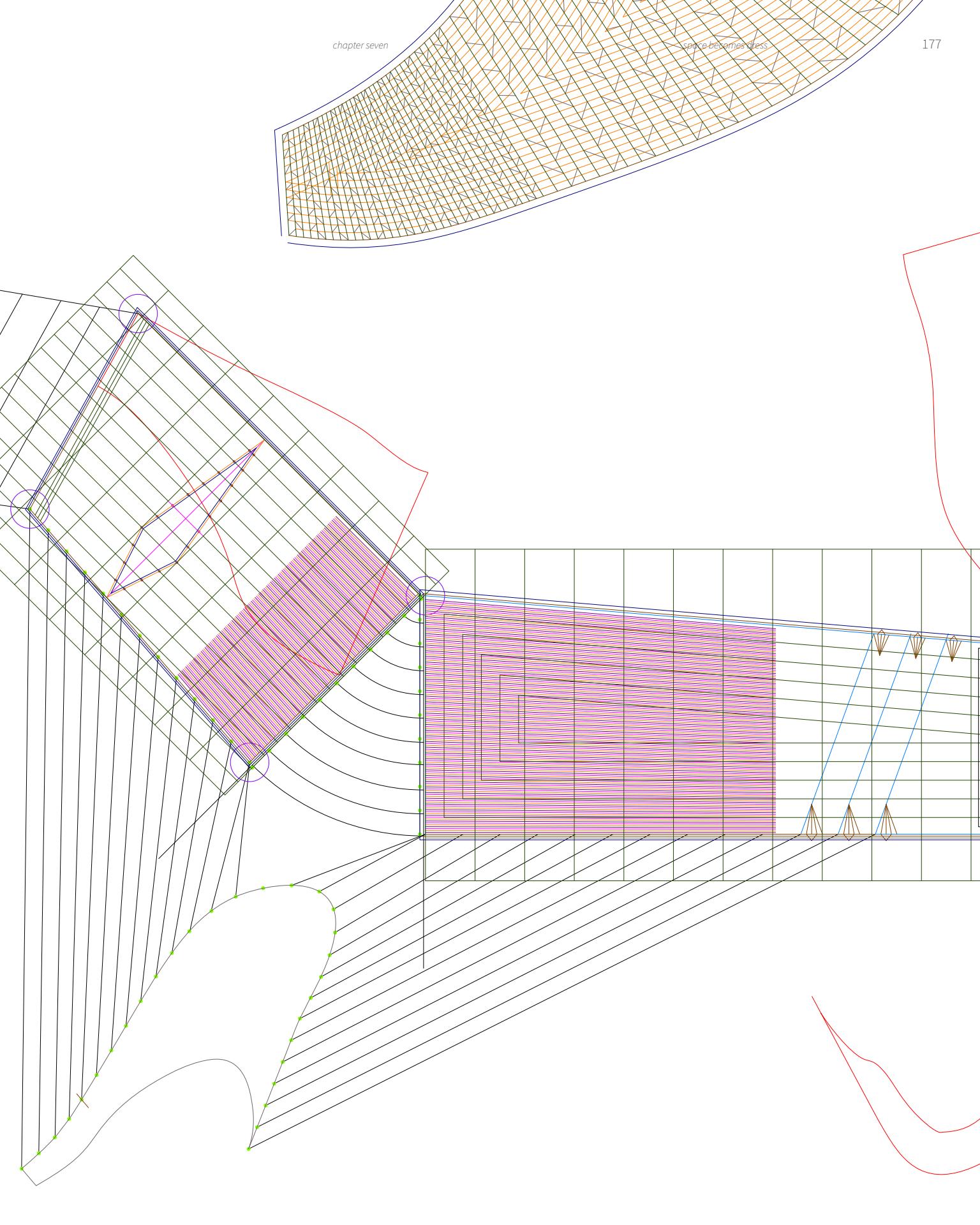
We layer the garments we wear — from most intimate to outer shells made public. In the soft housing, the layering occurs in a series of spaces that blur into each other, loosely blurring into one another so that there is a spatial fluidity. The pattern on the facing page created the enveloping installation for the final defence presentation. It was the soft architecture conceived at the scale of the body and its movements, providing flexibility of space, that can swell and contract and protrude around hard surfaces. The space was shaped to fit the body of the Paul H. Cocker Gallery at Ryerson University's Department of Architectural Science, always questioning the fit and feel of the potential outcome. Soft housing is an example vehicle of soft architecture, developed in this thesis to explore the tangible possibilities of a soft architecture. Where soft architecture outlines the theoretical position, soft housing proposes a particular set of design inquiries to demonstrate the theories, and were put forward here, at a scale of 1:1.



The envelope of one's physiological body extends outwards in various multiple shells, layer by layer, moments and boundaries existing somewhere between architecture and clothing, the layers are separate yet interwoven, allowing the physiological body to move through the interstitial areas of the soft architecture and through animate and inanimate organizers of space.

Figure 133. *A, B & C: Pattern to create envelopment in final defence presentation*

Figure 133.B



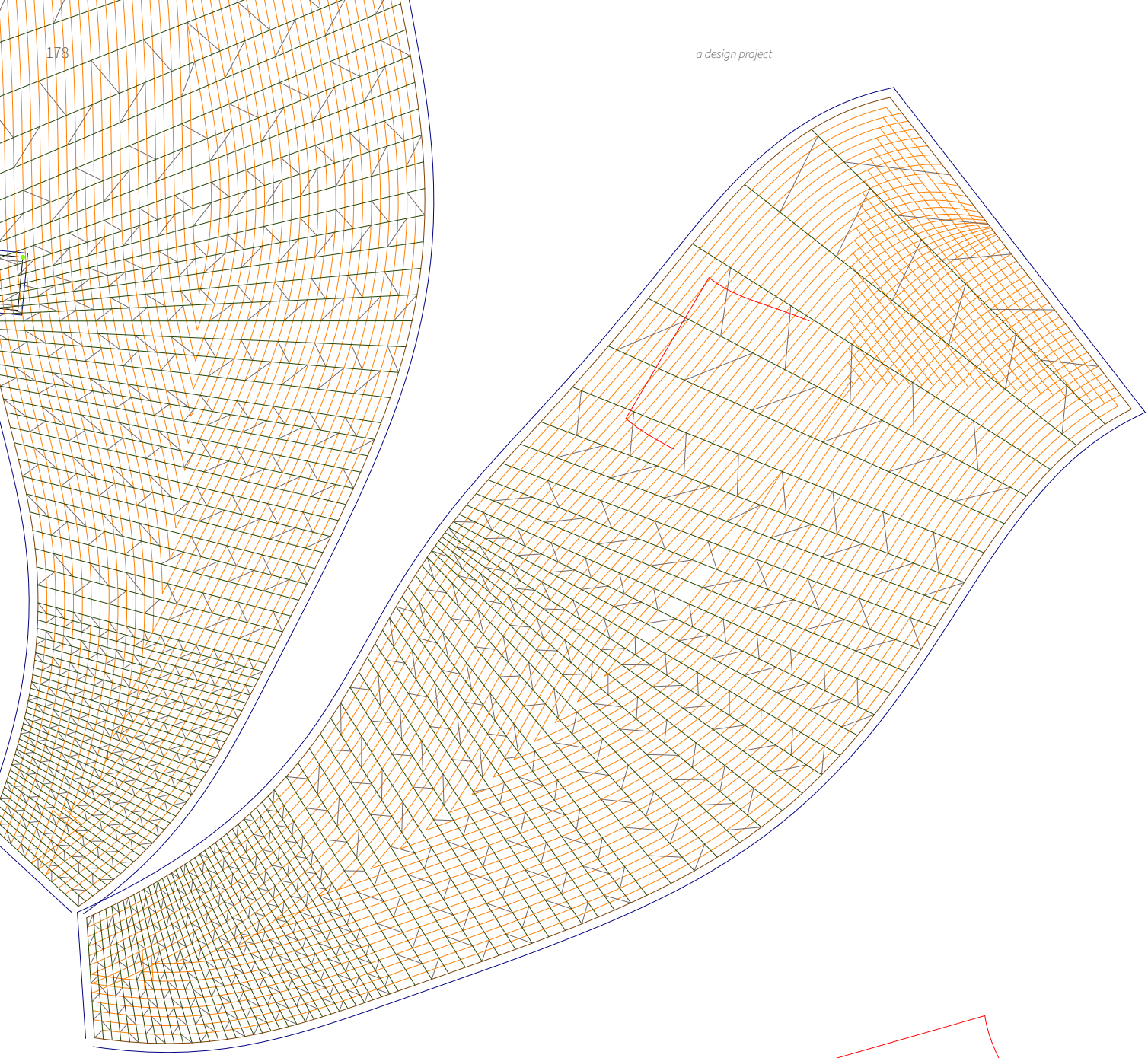
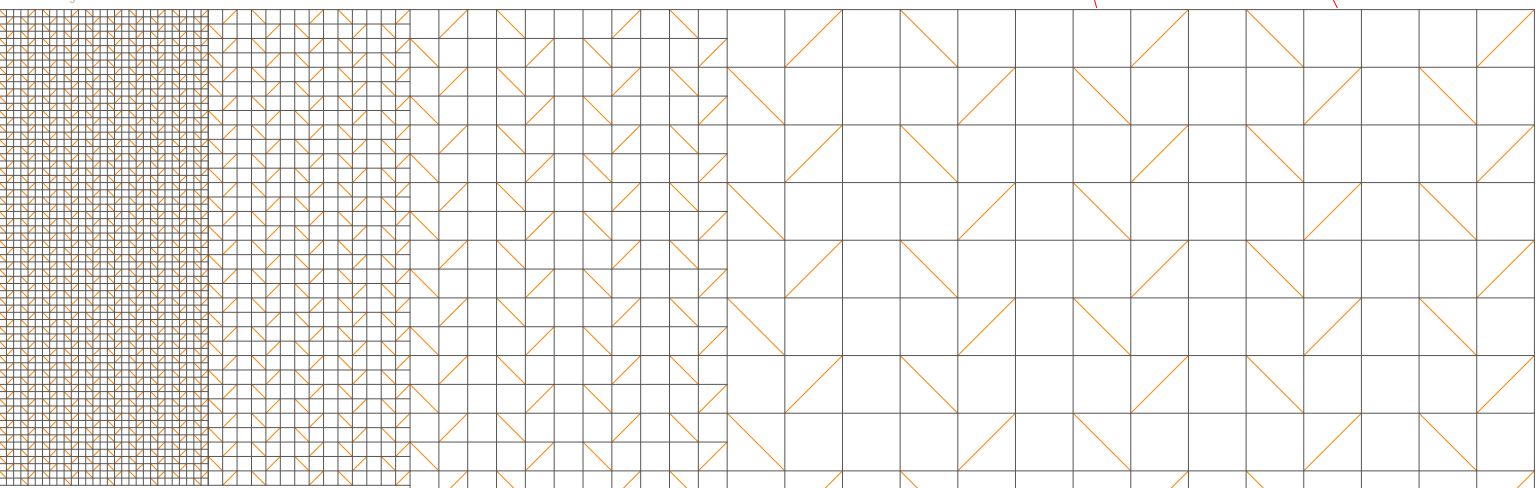
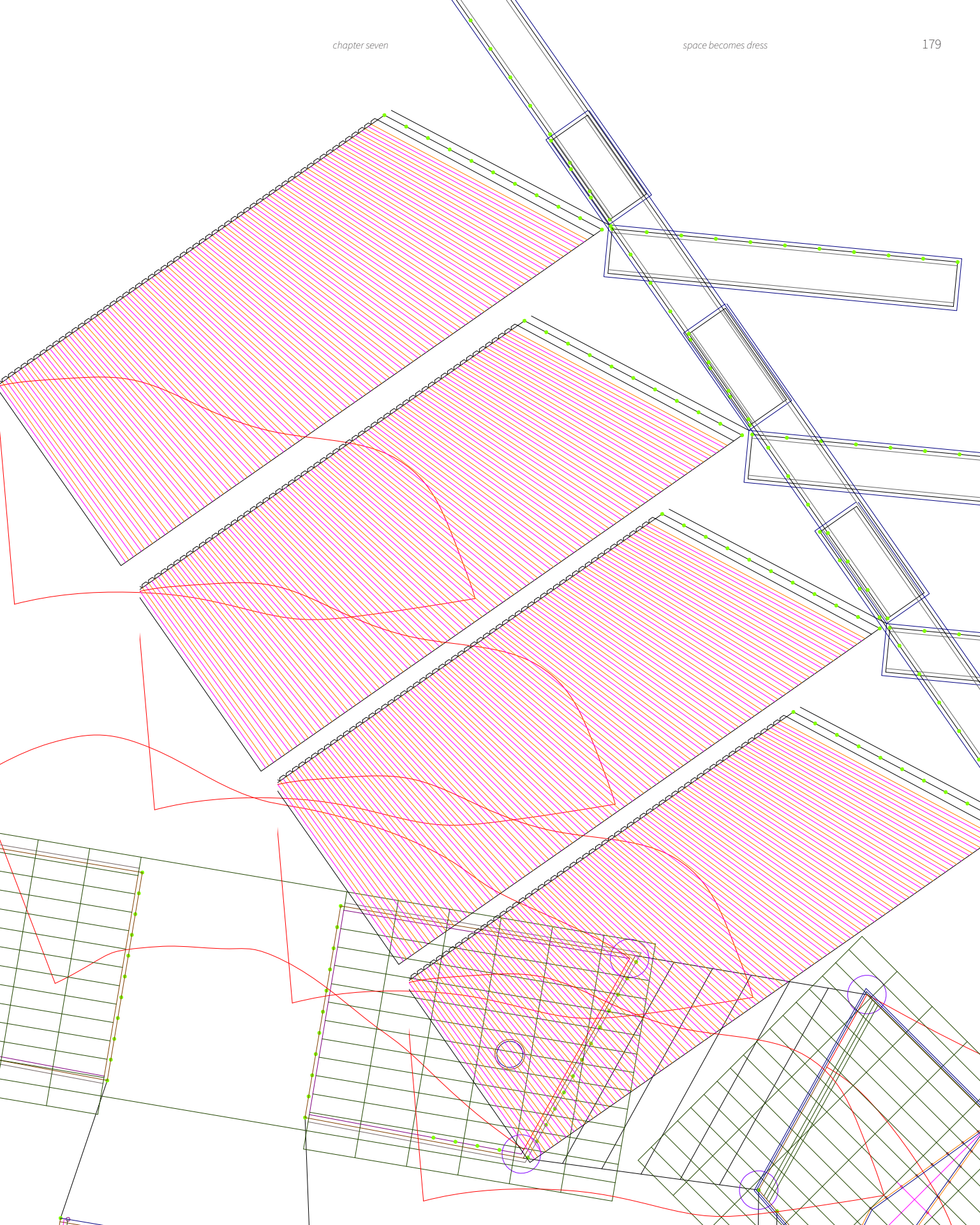


