

Inhabiting Doors: using haptic terrains to extend spatio-temporal awareness



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Abstract

As we pass over boundaries and cross thresholds, we start to inhabit the spaces around us. This research project explores how the act of moving *between* spaces via the door might create a heightened awareness of this threshold, and the inhabited spaces beyond. The hand is a critical moment in all stages of the design that approach leading to the outcome.

Touch points have become a key focal point in my project, as it shapes how the planar surface of the door extends the opportunity for multiple touch points. The hand and touch points of a doors planar surface work on building how we inhabit the spaces before and beyond a door.

This project explores the material qualities of wood and asks how far the material can be pushed, while still maintaining functionality as a door. Through explorative methods and using the hand as a tool, I use chisel and mallet, and consider the sound of the chisel as it strips away each thin layer of wood, guiding the chisel to the next spot. Through this process, I blow up the scale of a small touch point (handle) into a haptic terrain of textures across a larger surface.

Table Of Contents

ABSTRACT	2
ATTESTATION OF AUTHORSHIP	4
LIST OF FIGURES:	5
ACKNOWLEDGEMENTS	7
INTRODUCTION	8
CHAPTER ONE	11
<i>Introduction to door</i>	<i>11</i>
<i>Door Boundaries.....</i>	<i>13</i>
<i>Public VS. Private.....</i>	<i>15</i>
<i>Spaces of a Door.....</i>	<i>16</i>
CHAPTER 2: THE DOOR HANDLE.....	18
<i>Surface as a Handle.....</i>	<i>18</i>
<i>Handles as a Form of Tool.....</i>	<i>20</i>
<i>Material Memory.....</i>	<i>22</i>
<i>Material Culture.....</i>	<i>23</i>
<i>Methodology.....</i>	<i>24</i>
CHAPTER THREE: DOCUMENTATION OF PRACTICE.....	25
<i>Introduction to Practice.....</i>	<i>25</i>
<i>Bark Texture – CNC Machined.....</i>	<i>26</i>
<i>Bark Texture – Laser Cutting.....</i>	<i>28</i>
<i>Dough Surfaces – Tactile.....</i>	<i>29</i>
<i>Contouring Dough – Tactile.....</i>	<i>31</i>
<i>Hand Grip – Texture.....</i>	<i>32</i>
<i>Digital Texture – Illustrator.....</i>	<i>33</i>
<i>Door Handle – Prototypes.....</i>	<i>34</i>
<i>Drawings of the Skin – Texture.....</i>	<i>35</i>
<i>Digital Layering – Prototypes.....</i>	<i>37</i>
<i>MDF Layering – Models.....</i>	<i>38</i>
<i>CNC Models – Prototypes.....</i>	<i>40</i>
<i>Centre Point Pivot Fixing.....</i>	<i>42</i>
CONCLUSION.....	43
BIBLIOGRAPHY	44
APPENDIX OF IMAGES:	46

Attestation of authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the Acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

15th August 2022

List of Figures:

Figure 1: Phoebe Halliday, *The Doors of Home*, 2022 (pg. 13)

Figure 2: Monica Bonvicini, 'Don't Miss a Sec', 2004, Installation, <https://monicabonvicini.net/dont-miss-a-sec-2/>, accessed 10/8/22 (pg. 15)

Figure 3: Monica Bonvicini, 'Don't Miss a Sec', 2004, Installation, <https://monicabonvicini.net/dont-miss-a-sec-2/>, accessed 10/8/22 (pg. 15)

Figure 4-5: Caleb Woodard, 2020, *Sculpted Sliding Door*, <https://www.instagram.com/p/CSusuaanU2R/>, accessed 20/10/21 (pg. 18)

Figure 6: Sugatakatchi, *Door Knob Caillou*, <https://sugatakatchi.ocnk.net/>, accessed 22/2/22 (pg. 20)

Figure 7: Sugatakatchi, *Hanger & Knob Caillou*, Pavé, <https://sugatakatchi.ocnk.net/>, accessed 22/2/22 (pg. 20)

Figure 8: Sugatakatchi, *Door Handles Vagues*, <https://sugatakatchi.ocnk.net/>, accessed 22/2/22 (pg. 20)

Figure 9: Mike Davis, 'Lang Doors', 2017, *Sand Pattern Image*, <https://doi.org/10.24135/ijara.v0i0.14>, accessed 29/9/21 (pg. 21)

Figure 10: Mike Davis, 'Lang Doors', 2017, *CNC detail relief*, <https://doi.org/10.24135/ijara.v0i0.14>, accessed 29/9/21 (pg. 21)

Figure 11: Mike Davis, 'Lang Doors', 2017, *CNC variation on Rimu*, <https://doi.org/10.24135/ijara.v0i0.14>, accessed 29/9/21 (pg. 21)

Figure 12: Phoebe Halliday, *Heightfield Texture*, 2021, *Digital Model* (pg. 25)

Figures 13-18: Phoebe Halliday, *Same process; different outcome*, 2021, *Digital* (pg. 26)

Figure 19: Phoebe Halliday, *Crafting bark*, 2021, *Digital Rendering* (pg. 26)

Figure 20: Phoebe Halliday, *Crafted bark*, 2021, *Cnc machined redwood* (pg. 26)

Figures 21-23: Phoebe Halliday, *Different depths*, 2021, *Laser Engraving on Redwood* (pg. 27)