Figure 133.C





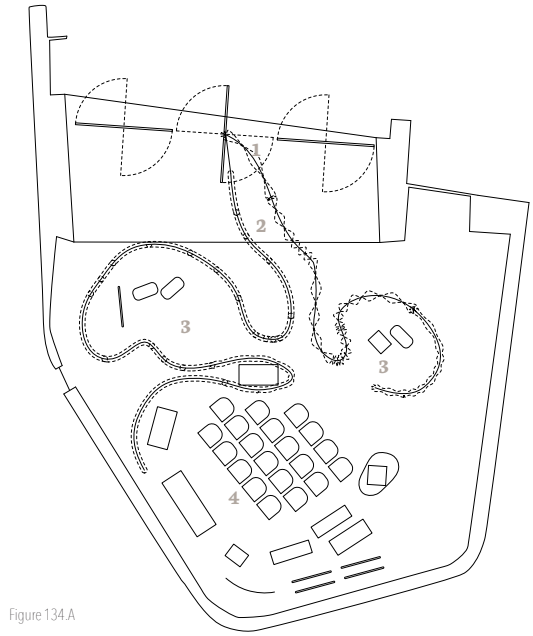


Figure 134.A

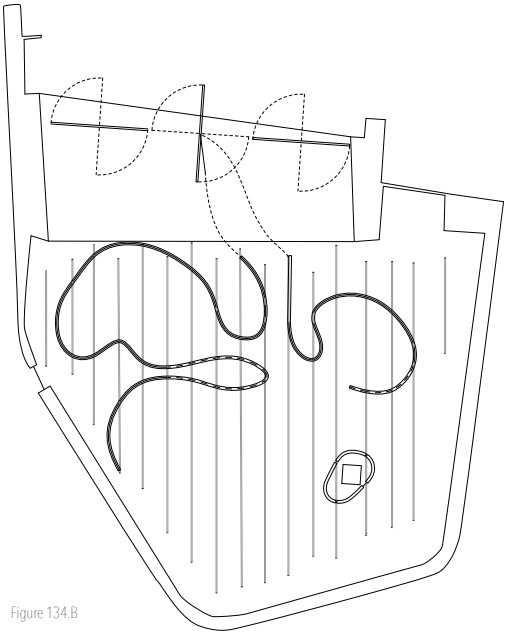


Figure 134.B

Figure 135.A

Figure 135.B

Figure 134. *A Floor plan of proposed installation. B: Reflected ceiling plan with structural formwork.*

Figure 135. *A, B & C: Mock up of smocked room, two days before final presentation*

Figure 135.C


Figure 136.A


Figure 136.B


Figure 136.C


Figure 136.D


Figure 136.E

Although not necessarily a hierarchy, the centre of the soft housing is the nucleus. Mimicking the body being the centre of all layers of clothing, and the heart the centre of the physiological body, the soft housing is in itself a body (in that it is a collection), and an envelope that makes up the main physical form and figure. This interpretation of soft housing for the gallery was composed of four different layers: an interstitial zone between interior and exterior (labelled on Figure 134.A as 1), a compressive entrance (2), rooms that create loose enclosures (3), and a nucleus where the audience sat (4).

The most exterior is a double threshold, it is the space between the initial entry and the muslin envelope. You have entered the gallery, but exist in an arcade-like intermediary zone between the interior of the housing and the exterior shell of the gallery. Mediating two environments, this now creates a third; a volumetric veil that expands the boundary situation into a spatial gradient. You may walk around to see the exterior of the muslin envelope, the seams and threads that hold the envelope together.

Entering the second layer of the soft housing, one is beneath a smocked ceiling surface, dipping lower at certain points to create a guided opening that seems near cave like. Gathered ruching of fabric create low overhead surfaces at first creating a darkness that, within a few steps, opens to a space suddenly filled with light. The smocked ceiling surface blends into a vertical surface enveloping a room to your left, while the gathered fabric continues to your right, expanding into an envelope composed of sheets of fabric stitched with a French seam, hiding a cord that can gather the fabric tightly to reveal its contents to the outside world. This gathering creates a three metre tall curved vertical surface, enclosing the exhibition for 'Dissident Tailoring', which then shortens to a one metre tall wall surface that is pleated, anchored in four places before expanding upwards again to three metres. This shortened wall hides plinths to display plaster casts from the Flexible Formwork experiments, and allows the audience to see into the different rooms once inside the envelope.

Figure 136. *A: Base of pleated wall. B: Pleated wall curving into digital presentation area. C: Display of Design Research: Pleats in canvas and pleated fabric formwork. D: Room to display Dissident Tailoring, 'Union' on mannequins. E: Audience seating area looking onto pleated wall and room for Dissident Tailoring*

Figure 137.A

Figure 137.B

Figure 138.A

Figure 138.B

Figure 139.A

Figure 139.B

The smocked wall curves to form a room exhibiting a bodice made from the fused wooden textile, becoming shorter at its tail end. The entire space was sewn from approximately 144m^2 of muslin fabric, with some previous experiments or projects sewn in. For example, one of the coats made in AR8101 — the smocked coat, was sewn at the tail end of the smocked room.

This one pattern fits the body of the existing gallery, one pattern that can give way to every body. There were several mock-ups done before the final install, and the fabric mutated differently — even slightly— in each iteration as it was arranged and rearranged on the body of the gallery. The installation was taken down in less than an hour after the end of the defence. It was a temporary fixture, one that was tried on, fitted, pinned in place, taken off, and folded back into an efficient shape to be stored for future use or discarded. All operations that we do with our garments.

This iteration of the soft housing asks the body to move and feel. Void of function, the form of the project is not subordinating itself to anything but the body and contours of the gallery. The desire to produce this prototype was to test the thesis, to spark a discourse of scale and proportion of the pieces, and observe the bodies sitting, standing, moving within and responding to the envelope. The layers of the installation, the soft housing, were not fixed, they were malleable. The boundaries were not hard, they were soft. Soft to the gaze, touch, kinaesthetic sense, and soft in its formality of surfaces above and around the audience.

Notes: Chapter Seven

1. Ibid
2. Eisenman, Peter. "Zones of Undecideability: The Processes of the Interstitial." *Anyhow*. Edited by Cynthia Davidson. (Cambridge: MIT Press, 1998), 33.
3. West, Mark. *The Fabric Formwork Book: Methods for Building New Architectural and Structural forms in Concrete. (*New York: Routledge. 2017), 21.

Figure 137. ***A: Pleated wall. B: Various hung displays and plinths to showcase experiments in Design Research.***

Figure 138. ***A: Looking toward entrance and first interstitial zone between interior and exterior. B: Smocked room to showcase bodice made of Architectural Textile. All in final presentation***

Figure 139. ***A: Hung display of bodice iterations. B: Entrance into gallery.***

Figure 140. *A: The envelope for the gallery space becomes the envelope personally. B: close-up of fabric formwork first model.*

8.0 Conclusion

To conclude this book, I recall three introductory questions. The first being, 'Why look outside of architecture?'

The interstice between dressology and architecture is a gradient of possibilities, a range of sites for meaningful connections and coexistences, but also of innovation and transformation for both practices. The symbiotic zone signifies new value placed on the fit and feel of space, derived from the moulding and tailoring of materials, geometries, and scale to allow the body to settle in space.

The visual expression of this book and its underlying concepts suggest that today's architecture fails the body; the traditional approach of disembodied preoccupation with function and economy leads to a corporeal detachment, where design should instead stimulate and enhance our experience of space. By introducing the agent of dressology, I hope that this thesis opens up a range of possibilities to determine form and volume in architecture, and ways to envelope the human body. As well, that the lessons of hapticity and intimacy established in the world and theories of dressology institute themselves in architecture so that the design process considers different ways to envelope the body so that we interact and move through space in a way that changes us and affects us emotionally, and that an ineffable architecture is more possible.

The next question I had sought to address was, 'What is an envelope?', and, 'How do we envelope the body?' The answer to this lies in the process of designing, specifically, that a necessary condition to creating envelopments is that we begin with the expression of the body. The movement of the body. That there is no necessary function. We do not require the body to do, but to *be*.

These investigations in design research began as a desire to make and mould for the body, lead to profound insights about the dangers and possibilities that technical, aesthetic, and social applications contained in dressology might encourage a new corporeal significance within architecture. These experiments and investigations suggest new scenarios and conditions to envelope the body, one that is based on the act of moving to experience architecture and on an extended kinaesthetic sense. The design experiments propose new aesthetics, materials, and, despite my better efforts to remove function, programmatic applications of how to inhabit space, how to take up space, and how we define it with our expressive and active bodies. An envelope does not limit the body, it allows an extension into its environment. An envelope is both malleable and structural, to allow the body to be in motion. An ideal envelope, in this sense, is soft.

The final question to address is, 'What would a seam, a pleat, or a tuck do for the contours of forming space?' In dress, bodily movements herald the advent of a new dimensional sensibility. Seams provide structure. Pleats provide room for growth. Tucks provide mystery and volume. In every case, these operations are accounted for in the original document that creates the garment: the pattern. Here is where questions of scale and proportion are also answered. In dress, pattern grading is a process of differential scaling applied separately and in multiple dimensions to every part of the original pattern — the application is formulaic, instrumentally complicated and technical, yet the benefit is not technical at all, but rather a simple concept.[1] One singular pattern may give way to the specification of many new sizes and shapes. In making dress, when we get bigger, our envelope gets bigger. Yet in architecture, as we build taller, we become smaller. Our patterns of scale do not grade in the same way, and proportions of space, apertures like doors and windows, become less humanlike, less of the scale of a physiological body, its movements, and perceptual self. In making architecture, a seam, a pleat, or a tuck would determine the tailoring and modification of the space and envelope relative to the body in question, so that the fit and feel of space may correspond with our senses and we may feel proportionate to our immediate environment, the world we inhabit.

When body meets space, our kinaesthetic sense perception extends beyond the limiting physical bodies, recognizing the relationship we have to objects we can see, and forces we can feel. We move to experience architectural space, and in turn are moved by its ineffable qualities. As we make shelter, patterns appear out of the organization of materials, geometries, and structural hierarchies.[2] And when space becomes dress, it extends, develops, and defines into form from rhythms that come from the desire to make a fitting enclosure that may stretch, bend, curve, and contract[3], determining specificity in spatial fit, unfit and fitness of its subject. It begins with the soft body, not as an abstraction of function, but as a definition of specific space, form, and experience.

The experiments in design research in dress and architecture brought up a range of challenges and questions that I could not have anticipated, with outcomes and physical developments that I could never have imagined were possible to achieve in an envelope, structure, and in spatial dimensions. Although my intentions and expectations controlled most of the conclusive configurations of these experiments in both dress making and making architecture, there was an enormous amount of trust placed in the materials to react and interpret the formation of inhabitable spaces. The hands may create the conditions and dimensions of spatial inquiry, but I have found in a moment of searing clarity, that form follows fabric.

Figure 141. ***A&B: Fabric formwork with apertures.***

Notes: Chapter Eight

1. Legendre, George L. Bodyline: The End of Our Meta-mechanical Body: Studies of Diploma. (London: Architectural Association Publications. 2006), 20

2. Betsky, Aaron. *Architecture Matters.* (New York: Thames & Hudson, 2017), 41.

3. Betsky, *Architecture Matters., 41.*

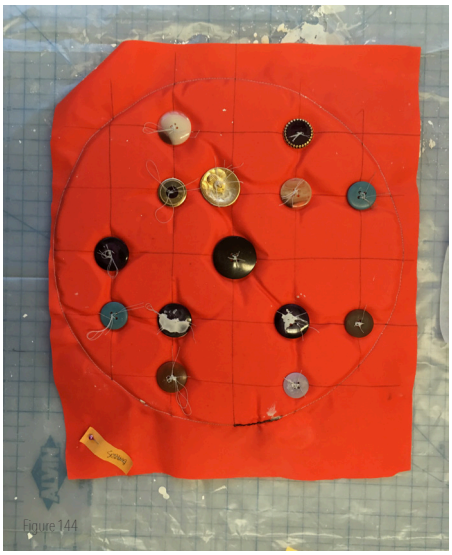
Figure 142

Figure 142. *View behind my desk, taken mid-April with many cast-tests*

Appendix A

Process & Schematic Work

Showing the process of casting and creating the formwork for some of the models.



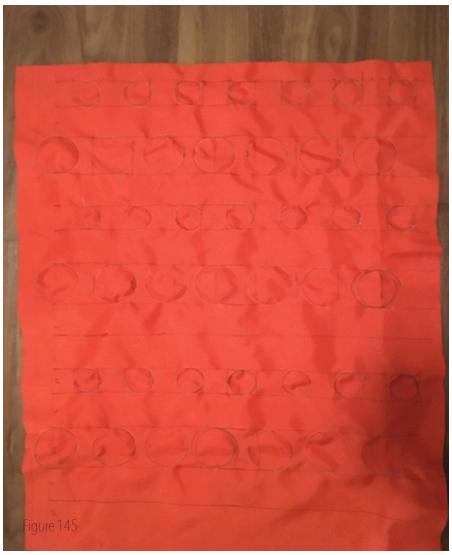
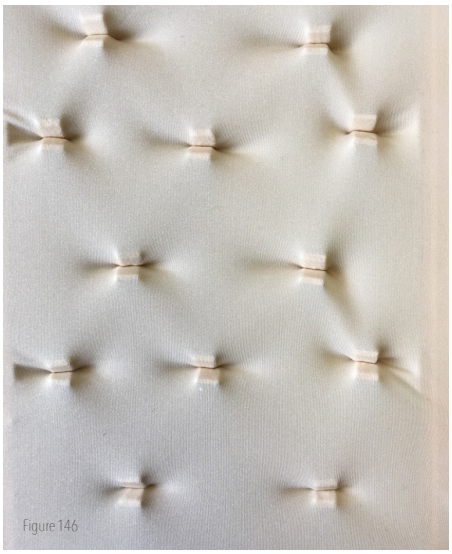


Figure 143. ***Sewn Formwork before pouring plaster***

Figure 144. ***Sewn Formwork before pouring plaster***

Figure 145. ***Sewn Formwork before pouring plaster***



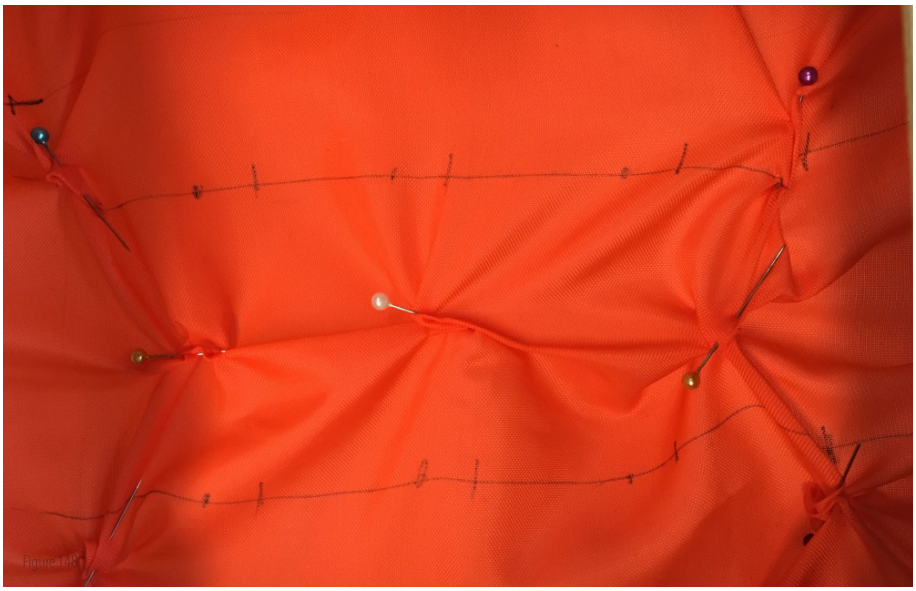


Figure 146. ***Application to fabric before pouring plaster***

Figure 147. ***Application to fabric before pouring plaster***

Figure 148. ***Application to fabric before pouring plaster***

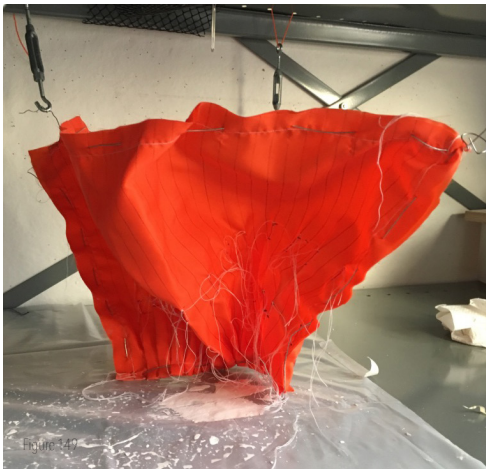


Figure 149


Figure 150

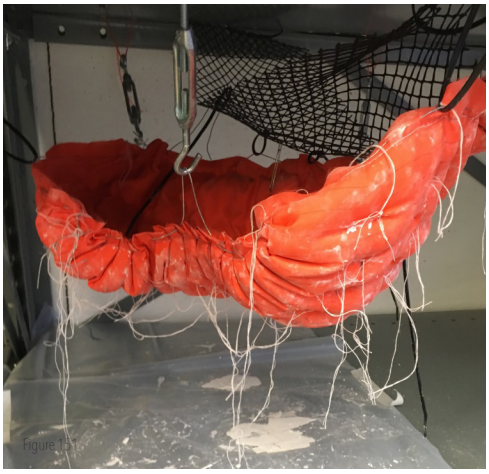


Figure 151


Figure 152


Figure 153


Figure 154

Figure 155

Figure 149. *Hanging formwork to determine position before pouring plaster*

Figure 150. *Adjsuting plaster within formwork - this one failed.*

Figure 151. *Curing plaster*

Figure 152. *Curing plaster*

Figure 153. *Hardened plaster, standing on its own*

Figure 154. *releasing formwork*

Figure 155. *Freshly poured plaster into formwork. This is clamped around my desk and chair in studio*