Figures 24 and 25: Phoebe Halliday, *Lockdown Making*, 2021, *Playdoh* (pg. 28)

Figures 26 and 27: Phoebe Halliday, *Lockdown Making 2*, 2021, *Playdoh* (pg. 29)

Figures 28 and 29: Phoebe Halliday, *Lockdown Making 3*, 2021, *Playdoh* (pg. 30)

Figures 30 -34: Phoebe Halliday, *The way in which I grip*, 2021, *Playdoh* (pg. 31)

Figures 35: Phoebe Halliday, *Contour Lines*, 2022, *Digital Drawing* (pg. 32)

Figures 36-39: Phoebe Halliday, *Interesting Handle One*, 2022, *Redwood* (pg. 33)

Figures 40-44: Phoebe Halliday, *Interesting Handle Two*, 2022, *Redwood* (pg. 33)

Figures 45 and 46: Phoebe Halliday, *The Handles*, 2022, *Real Life Context* (pg. 33)

Figure 47: Phoebe Halliday, *Sections of the Hand*, 2022

Figure 48: Phoebe Halliday, *Drawings of the Hand*, 2022, *Pen Drawings* (pg. 35)

Figure 49: Phoebe Halliday, *Tracing*, 2022, *Digital Drawing* (pg. 35)

Figure 50: Phoebe Halliday, *Stencils*, 2022 (pg. 36)

Figure 51: Phoebe Halliday, *Digital Form Explorations*, 2022, *Digital Modelling* (pg. 37)

Figure 52: Phoebe Halliday, *Doors taking on layers*, 2022, *Mdf models* (pg. 39)

Figure 53: Phoebe Halliday, *Doors taking on Texture*, 2022, *Mdf models* (pg. 39)

Figure 54: Phoebe Halliday, *Cnc machined doors*, 2022, *Scaled models on Redwood* (pg. 40)

Figure 55: Phoebe Halliday, *Cnc machined door*, 2022 (pg. 41)

Figure 56: Phoebe Halliday, *cnc machined door*, 2022 (pg. 41)

Figure 57: Phoebe Halliday, *Pivot Explorations*, 2022, *Hand Drawings* (pg. 42)

Figure 58: Phoebe Halliday, Gallery Exhibit 1, 2022, Photography

Figure 59: Phoebe Halliday, Gallery Exhibit 2, 2022, Photography

Figure 60: Phoebe Halliday, Gallery Exhibit 3, 2022, Photography

Figure 61: Phoebe Halliday, Gallery Exhibit 4, 2022, Photography

Figure 62: Phoebe Halliday, Gallery Exhibit 5, 2022, Photography

Figure 63: Phoebe Halliday, Gallery Exhibit 6, 2022, Photography

Figure 64: Phoebe Halliday, Final Door (side one), 2022

Figure 65: Phoebe Halliday, Final Door (side two), 2022

Figure 66: Phoebe Halliday, Detailing 1, 2022, Photography

Figure 67: Phoebe Halliday, Detailing 2, 2022, Photography

Figure 68: Phoebe Halliday, Detailing 3, 2022, Photography

Figure 69: Phoebe Halliday, Detailing 4, 2022, Photography

Figure 70: Phoebe Halliday, Detailing 5, 2022, Photography

Figure 71: Phoebe Halliday, Pivot Technical Drawing, 2022, Digital Drawing

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Introduction

As a spatial designer, my practice focuses on conceptualizing a narrative surrounding simple, functional design. I investigate ways in which haptics¹, built from working with my hands a lot, can open discussions about the way we can look at and approach design. Working with my hands and being able to touch, as a form of interaction with any design, has dramatically influenced my decision-making when it comes to my design practice. My project *Inhabiting Doors: Using haptic terrain to extend Spatio-temporal awareness*, embraces using the hands as a tool to influence an extended haptic experience. It begins in exploring everyday design where the investigation took focus on the door, specifically the front door of my home. The door stands for the functionality of daily life as well as a vital touch point for the hand within the field of Spatial Design. Creating with a haptic outcome is not only personal to the way I learn but also what I find is a crucial role in design. We use our hands to make, feel, and interpret, so embracing the hand as a tool is vital in my project.

¹ When I talk about haptics, I use it as a definition in which it is the exploration of how we use touch daily to understand our movement and inhabitation of spaces. It means using the hand to touch surfaces and textures on a door to situate ourselves within the everyday.

Haptics comes out of my enjoyment of being able to touch and pick things up to get a better understanding of them. Anything involving unusual texture has always been an invitation for me to reach out and touch. Working with spaces to create an outcome led me to ask how using our hands daily might be used to determine the spaces we inhabit. Spaces we inhabit can be looked at through the crossing of a threshold, passing through a door moving from one space to another. Doors are a common point where to pass a threshold which in turn allows us to inhabit space. Spaces become transformed when occupied, especially when entering and exiting. When entering and leaving a space, we touch a door handle or door plate, often positioned at a standard height to fit the functionality of our hands.