Figure 156

Figure 157

Figure 156. ***Releasing the formwork***

Figure 157. ***Applications to a single typology/shape***

Facing page

Figure 158. ***Hanging formwork with plaster curing inside***

Figure 159. ***Cured plaster in formwork, solid***

Figure 160. ***Trying to replicate gathering application in the photo***

Folowing Pages

Figure 161. ***Velour formwork***

Figure 162. ***Testing various fabrics***

Figure 163. ***Testing various positions in Lycra***

Figure 164. ***Linen Formwork***

Figure 165. ***Various formwork after curing***

Figure 166. ***Adjsuting hanging position***

Figure 167. ***Curing position for large cast***

Figure 168. ***Curing position for large cast***

Figure 169. ***Final formation***


Figure 161


Figure 162


Figure 163


Figure 164


Figure 165


Figure 166


Figure 167


Figure 168


Figure 169

Deriving architecture from previous experiments by extracting linework

Figure 170

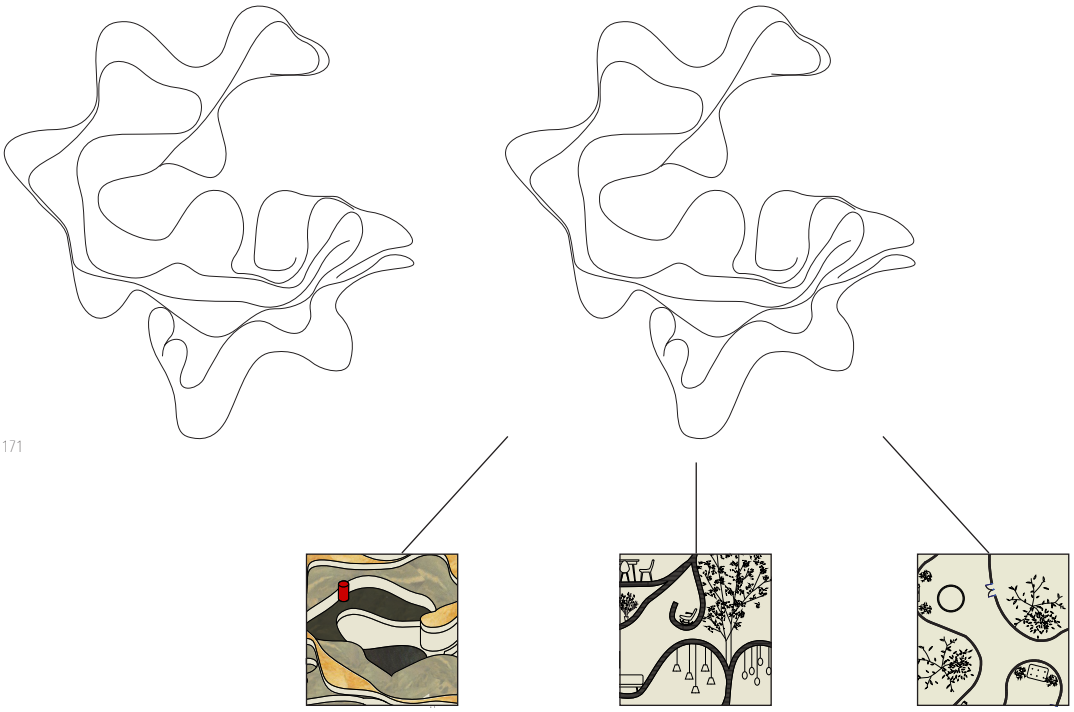
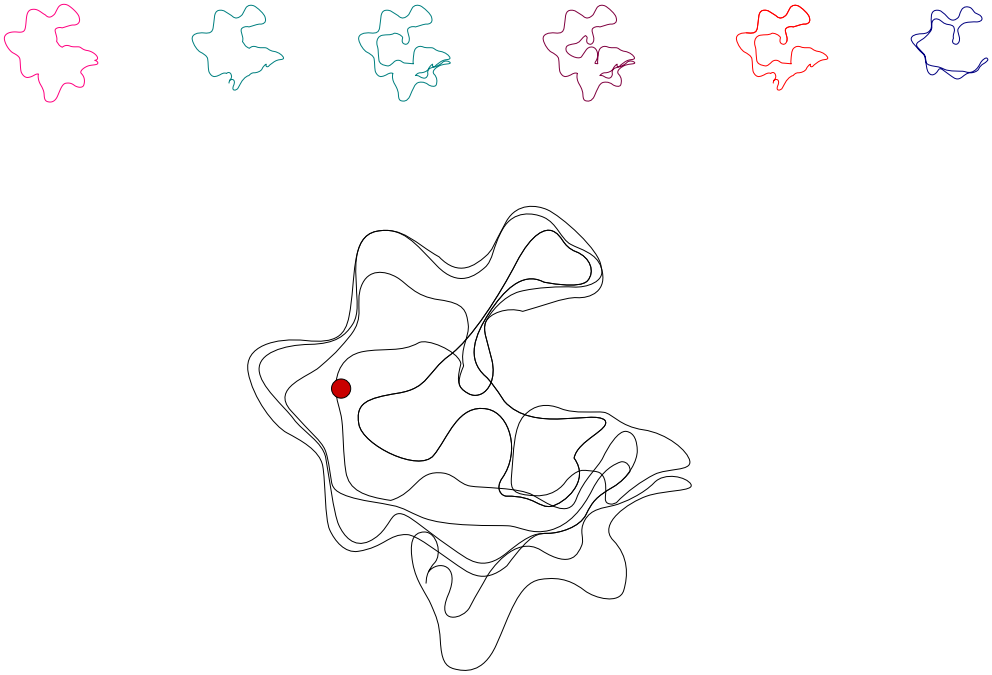


Figure 171

Figure 170. ***Photograph of material exploration to create space.***

Figure 171. ***Illustrative lines derived form photograph.***



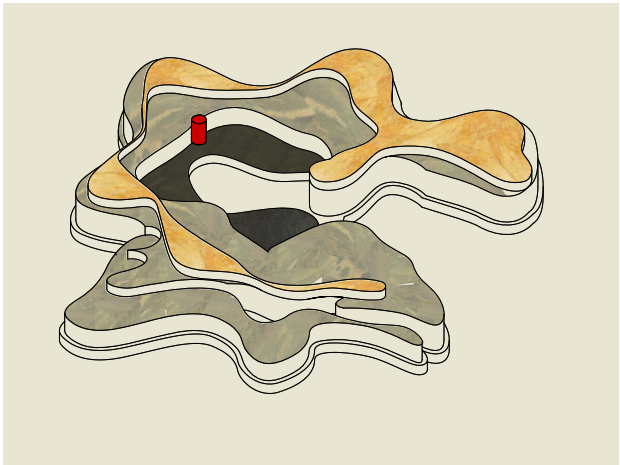


Figure 172

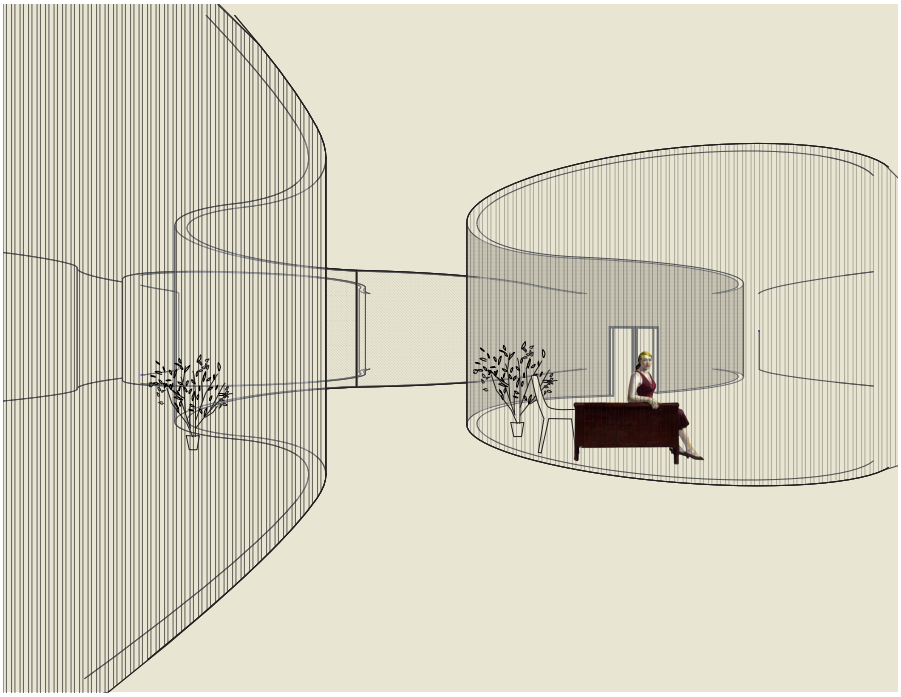
Figure 172. ***Lines interpreted into Topography lines***

Figure 173

Figure 173. *Lines interpreted into Section boundaries*

Figure 174

Figure 174. *Lines interpreted into Plan boundaries*



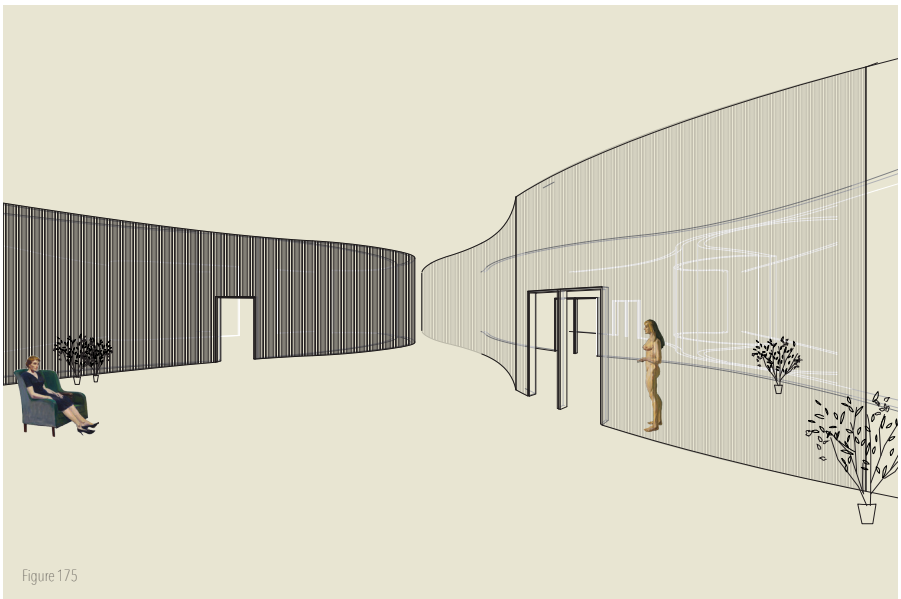


Figure 175

Figure 175. *A pair of renderings taken from the building that was derived from the exercise in turning folded lines into'plan lines'*