This project aims to break down and understand conceptually what a door is; how it functions as a threshold, and highlighting it as a boundary between spaces, both public and private. It also aims to discuss the relevance of

a door handle that accompanies door designs. The significance of the door handle is vital in understanding how a small scale can slow down our fleeting moments of interaction with a door. The project then takes these ideas and investigates how haptic design can create a fully functional door to fit in any space. It takes on the general properties that constitute a door and reimagines what a door could be when designed with an intention to bring spatio-temporal awareness. I will use working with my hands-on materials as a tool to influence relief carving, a very hand-orientated method of making to design a haptic terrain that will function as a door.

This project asks: How can spatio-temporal awareness be explored through haptics as a guide when passing through thresholds?

In Chapter One I ask, 'what is a door?' and explore the doors' boundaries, public and private doors, and the spaces of doors. These ideas are explored through Bruno Latour's notion of the doors invention as a way to connect multiple spaces, Juhani Pallasmaa's idea of boundaries in a domestic setting, and Rita Felski's idea of spatial differentiation. It is also backed up by Robin Evans idea of a door dividing and reuniting spaces, and Georg Simmel's

idea around what the spaces before and beyond a door are.

Chapter Two explores the door handle as a threshold, as a form of tool, and positions the terminology of material memory and material culture into my project. The topics are explored through Edwin Heathcote's concept of the door handle as an interface of structures, and Pallasmaa's idea of the way in which our actions influence our encounters with surfaces. It also explores Mike Davis' idea of material memory surrounding design and materials, and Victor Buchli's idea of material culture and its influence on the everyday.

Chapter Three presents a series of images and reflections showing my design methods and offers an unfolding of my practice. It explores the creation of haptic terrains as a touch point through drawings and model making and shows how I expand into a deeper understanding of working with timber and how a variety of tools, from drawing to digital modelling, to 3D printing. It then repeats itself from digital modelling to laser cutting, to the CNC machine. Finally, when the models are involved, texture through hand carving is approached in my methods, building to the final

outcome. Tools are used to extend and push the limits of the material over a series of experiments and prototypes.

Chapter One

Introduction to door

At the beginning of this research project, I began by asking the question: what is a door?

The door is a movable structure that people interact with daily. This movable structure is becoming a conscious or unconscious decision. French Philosopher, Anthropologist and Sociologist Bruno Latour suggests that the idea of the door comes is an invention by architects that allowed people to move freely within a given environment². A house, for example, is generalised as a space alone; however, a home is a space with multiple spaces, so how does one move between each space freely? Latour suggests the concept around the door comes from the term "hole-wall"³, which gets explained through his writing as a break between walls. Spaces are a form of barrier or wall which gives us space within. Adding in openings or holes, in this case, extends the spaces and interconnects them.

² Jim Johnson, 'Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer', *Social Problems* 35, no. 3 (1988): 298–310, <https://doi.org/10.2307/800624>.

Latour writes:

Walls are a nice invention, but if there were no holes in them, there would be no way to get in or out; they would be mausoleums or tombs. The problem is that if you make holes in the walls, anything and anyone can get in and out. So, architects invented this hybrid: a hole-wall often called a door.⁴

For Latour, a door becomes a way of moving between places; otherwise, how would buildings function if not for the door?

This shaping of the door allows me, in my research project, to explore the concept of what a door can be. The door exists in order to allow us movement between otherwise closed and impenetrable spaces (or, conversely, entirely open). The domestic house is a space filled with rooms that

³ Johnson, *Mixing Humans and Nonhumans Together*. Pg. 299

⁴ Johnson, *Mixing Humans and Nonhumans Together*. Pg. 298

interconnect through doors. Industrial buildings, excluding open floored spaces too, are broken up through the use of doors or hole-walls if considering the context of cubby-hole spaces in offices – in some cases, which are just holes in the walls. Further developing my research project is taking this idea of the door and seeing how the actions we partake in when involving the door change how we interact and use the door. The whole (human) body plays its role in the door as we cross under the frame moving from one space to another. Our hand pushes or twists the handle giving the door motion. Our involvement with the door through hand and body becomes a critical development in my research of making a door. I am framing the idea of how the door can be described as a movable structure that, through actions of the hand and body, allow us to move between spaces.

To begin my research project, I first explored my fascination with the front door of my home, which, as the project builds, shifted to become any door. The front door operates as a focussed threshold moment between exterior and interior. The threshold moves us in both directions; it

⁵ When talking about the interior, I am referring to space situated on the inside of a building or home. Bedroom doors, kitchen doors, and toilet doors are within the domestic example. A doorway between two galleries is a public example.

depends which way we are coming or going. This distinction becomes significant in subsequent sections as I discuss other doors that operate only between interior-to-interior spaces. Within this research project, a door is a moveable structure that *becomes something* when met with actions undertaken by the hand and body. The front door is the main door between the interior⁵ and exterior⁶ within a domestic setting, or one space to another when talking about internal doors.

The front door is a door we often cross paths with multiple times every day, as well as the bedroom door. The treatment or lack of, to the surface of a door starts to shape it as a focal point. The treatment could be simple relief carvings or specialised paint to account for weather. The focal point of treatment on a door for my project aims at questioning: what are the front and back of a door? – which is dependent on the person's directionality.

A front door is also evidence of intentions regarding public and private access. An open door allows outsiders to view

⁶ Exterior is talking about being situated outside of spaces. When we are moving from the outside in. Front doors and ranch sliders are good examples of how we move from the exterior into interior spaces.

the inner space of the home, like someone gazing into the opening of a cave. A home bearing no door is similar to that of a cave; it simply is a space into which anyone can look but also, without a door, there are no limitations. Hence, people who look are free to invite themselves into the space, which changes how the door works as a barrier between spaces. A space with an entry gives the person the opportunity to limit those entering. It closes off the outside. Doors, in a sense, become a boundary line, a movable boundary line. A space with no door allows anyone in, which creates an open boundary crossing; a community space.

Door Boundaries

Architect Juhani Pallasmaa in 'The geometry of feeling'⁷, proposes we cross over a boundary when entering the house. Pallasmaa says, "Stepping into the house, entering through the door, crossing the boundary"⁸. Crossing over the boundary, in my project, is taking the door to be the barrier between two spaces and altering the door frame to be the threshold or boundary crossing. As previously

discussed, the door closes spaces and opens spaces, connecting people and spaces.

The door frame becomes the boundary that we cross over. A person passes over and under the door frame to get from somewhere to somewhere, space to space. In this research project I'm thinking about Juhani Pallasmaa's idea of boundary crossing in terms of the door frame. The door frame is an invisible line that we cross when stepping between spaces daily.

Academic and critic in literary theory, cultural studies and feminism, Rita Felski counters this idea by stating that "everyday life is usually distinguished by an absence of boundaries and thus a lack of spatial differentiation".⁹ The involvement of Felski's idea of every day is to consider that a boundary does not have to mean a specific place of crossing. Mapping out the spaces we go to within a daily context shows there is no distinguished single line to cross. People cross over many boundary lines as they move around. The spaces all interconnect depending on how

⁷ Juhani Pallasmaa, 'The Geometry of Feeling: A look at the Phenomenology of Architecture (New York, K.Nesbitt (ED.), 1996), 448-453

⁸ Pallasmaa, 'The Geometry of Feeling, pg. 452

⁹ Rita Felski, *Doing Time: Feminist Theory and Postmodern Culture* (New York University Press, 2000). Pg. 85

much we move around, creating an absence of boundaries. Spatial differentiation is another way of thinking about how our daily movements connect all spaces we inhabit, giving us no set space of inhabitation. For my project, spatial differentiation is about thinking of the spaces before and beyond a door.

The materiality can be an aesthetic decision. A glass door, for example, has limitations in the way we interact with the surface of a door. The tactility becomes limited to the door handle. Fingertips touching glass leaves marks, so when approaching a glass door, there might be a sense of apprehension about not dirtying it - the door handle becomes the critical part of the design in terms of tactility. The door becomes active in assisting us through boundaries because often it has a handle. It has a moment where the tactility allows the door to be restful (closed) and active (open). A bedroom door is different to the front door, which are both different to the back door within my home (Figure 1). Those are three types of doors, different again to the context of a revolving door. All these doors differentiate between public and private spaces.



Figure 1: Phoebe Halliday, *The Doors of Home*, 2021

Public VS. Private

Different doors mean different forms of public and private. Architect and Historian Robin Evans, in his essay 'Figures, doors and passages'¹⁰, writes about how doors divide and re-unite spaces all around us as entirely inhabited spaces by people. People are what occupy the space, and it is our actions around the door that make the spaces both separate but together. An open door is how we can view the space as a collective; an open door is an invitation into the space, reuniting people and space. However, as soon as that door closes, the space becomes divided. Here is a bedroom, here is another bedroom, here is a bathroom and so forth. Leaving the bedroom door open allows people to come and go within the space, but as soon as it is closed, it becomes private and allows only the occupant of the room in. Evans uses the architectural plan and the human relationships within those plans to grasp better how space gets divided, "walls, doors and stairs – are employed first to divide and then selectively to re-unite inhabited space."¹¹ The movement and actions of people and doors are what connect one space to another but also divide the

space, inevitably leading to the two contexts: public and private.

The work of visual artist Monica Bonvicini challenges political and social references through architectural structures. In 2004, Bonvicini installed a work in Switzerland titled 'Don't miss a sec' – a two-way mirror glass structure housing a toilet in the middle of a sidewalk (Figures 2 & 3)¹². In her work, the simple act of opening the door breaks down what is public and private; something so intimately personal as going to the bathroom has been disrupted and turned into a public affair. Yet somehow, it remains private; it only becomes public through knowing that people are walking around you as you can see out, but people cannot view it unless they open the door. There is so much chaos surrounding the act of opening the door, and the mix of people watching is clearly defined as separate because they happen in different spaces, before and after the door.

¹⁰ Robin Evans, Figures, Doors and Passages. In *Translations from Drawing to Building and Other Essays* (London: AA Publications, 1997). 54–91.