Deriving architecture from bodice experiments by extracting linework

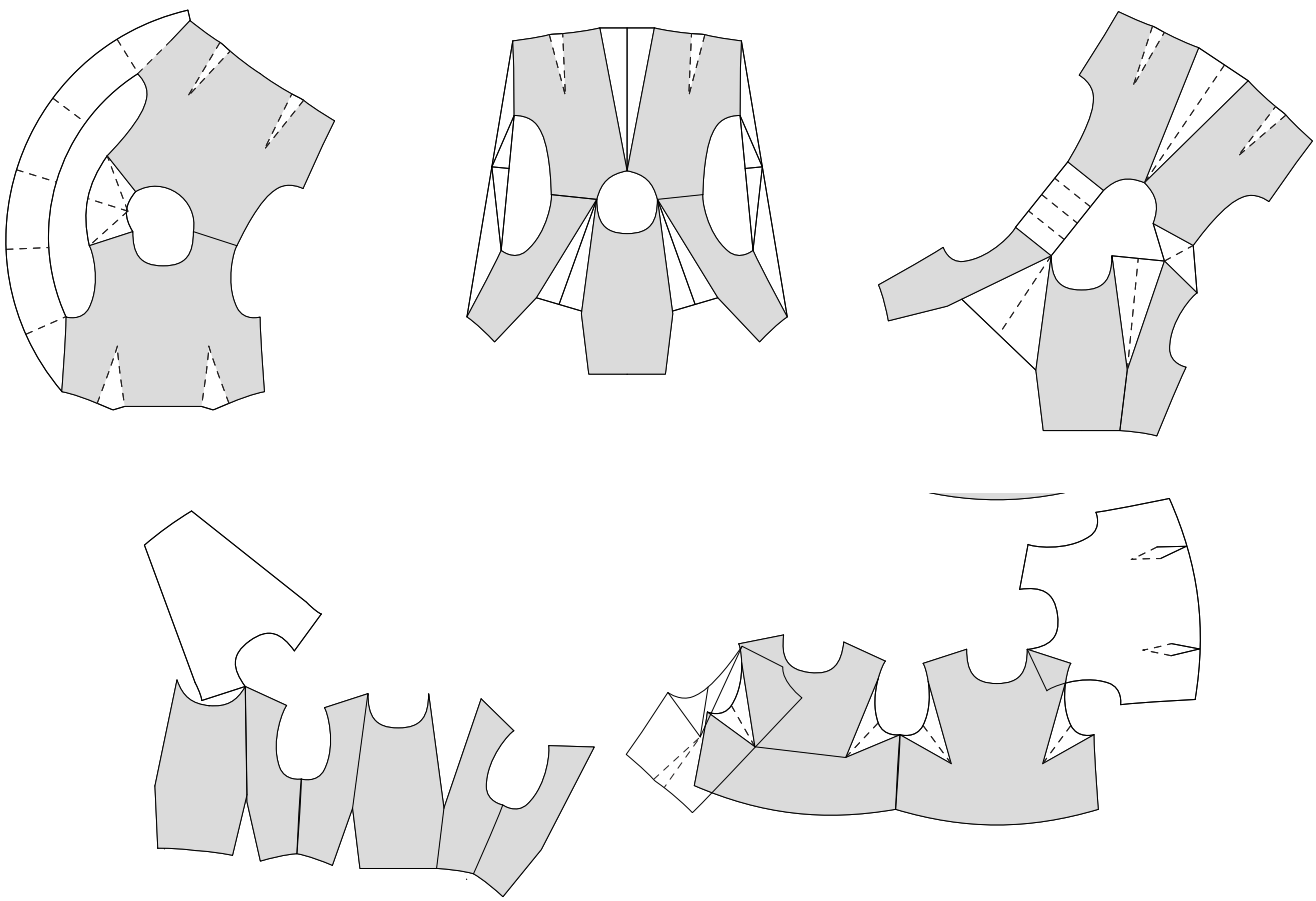


Figure 176

Figure 176. *5 Bodice plans from Design Research exploration*

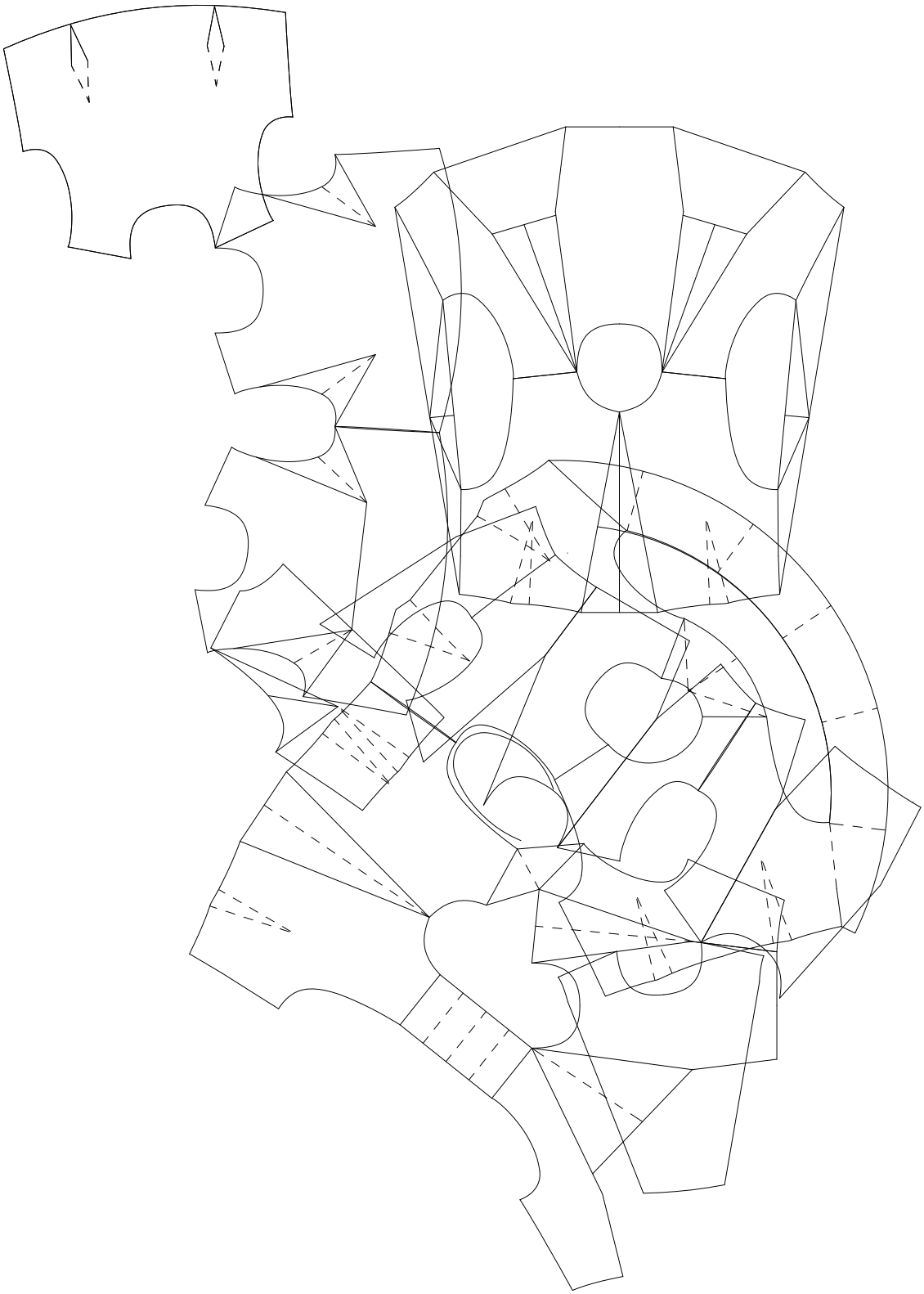


Figure 177

Figure 177. ***Overlapping bodices***

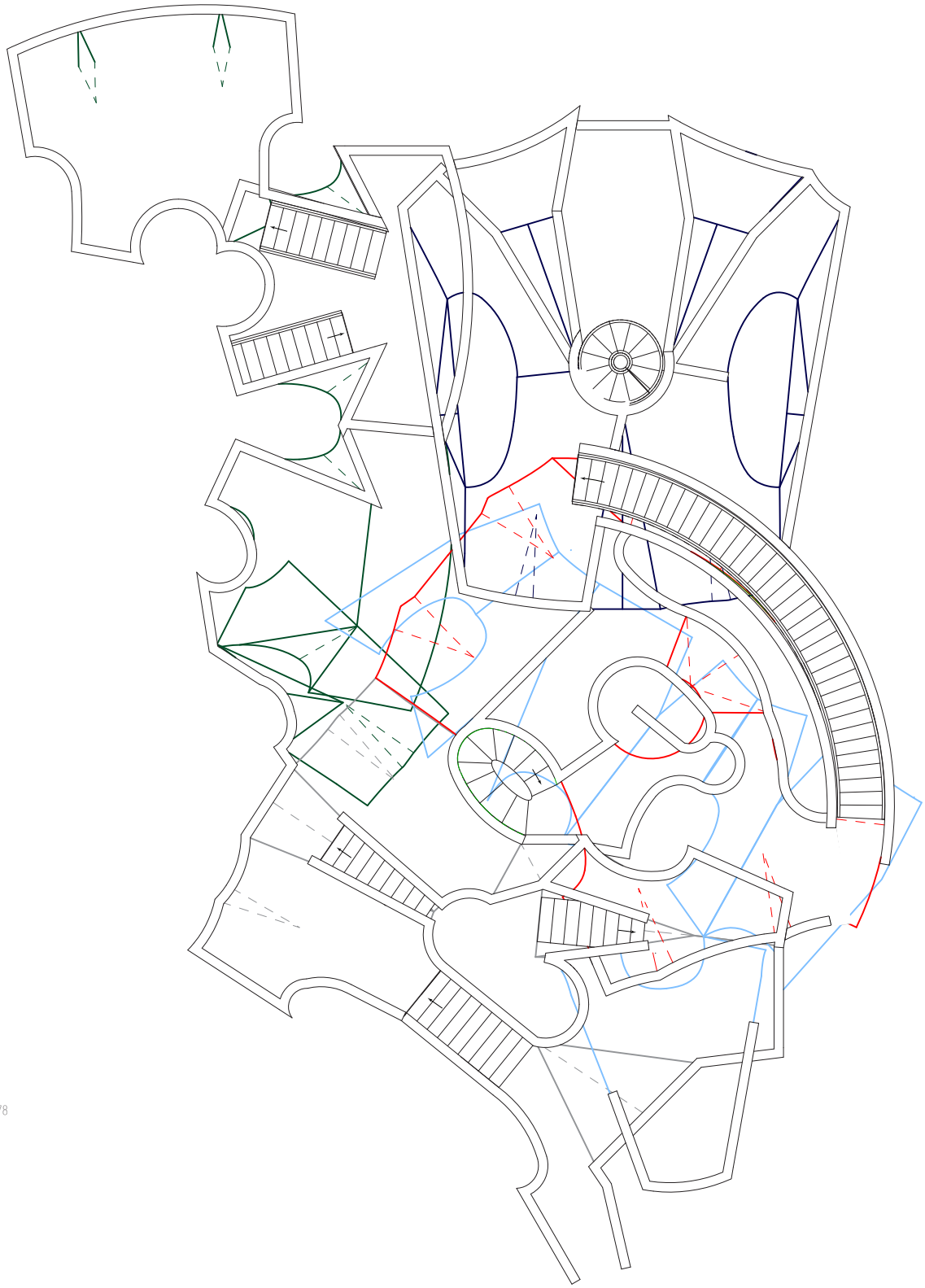


Figure 178

Figure 178. ***Turning the linework into boundaries***

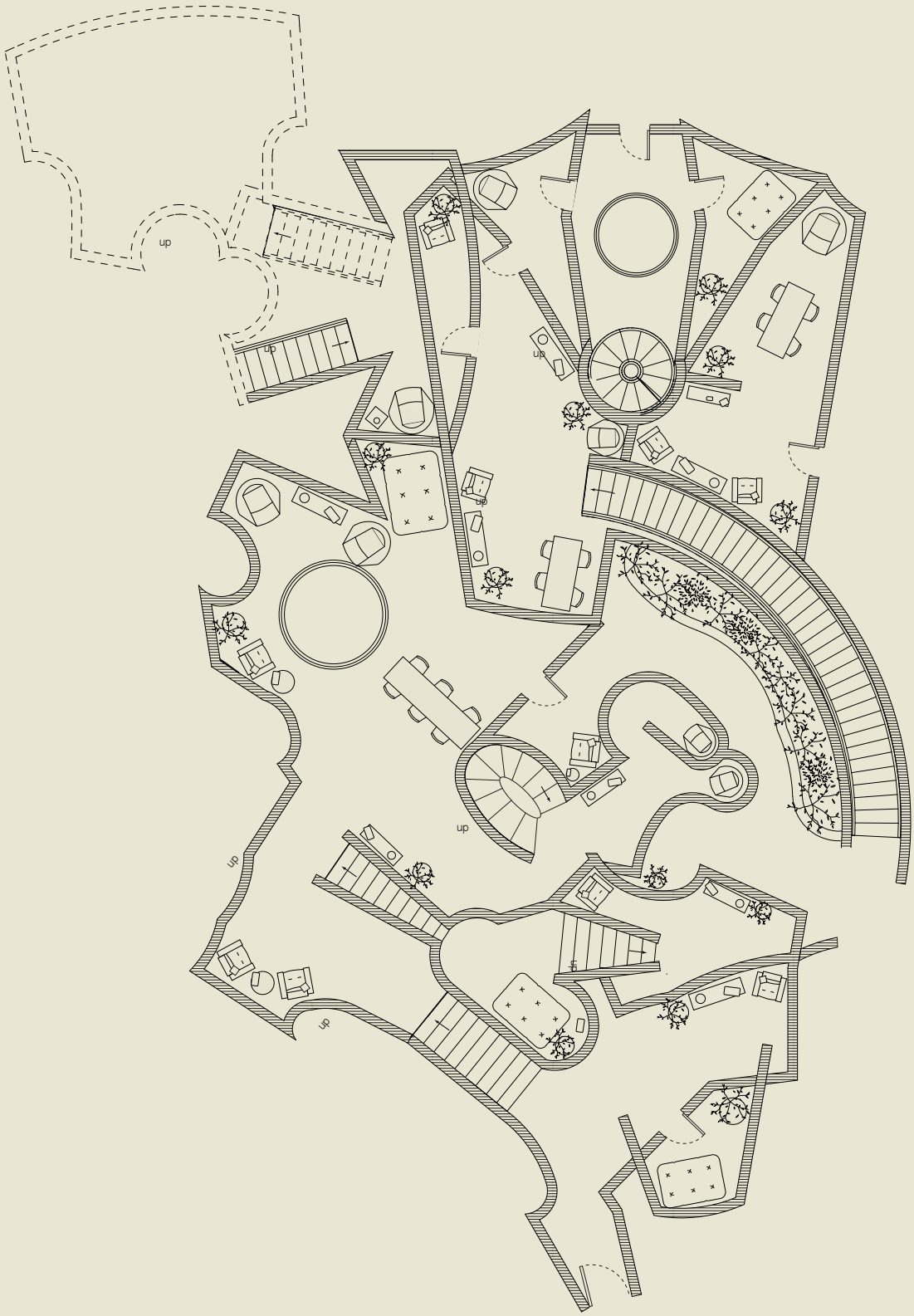
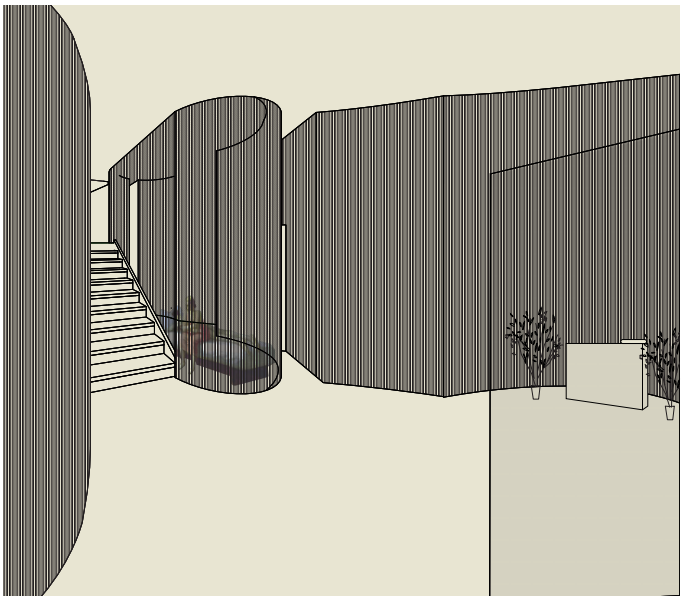


Figure 179



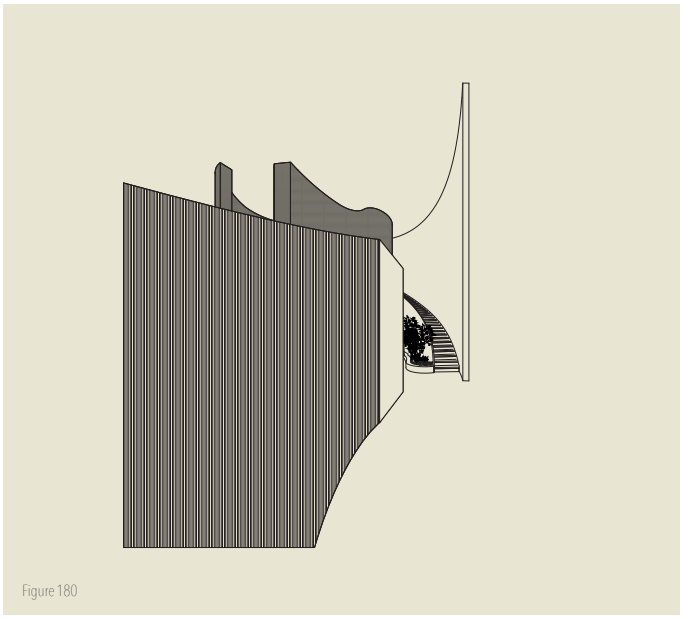


Figure 180

Figure 179. *Creating space from those boundaries*

Figure 180. *Pair of perspective renderings from spaces.*

Appendix B

Pairings

This was an initial exercise in design research in where images that were typically ‘architectural’ were paired with images that were typically understood as ‘dress’. The images go together mostly in twos, sometimes in cases of threes. Most commonly there were similarities in form of the pieces or in how the photograph was frames. In other cases, it was colour, texture, material, construction, or operative processes.

Figure 181

Figure 182

Figure 183

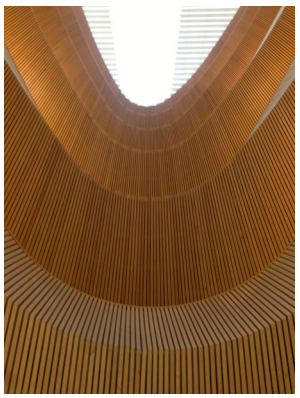


Figure 184

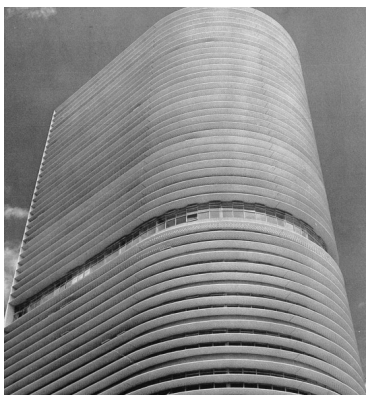


Figure 185

Figure 186

Figure 187

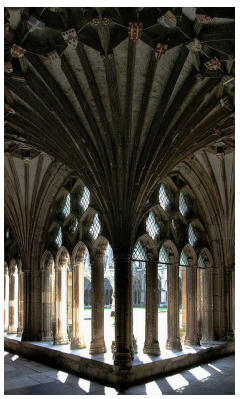


Figure 188

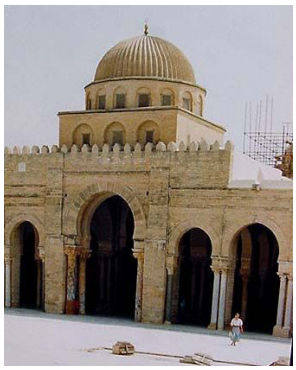


Figure 189

Figure 190

Figure 191

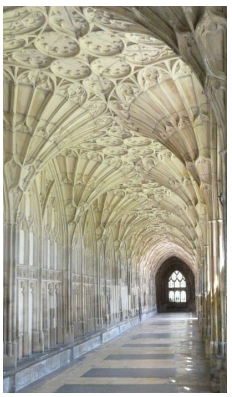


Figure 192

Figure 193

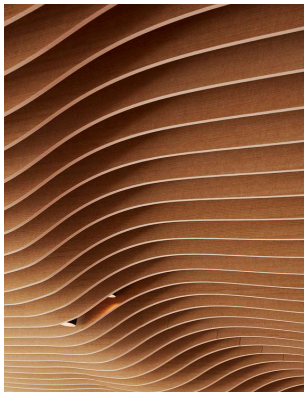


Figure 194

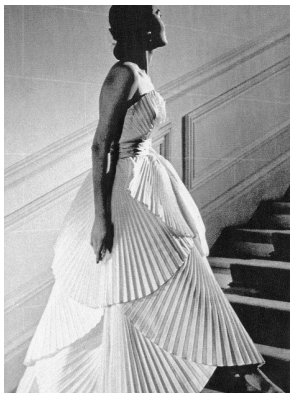


Figure 195

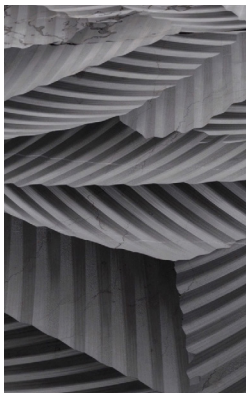


Figure 196

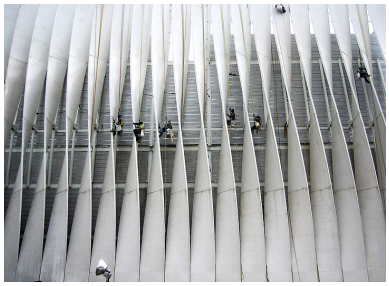


Figure 197

Figure 199

Figure 198

Figure 181. *Pleated sleeve, Anaise*