¹¹ Evans, *Translations from Drawing*, 54–91. Pg. 57

¹² Bonvicini, Monica. 'Don't miss a sec', 2004, installation, <https://monicabonvicini.net/dont-miss-a-sec-2/>, accessed 10/8/22

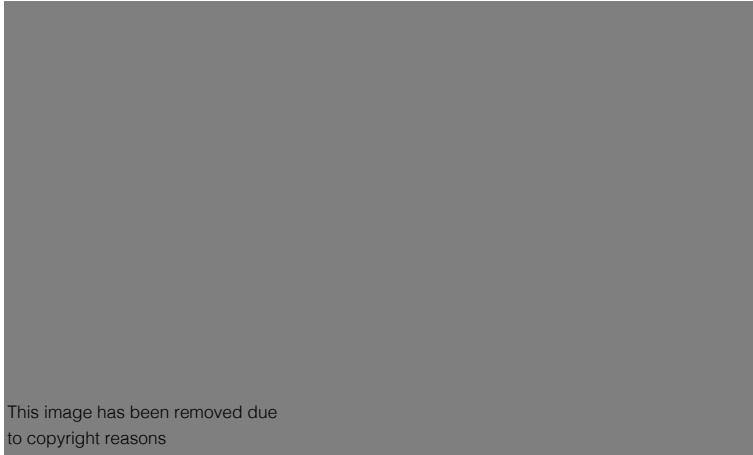


Figure 2: Monica Bonvicini, 'Don't Miss a Sec', 2004, Installation, <https://monicabonvicini.net/dont-miss-a-sec-2/>,

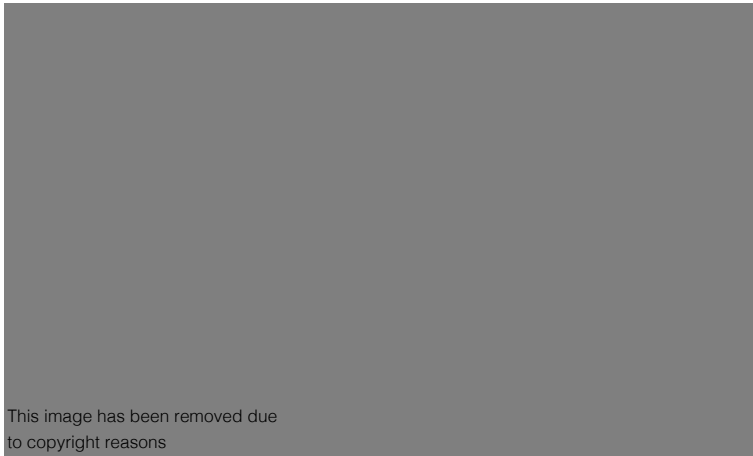


Figure 3: Monica Bonvicini, 'Don't Miss a Sec', 2004, Installation, <https://monicabonvicini.net/dont-miss-a-sec-2/>,

Spaces of a Door

Following Evans, Georg Simmel, a German sociologist, philosopher, and critic, expands on the idea of the spaces before and after a door. He says, "things must first be separated from one another to be together"¹³. This symbolic understanding is that our movement through space and our interaction with doors that keeps us connected to space but also allows us to separate the connected – passageways appear as spaces when the doors start closing. The movement of life is moving from outside to inside, which Simmel discusses in his writing ' *bridge and door*'. Moving from inside to outside can be determined by the front and back of the door. As stated earlier, the outside feels and looks different from the inside in terms of my front door. What are the front and back of a door? Observationally, it can be argued as not a definition because the direction we approach the door changes the notion: this is strictly the front and this the back. The material and surface treatment can also change the view on the front and back of the door. A revolving door covered with texture builds on the confusion between interior and

¹³ Georg Simmel, *Bridge and Door: Theory culture and society* vol.11 (SAGE, London, Thousand Oaks, New Delhi, 1994, Translated by Mark Ritter), 5-10

exterior - 'front' and 'back' continuously interchange as we move through the door's threshold.

Doors facilitate movement through space as we travel between spaces. Michel de Certeau talks about moving around cities¹⁴ in terms of mapping out the spaces we inhabit. He uses the example that we understand space through the everyday notion and motion of movement. Our experience and our inhabitation of space transforms into a spatial experience. He expresses that "space is practiced place"¹⁵ – a practised place meaning everyday travel. Everyday travel consisting of the daily repetitions that a traveller will act out every day over the course of months or years, possibly decades- which is something that can be mapped out.

Movement and memory become a crossed boundary. Moving through spaces is a journey; one that we experience ourselves. A front door, for example, is a journey we take moving from public to private. An open front door leads the public view to be allowed inside, but as

soon as the door closes, the public gets pushed out, and the space beyond the door becomes private. Ben Highmore, in '*Everyday life and cultural theory: an introduction*¹⁶ talks about this journey through the eyes (us) of a traveller; "Travelling suggests a journey alters not only the traveller but also the spaces travelled"¹⁷.

¹⁴ Michel De Certeau, *The Practice of Everyday Life* (London, England: University of California Press, 1984).

¹⁵ Certeau, *The Practice of Everyday Life*. Pg. 117

¹⁶ Ben Highmore, *Everyday Life and Cultural Theory: An Introduction* (New York: Routledge, 2002).

¹⁷ Ben Highmore, *Everyday Life and Cultural Theory*. pg. 146

Chapter 2: The Door Handle

Door handles have become a fixation in my practice which has developed while looking into the small but meaningful objects we touch every day and how they can be understood through touch. This leads to how the door handle can experience thresholds and spaces before and beyond the door itself – the idea of taking a moment when we touch the door handle to the moment we embody the space through our movements. Movement creates a collaborative experience of the door and its space through touch. Every time we touch the handle, grip it, and twist it, then move our body as we walk, we transform our experience with the door. A slight touch transforms subconscious movement into a spatial experience. During my research, I have come to notice that the door handle is an aspect of design that we touch and interact with astonishingly often. The door handle can be observed as a fleeting moment in time. The brief contact is all about the door handle. When interacting with the door handle, we touch it for a few seconds at a time. We grip and twist it,

pulling or pushing on it to move through the doorway. Our touch is only limited to our need to pass between spaces. Touch on a door, whether it is touch on the surface or handle is a fleeting touch. The fleeting touch occurs in many moments of everyday life, through our constant movement between spaces. Over periods of days, months, and years, I propose the idea that this ongoing fleeting touch extends itself into a continuous activity and has the capacity to extend our spatio-temporal awareness of thresholds and movement.

Surface as a Handle

Through my practice, I investigate how to use materiality and surface structure to create a door that slows down our fleeting moment with the door. I do this through using textured surfaces, without traditional handles, in order to explore how texture can be used to slow the passing movement through a door's threshold¹⁸. Caleb Woodard, a woodworker and designer who makes furniture full of

¹⁸ Threshold is a physical moment of passing from one space to another. A door frame is an excellent way to understand the physical threshold. A door frame, although built into the walls, often so they

are hidden, is the physical line that differentiates spaces. The structure itself is a physical object that some grip for support. Thus, making a person crossing through the door frame a physical threshold.

textural detailing, has created a door rich in detailing on slightly different layers (Figures 4 and 5). The door is a 10 foot wide sculpted sliding door from walnut timber. It was designed for Suzanne Lovell, who is an architectural designer, for her home . The piece stood out to me as I am looking at how to bring awareness of thresholds within the domestic setting to our attention. The doors of a home is already a on a large-scale, however, I wanted to push the bounds of how a large scaled door can expand our views on spaces. The scale of this door within its placement of a home pushes the bounds of what a door can mean for spaces around us, it doesn't follow the generic properties of doors within a home. I imagine that with the door being large scaled that it leaves an impression on visitors to the home its placed in. Large scaled doors can push bounds of generic properties that doors adhere too, it can open awareness of space, it can transcend us into a new spatial awareness. Everyday elements will transform the way people move and interact with my door. Taking inspiration from Caleb Woodard's large-scale door, I imagine a slow opening transcend when pushed open. The handle also becomes a way of connecting us to the spaces before and after a door alongside the rich surface detailing.

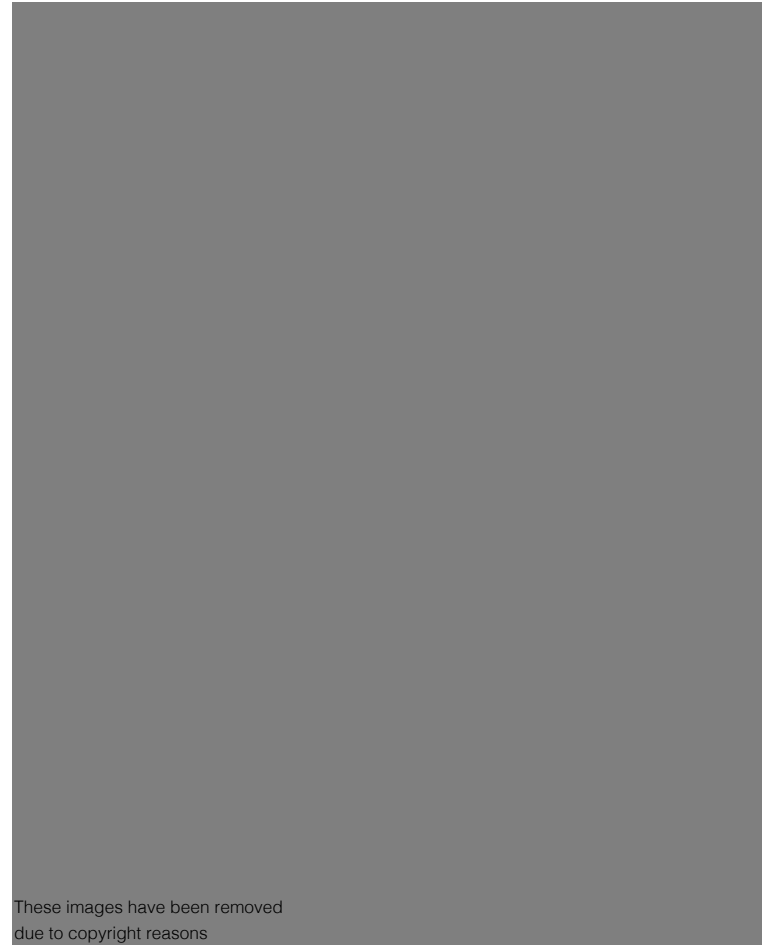


Figure 4-5: Caleb Woodard, 2020, Sculpted Sliding Door

Handles and Thresholds

In the article '*Points of contact – A short history of door handles*'¹⁹, Edwin Heathcote talks about how we perceive door handles and how they have changed over the years. Heathcote also talks about how the door handle is the interface between structures, as does Juhani Pallasmaa in '*The thinking hand: existential and embodied wisdom in Architecture*'²⁰. Heathcote writes, "This modern piece of handheld architecture is our critical interface with structure and the material of the building"²¹ – the door handle becomes a pivotal role between body and threshold (space). Through the touch of a door handle, we can change between spaces that transition the door into a threshold. We perform the transitioning between spaces through simple actions of pushing, pulling, or twisting a door handle and walking beneath the doorframe. These actions led to an embodiment of space as the body crosses over the threshold going from one area to the next. An

intimate moment between body, touch, and space or as Pallasmaa writes, "the pulling of the door with one's body weight is often the most intimate encounter with an architectural structure"²². From this, I frame my design proposition of a door, and door handles, that focus on touch and surface in a way that changes one's spatial experience as one enters and exits between thresholds.