Figure 182. *Kazunori Fujimoto Architect & Associates, House in Akitsu, 2016*

Figure 183. *Issey Miyake, Pleats Please*

Figure 184. *Santiago Calatrava, University of Zurich Law Library, Zurich, Switzerland. 1989-2004*

Figure 185. *Oscar Neimayer, Montreal Building, São Paulo, Brazil, 1951*

Figure 186. *Celine, SS 2018*

Figure 187. *Anna Cleveland by Greg Kadel for Numéro #168, November 2015*

Figure 188. *Cloisters in Canterbury Cathedral, Canterbury, UK*

Figure 189. *Great Mosque of Kairouan, Tunisia, 670 AD*

Figure 190. *Benjamin Lennox, Campaign SS2017 in 10 Magazine*

Figure 191. *Decadent collar*

Figure 192. *Catedral de Gloucestor, Gloucester, UK*

Figure 193. *Wrangler Campaign, 1978*

Figure 194. *Atmosphera Analog 3D acoustic system by Arktura*

Figure 195. *Dior gown, 1950's*

Figure 196. *Milled surface: Texture*

Figure 197. *Concrete Facade, Iñ aki Echeverría Arquitectura, Liverpool Villahermosa, Tabasco, Mexico, 2012*

Figure 198. *Pleated Collar, by Victoria Beckham*

Figure 199. *Junya Wantabe, FRTW 2000*

Figure 200

Figure 201

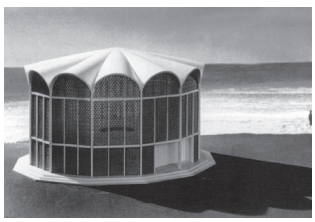


Figure 202

Figure 204

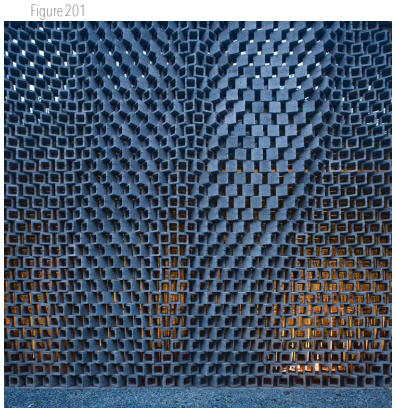


Figure 205

Figure 206

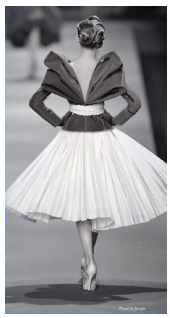


Figure 207

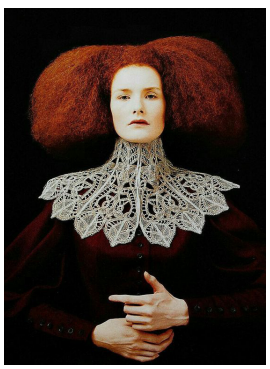


Figure 208

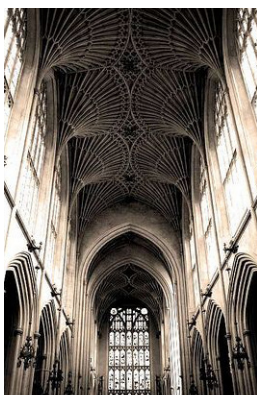


Figure 209

Figure 210

Figure 211

Figure 212

Figure 213

Figure 200. ***Smocked Cape, Junya Watanabe, FW2015***

Figure 201. *Leonardo/Nicola Mosso: Chiesa Sel Gosu Redentore, Turin, Italy*

Figure 202. ***Philip Johnson, José M. Bosch House***

Figure 203. ***Dior Wedding Dress***

Figure 214

Figure 215

Figure 204. ***Joan Didion***

Figure 205. ***ArchiUnion, Shanghai***

Figure 206. *GADD Architects, Grand Central Watertank, Midrand, South Africa, 1996*

Figure 207. ***John Galliano for Christian Dior F2011 Haute Couture***

Figure 208. ***Alexander McQueen for Givenchy Haute Couture AW1999***

Figure 210. *The Abbey Church of Saint Peter and Saint Paul (Bath Abbey,) London, UK*

Figure 209. ***Ballet tutus***

Figure 211. *Frank Lloyd Wright, Guggenheim New York, USA*

Figure 216

Figure 218

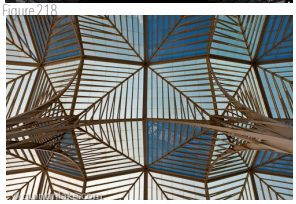


Figure 217

Figure 212. *Gerard Grandval: Les Coux, Cretiel, France, 1969-1974*

Figure 214. ***Rianne von Rompaey in editorial by Richard Bush for Document Journal, September 2014***

Figure 213. *Gerard Grandval: Les Coux, Cretiel, France, 1969-1974*

Figure 215. *Gucci Resort 2018*

Figure 216. *Christopher Kane, FW 2014, Look 55*

Figure 217. *Santiago Calatrava, Gare de Oriente Railway Station, Lisbon, Portugal*

Figure 218. *Santiago Calatrava, Gare de Oriente Railway Station, Lisbon, Portugal*

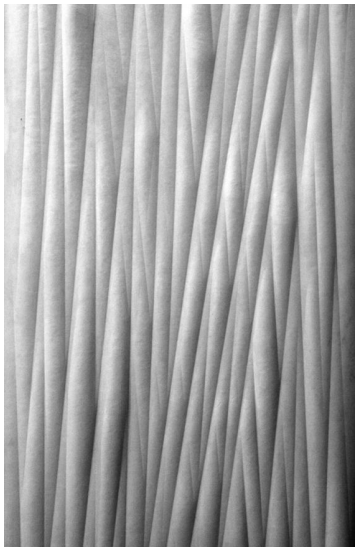


Figure 219

Figure 220

Figure 221

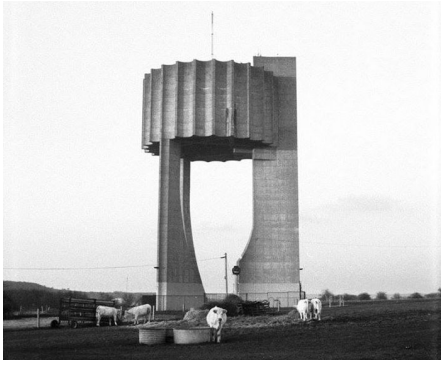


Figure 222

Figure 223

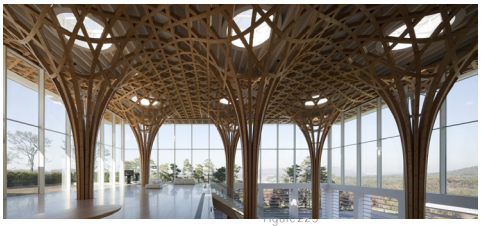


Figure 225

Figure 219. *Precast concrete, by Matsys, Roka Akor Restaurant wall, California 2013*

Figure 220. *Charlotte Wales by Alexandre Wetter for Rika Magazine, AW 2015*

Figure 221. *Emile Allard, Talliard France, 1977*

Figure 222. *Watertank in St. Aubin les Elbouf, France*

Figure 223. *Junya Wanatabe, FRTW 2000, Look 27*

Figure 224. *John Paul Gaultier dress*

Figure 225. *Shigeru Ban Architects, Nine Bridges Country Club, Yeoju-gun, Gyeonggi-do, South Korea 2009*

Figure 226

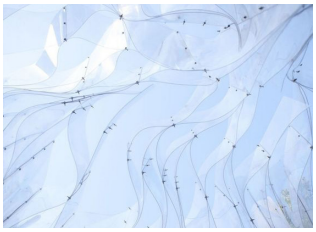


Figure 227

Figure 228

Figure 229

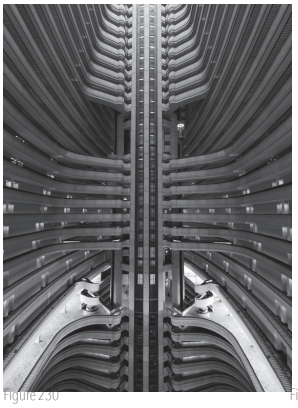


Figure 230

Figure 231

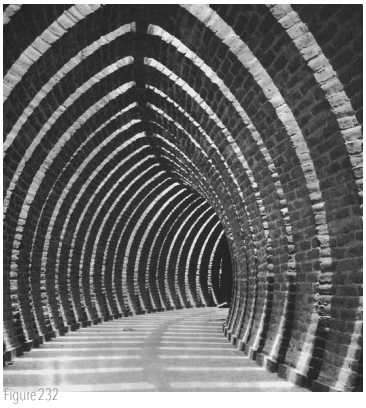


Figure 232

Figure 233

Figure 234

Figure 235

Figure 236

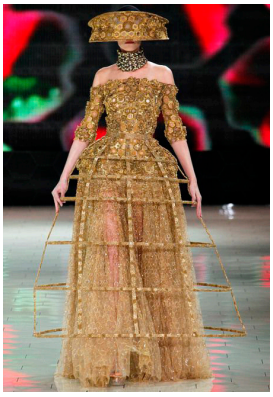


Figure 237

Figure 226. *Junya Watanabe , FRTW 2000*

Figure 227. *'Ban' Pavilion by Jasper James and Orproject, 2012*

Figure 228. *Cage skirt in 'Work in Progress', Book by Karl Lagerfeld*

Figure 229. *Traditional concrete formwork for stairs*

Figure 230. *John C. Portman, Marriot Marq Hotel, Atlanta, 1985*

Figure 231. *Corset*

Figure 232. *Kaedi Regional Hospital, Islamic Republic of Mauritania, Africa, 1995.*

Figure 233. *Alexander McQueen for Givenchy Haute Couture AW98*

Figure 234. *Structural seams on outside of Maison Margiela suit jacket*

Figure 235. *Buttresses of Duomo di Milano, Italy*

Figure 236. *Hossein Amanat, Azadi Tower, Tehran, Iran, 1971*

Figure 237. *Sarah Burton for Alexander McQueen, SRTW 2013, Look 28*

Appendix C

Presentations

Images of presentation rooms for Milestone Defence Presentations

Figure 238

Figure 238. *Room set up for presentation, Third Defence, April 24, 2018*

Figure 239. *Close ups of models, Third Defence Presentation, April 24, 2018; 4 views*

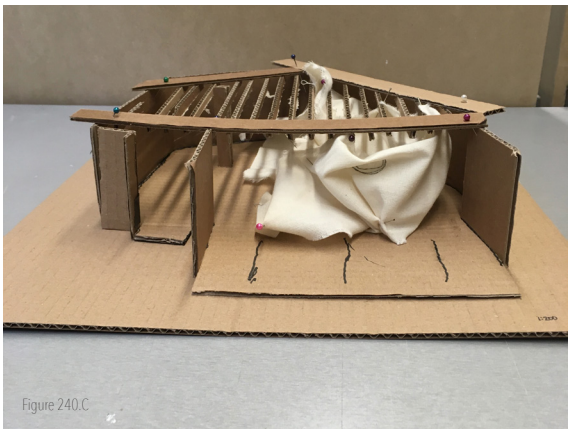


Figure 240. *Preparation for final presentation. A: Mock up of smocked wall. B: Room 206 used as a prep room. C: 1:50 cardboard model with small tests to fit the space. D: Sewing*

Figure 241. *Installing structure for the final presentation installation. 4 images.*

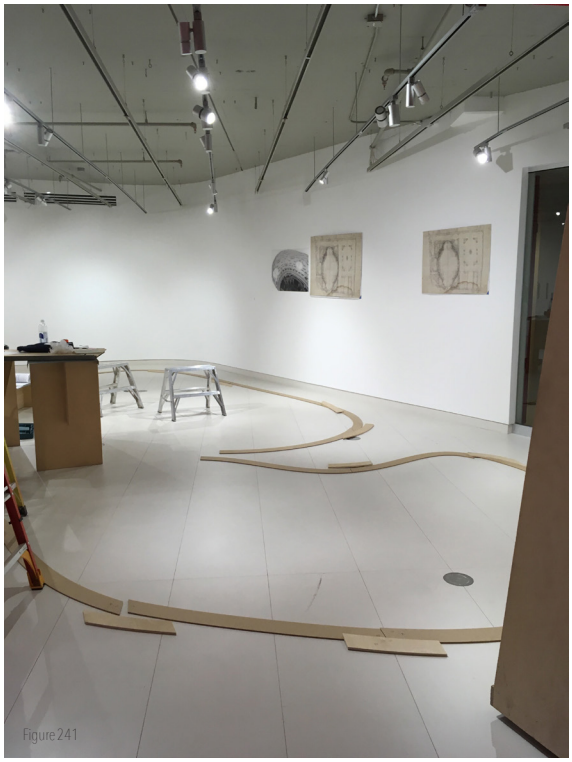


Figure 241








Figure 243

Figure 244

Figure 242. *Installing the envelopment, 16 sequential images. Previous pages.*

Figure 243. *After final presentation: Standing outside of entrance to the Paul. H. Cocker Gallery.*

Figure 244. *Standing behind smocked room.*

Figure 245. *Close up of smocked room.*

Figure 246. *Facing room for Dissident Tailoring.*

Figure 247. *Pleated Fabric Formwork (endpage).*

Figure 245

Figure 246

Works Cited

A Notebook on Cities and Clothes, A film by Wim Wenders with Yohji Yamamoto. 1989. Youtube, https://www.youtube.com/watch?v=Yd4PtrcNPps. Retrieved. October, 2016.

Addington, Michelle. "The Phenomena of the Non-Visual". *Softspace: From a Representation of Form to a Simulation of Space*. Edited by Sean Lally and Jessica Young. London: Routledge. 2014.

Benjamin, Walter. *The Arcades Project*. Translated by Howard Eiland and Kevin McLaughlin. Cambridge: Belknap Press, 2002, c1999.

Benjamin, Walter. *The Work of Art in the Age of Its Technological Reproducibility, and Other Writings on Media*. Edited by Michael W. Jennings, Brigid Doherty, & Thomas Y. Levin. Cambridge: Belknap Press of Harvard University Press, 2008.

Betsky, Aaron. *Architecture Matters*. (New York: Thames & Hudson, 2017), 41.
Collier, Billie, Martin Bide, and Phyllis Tortora. *Understanding Textiles. Seventh Ed*. New Jersey, USA: Pearson Education Inc. 2009.

Constantine, Mildred, and Laurel Reuter. *Whole Cloth*. New York: Monacelli Press. 1997.

Cruz, Marcos. *The Inhabitable Flesh of Architecture*. Surrey: Ashgate Publishing. 2013.

Deleuze, Gilles. *The fold: Leibniz and the Baroque*. Minneapolis: University of Minnesota Press. 1988.

Descartes, René. *Principles of Philosophy*. Translated by John Veitch. Blackmask Online. 2002.