Handles as a Form of Tool

Door handles are a tool used to move about space, an interface that connects people and space. A connection has been made through the little detail within a design. *Sugatakatchi* is a company specializing in interior decoration. The company was founded by Makiko Takahashi and the designer Yasufumi Takahashi, a sculptor who is interested in the "interdependent relationship between body and space"²³. The makers '*Sugatakatchi*' specializes in the creation of door handles

¹⁹Edwin Heathcote, 'A Short History of Door Handles', Apollo Magazine, 10 June 2020, <https://www.apollo-magazine.com/history-door-handle-designs/>. Edwin Heathcote, 'A Short History of Door Handles', Apollo Magazine, 10 June 2020, <https://www.apollo-magazine.com/history-door-handle-designs/>.

²⁰ Juhani Pallasmaa, *The Thinking Hand: Existential and Embodied Wisdom in Architecture*, AD Primers 3 (John Wiley & Sons, 2009).

²¹ Heathcote, 'A Short History of Door Handles'.

²² Pallasmaa, *The Thinking Hand*, Pg. 104

²³ "Doorhandle-Sugatakatchi," Sugatakatchi_Doorhandle, accessed March 9, 2022, <https://www.sugatakatchi.com/EN/>.

(Figures 6-8) as an interface that connects people and space. They say, "We believe that the door handle is the human interface that connects people and space"²⁴. In their works and, and as Heathcote and Pallasmaa understand the role, door handles evolve from being undocumented to this significant moment of spatial experience, enhancing the spatial experience through haptics. The concept was formulated from the idea of the *everyday*, something used all the time, touched all the time daily but extending that idea into a new design that makes people think. The idea took off when Edwin Heathcote described that a door handle can absorb change – like fashion, it has its trends then goes back to normal, a generational concept. He says, "[N]evertheless, exquisite and unexpected designs occasionally emerge, and each generation finds something new in the everyday"²⁵.

²⁴ "Doorhandle-Sugatakatchi," Sugatakatchi_Doorhandle, accessed March 9, 2022, <https://www.sugatakatchi.com/EN/>.

²⁵ Heathcote, 'A Short History of Door Handles'.

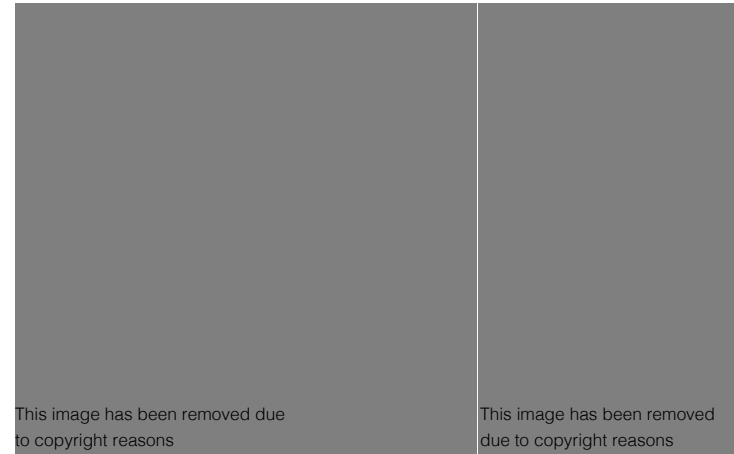


Figure 6: Sugatakatchi, Door Knob Caillou

Figure 7: Sugatakatchi, Hanger & Knob Caillou, Pavé

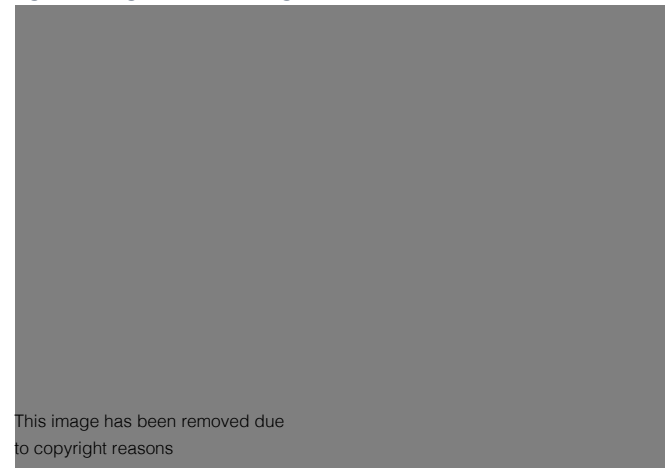


Figure 8: Sugatakatchi, Door Handles Vagues

Material Memory

Material memory is evidenced in the project *'The Lang Door'*²⁶ by New Zealand Architect Mike Davis. He recycled old weatherboards and flooring from a bach and turned them into something new, keeping the memory of the old bach alive through materials. The way Davis has taken into consideration the materials and how they hold the memory of the old bach helped me to develop the idea of material memory in my project. The way he used the surroundings to create the surface detailing (Figures 9 and 10) brings all the memories surrounding the bach into one. Collectively there is a lot of memory forming this collection of land, sea, and salvation of materials, leading up to the new occupants (family) to experience constant nostalgia as they touch or brush up against the doors' (Figure 11).