Duvernoy, Sophie. Endless Houses or Vast Potatoes? The Impossible Architecture of Frederick Kiesler. LA Review of Books. May 26, 2017. https://lareviewofbooks.org/article/endless-houses-or-vast-potatoes-the-impossible-architecture-of-frederick-kiesler/. Accessed: May 30, 2018.

Eisenman, Peter. “Processes of the Interstitial: Notes on Zaera-Polo’s idea of the Machine”. *Deleuze and Guattari on Architecture: Critical Assments in Architecture*. Edited by Graham Livesey, 172-190. New York, NY: Routeledge. 2015.

Eisenman, Peter. “Zones of Undecideability: The Processes of the Interstitial.” *Anyhow*. Edited by Cynthia Davidson. Cambridge: MIT Press, 1998.

Emery, Irene. *The Primary Structures of Fabrics: An illustrated classification*. New York, N.Y.: Thames & Hudson. 2009.

Feuerstein, Marcia F. "Body and Building inside the Bauhaus's Darker Side: On Oskar Schlemmer." *Body and building: Essays on the Changing Relation of Body and Architecture*. Edited by George Dodds and Robert Tavernor, 226-237. Cambridge, Mass.: MIT Press. 2002.

Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century". *Simians, Cyborgs and Women: The Reinvention of Nature*, 149-181. New York: Routledge. 1991.

Heidegger, Martin. "Building Dwelling Thinking". *Martin Heidegger: Basic Writings*. Edited by David Farrell Krell. London: Harper & Row. 1997.

Holl, Steven, Juhani Pallasmaa, and Alberto Perez-Gomez. *Questions of Perception: Phenomenology of Architecture*. San Francisco, CA: William Stout Publishers, 2006.

Hollander, Anne. *Seeing Through Clothes*. New York, NY: Viking Press. 1978.

Jencks, Charles. *Architecture 2000: Predictions and Methods*. New York: Praeger Publishers. 1971.

Kagis McEwan, Indra. *Vitruvius: Writing the Body of Architecture*. Cambridge: MIT Press. 2003.

Klinck, Tala. "Body, Performance, Boundary." *Immaterial Ultramaterial*. Edited by Toshiko Mori. New York: President and Fellows of Harvard College. 2002.

L'Heureux, Eric. *Deep Veils*. Novato, California: ORO Editions. 2014.

Latour, Bruno. *How to Talk About the Body?*. The Normative Dimension of Science Studies. Body & Society. SAGE Publications. Vol 10 (2-3): 205-229. DOI: 10.1177/1357034X04042943. 2004.

Lavin, Sylvia. *Form Follows Libido. Architecture and Richard Nuetra in a Psychoanalytic Culture.* Cambridge: MIT Press. 2004.

Le Corbusier. *Modulor: A Harmonious Measure to the Human Scale and Universally Applicable to Architecture and Mechanics*. London: Faber and Faber. 1961.

Lefebvre, Henri. *The Production of Space*. Translated by Donald Nicholson-Smith. Cambridge: Blackwell. 1974.

Legendre, George L. *Bodyline: The End of Our Meta-mechanical Body: Studies of Diploma*. London: Architectural Association Publications. 2006.

Love, Timothy. Kit-of-Parts Conceptualism: Abstracting Architecture in the American Academy. Harvard Design Magazine Issue 19. http://www.harvarddesignmagazine.org/issues/19/kit-of-parts-conceptualism-abstracting-architecture-in-the-american-academy.

Lynn, Greg. *Folds, Bodies & Blobs: Collected Essays*. Bruxelles: La Lettre volée. 1998.

McLuhan, Marshall. *Understanding Media: The Extension of Man*. New York: McGraw-Hill, 1964.

Merleau-Ponty, Maurice. *Sense and Non-Sense*. Translated by Hubert L. Dreyfus & Patricia Allen Dreyfus. Evanston: Northwestern University Press. 1964.

Merleau-Ponty, Maurice. *The Visible and the Invisible*. Translated by Alphonso Lingis. Edited by Claude Lefort. Northwestern University Press. Evanston. 1968.

Neufert, Ernst . and Neufert, Peter. *Architect's Data.* Fourth Ed. Translated by David Sturge. Chichester, West Sussex, UK: Wiley-Blackwell. 2012

Ostwald, Michael J. *The Modulor and Modulor 2 by Le Corbusier (Charles Edouard Jeanneret), 2 Volumes*. Nexus Network Journal 3, 145-48. Basel: Birkhäuser, 2000.

Pallasmaa, Juhani. *The Eyes of the Skin: Architecture and the Senses*. Chichester: John Wiley & Sons Inc. 2014.

Payne, Alina. "Reclining Bodies: Figural Ornament in Renaissance Architecture." *Body and building: Essays on the Changing Relation of Body and Architecture*. Edited by George Dodds and Robert Tavernor, 94-113. Cambridge.: MIT Press. 2002.

Simitis, Matthew J. and Zeynep E. Celik. *Thresholds* vol. 22. MIT Department of Architecture. 2007.

Tanizaki, Junichiro. *In Praise of Shadows*. Translated by Thomas J. Harper and Edward G. Seidensticker. London: Vintage 2001. 1977.

Vitruvius. *Vitruvius: The Ten Books on Architecture*. Translated by Morris Hicky Morgan. New York, N.Y. Dover Publications, 1960.

West, Mark. *The Fabric Formwork Book: Methods for Building New Architectural and Structural forms in Concrete.* New York: Routledge. 2017.

Wigley, Mark. *White Walls, Designer Dresses: The Fashioning of Modern Architecture.* Cambridge: MIT Press. 1995.

Works Considered

Bachelard, Gaston. *The Poetics of Space*. Boston: Beacon Press. 1994.

Brownell, Blaine, and Marc Swackhamer. *Hypernatural: Architecture's New Relationship with Nature*. New York, NY: Princeton Architectural Press. 2015.

Chard, Nat, and Perry Kulper. *Fathoming the Unfathomable*. New York: Princeton Architectural Press, 2014.

Eisenman, Peter. *Written into the Void: Selected Writings, 1990-2004*. New Haven: Yale University Press. 2007.

Hall, Mildred Reed and Edward T Hall. *The Fourth Dimension in Architecture: The Impact of Building Behaviour*. Santa Fe: Sunstone Press, 1995.

Harman, Graham. *Towards speculative realism: Essays and Lectures*. Winchester, UK: Zero Books. 2010

Harman, Graham. "The Third Table". *100 Notes - 100 Thoughts*. Ostfildern, Germany: Erschienen im Hatje Cantz Veriag. 2012.

Morris, David. *The Sense of Space*. Albany: State University of New York Press. 2004.

Pallasmaa, Juhani. *The Embodied Image: Imagination and Imagery in Architecture*. Chichester: John Wiley & Sons, 2011.

Pallasmaa, Juhani. *Mental and Existential Ecology*. Lecture at Ljubljana Castle, Ljubljana, Slovenia. October 2009.

Perez-Gómez, Alberto. *Attunement: Architectural Meaning After the Crisis of Modern Science*. Cambridge: The MIT Press. 2016

Relph, Edward. *Place and Placelessness*. London: Pion Ltd. 1976.

Sennett, Richard. *Flesh and Stone*. New York: W.W. Norton & Company. 1994.

Starobinski, Jean. *The Living Eye*. Cambridge: Harvard University Press. 1989.

Verstegen, Ton. *Gestures: atmospheric perception and architecture*. Arnhem: ArtEZ Press. 2009.

Weil, Simone. *Gravity and Grace*. New York: Putnam. 1952.

Glossary

Lexicons

Dress (noun) Refers to the clothing in which we envelope our physiological body in. Not specifically a dress of a women's bodice attached to a skirt, but the garment or series of garments that cover human bodies, composed of different textile fabrics. Non traditional. Interchangeable with garment, clothing, garb, throughout the thesis book.

Dress (verb) To clothe oneself in; to put on; to wear at the closest level to one's physiological body. Interchangeable with: to cover, to protect, to prepare, to envelope.

Dressolgy The discipline of design, organizing, and constructing garments as envelopes for the human physiological body, and its prevailing studies and theories surrounding it.

Dress - making The craft of designing and constructing dress and clothing items from flat textile fabrics. Includes measuring, planning and pattern making, technical details etc. Interchangeable with garment-making, clothing making.

Interstitial the non-physical, non-tangible area between entities or boundaries. It is not an on/off condition, but rather the relationship of being both on and off, or being somewhere that is in between on and off. It is not black or white, but being grey and the gradients of possibilities of grey. The interstitial is the black embedded in the white; yet replacing the black with architecture, and the white with dress, creating a new grey - a new entity for architecture and dress.

Interstitiality The condition or quality of being in between.

Fabrics

Abrasion An area damaged by scraping or wearing away. *
The wearing away of any part of a material by rubbing against another surface **

Appliqué Ornamental needlework in which smaller pieces of fabric are attached or sewn on to the surface of larger piece of textile for decoration

Crimp, Fibre The wavy physical structure of a fibre.

Crimp, Yarn The wavy configuration that develops in yarn interlaced in woven fabrics **

Crosslinking The attachment of one long-chain molecule to another by chemical linkages **

Crystallinity Orderly, parallel arrangements of molecules within a fibre structure.

Dimensional Stability The ability of a fibre or yarn to withstand shrinking or stretching

Elasticity The ability of an object or material to resume its normal shape after the force of deformation, whether being stretched or compressed *

Elongation The ratio of the extension of a material to the length of the material before stretching. *

Fibre A generic term for any one of the various types of mater that form basic elements of textile and that is characterized by having a length at least 100 times its diameter (ASTM)

Filament A continuous fibre of extremely long length

Flexibility That property of a material by virtue of which may be flexed or bowed repeatedly without undergoing rupture **
The capability of bending without breaking

Heat Setting The treatment of thermoplastic manufactured fibres or fabrics with heat to set the fibres or fabrics into a specific shape or form.

Hydrophilic Describes materials that have an affinity for water, they often absorb water well and perform well when wet.

Mercerization The treatment of cellulosic fibres with a strong basic solution to swell the fibres and produce permanent changes.

Modulus The resistance to stretching of a textile material: High modulus = high resistance, or not easily stretched; Low modulus = low resistance, very stretchable.

Moisture Regain The amount of moisture in a material when expressed as a percentage of the total weight is known as the percentage moisture content. Regain of Textile Materials. When the moisture present in a textile material is calculated as a percentage on the oven-dry weight the percentage is known as the regain.

Oleophilic Materials that have an affinity for oil. For example, leathers.

Ply Yarns A yarn formed by twisting together two or more single yarns. **

Polymer A long chain molecule formed by chemically bonding repeating units (monomers) of the same different composition. **

Regenerated Fibres Fibres produced from natural materials that cannot be used for textile in their own original form but that can, through chemical treatment and processing be made into textile fibres.

Resilience The ability of a textile material to recover its original position after a distorting force such as stretching, bending, or compression. **

Scrim An open-weave fabric that is often used as a backing material.

Scye An armhole or sometimes leghole in dressmaking.

Specific Gravity The density of the fibre in relation to the density of an equal volume of water at 4° C. **

Tenacity The tensile force of a fibre will sustain before rupturing, expressed as a force relative to fibre linear density**

Tensile Strength The resistance of fibres, yarns, or fabrics to a pulling force.

Thermoplastic A material that softens and flows under the influence of heat. **

Triaxial Weave A type of seating in which three sets of yarns are utilized, with two sets of yarns moving in a diagonal direction to the third, rather than at right angles.

Warp The yarn running lengthwise in a woven fabric.

Weft The crosswise direction of a woven fabric; the filling perpendicular to the warp.

Yarn Assemblies of fibres twisted or otherwise held together in a continuous strand.

Figure 247