²⁶ Esther Mecredy, 'Mike Davis' Lang Doors: A Commentary in Terms of Time, Material and Practice', *Interstices: Journal of Architecture and Related Arts*, 22 December 2017, 80–83, <https://doi.org/10.24135/ijara.v0i0.14>.

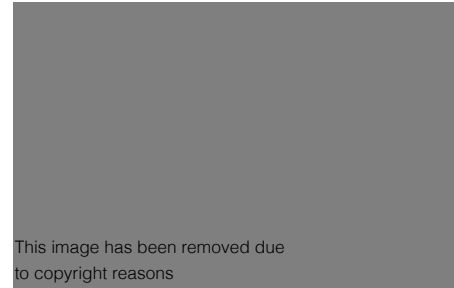


Figure 9: Mike Davis, 'Lang Doors', 2017, Sand Pattern Image

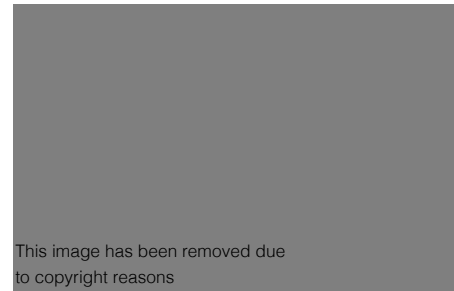


Figure 10: Mike Davis, 'Lang Doors', 2017, CNC detail relief

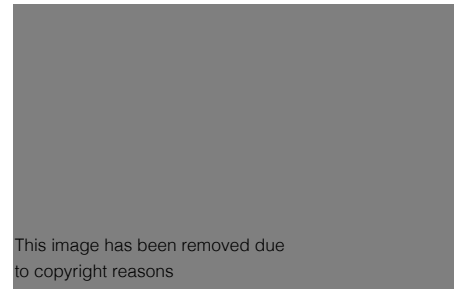


Figure 11: Mike Davis, 'Lang Doors', 2017, CNC variation on Rimu

Another way of looking at doors in terms of material memory is through the work of Juhani Pallasmaa. In '*Identity, Intimacy, Domicile: Notes on the phenomenology of the home,*' he describes how in the summers, he spent most of the time on his Grandfather's farm. He talks about how one of his most lived in homes of his childhood occurs through memories being there; over time, the memory stuck, but it also transformed into new things at the same time. "I cannot recall the shape of the front door of my grandfather's house either, but I can still sense the warmth and odour of air flowing against my face as I open the door"²⁷. Although this memory is considerably different from the '*Lang Door*', the memory is still surrounding a door. Still, now the memory comes alive through the actions of the door in an everyday experience and environment. Where Mike Davis uses the materials and surrounding context to keep memories alive, Juhani Pallasmaa treats memories with scents and feel. Pallasmaa describing how

²⁷ 'JUHANI PALLASMAA: IDENTITY, INTIMACY AND DOMICILE - Notes on the Phenomenology of Home', accessed 24 March 2022, http://www.uiah.fi/opintoasiat/history2/e_ident.htm. Pg. 6

²⁸ Material Culture, in a brief definition according to Merriam Webster, is "The totality of physical objects made by a people for the satisfaction of their needs". - *Merriam-Webster.com Dictionary*, s.v. "material culture," accessed Nov 23, 2021, <https://www.merriam-webster.com/dictionary/material%20culture>.

he remembers his childhood home extends how we view memory. Memory is not just about the physical material but a deeper involvement of the senses. Mike Davis uses the details to keep the memory around, however the details begin to recede but the context is around the door still stays with Juhani Pallasmaa's remembrance. The sensations surrounding him as he walks close, pulls open the door are the connection to the door. Material memory combines materials and the senses when it comes to the contextualism of doors in my project.

Material Culture

In this research project, I have used the term '*Material Culture*'²⁸ to gain my understanding of *Material Memory*²⁹. Material culture in the past has been mostly used in the fields of archaeology and anthropology. Throughout '*The Material Culture Reader*'³⁰, Victor Buchli, a professor of

²⁹ Material Memory, in terms of this project, is how materials around us and materials we remember from the past help transcend us into keeping memories alive even as they blur over time. We lose bits and pieces as the memories build up. I talk about memory culture in terms of this project surrounding the idea of touch. However, material memory can also be through the other senses, sight, smell, taste, and hearing.

³⁰ Victor Buchli, ed., *The Material Culture Reader* (Oxford International, Berg, 2002).

material culture in the Anthropology department at University College of London, continues to reiterate he often found those two fields mostly use the term as they signify a way of remembering or discovering what the past can tell us. It's a way of keeping the memory alive of all those before us who made and designed for us to get where we are now. Buchli calls this the "materiality of social life".³¹ As time has gone on, the term *Material culture* has developed an understanding of the past and present in terms of things we see every day. The basic form of my project develop through the realm of everyday objects.

Methodology

My practice takes on the exploratory methods in understanding haptic terrains through spatial design. Spatial design, as a field, explores how we inhabit spaces, my project is particularly focussed where the door is concerned, in relation to threshold and spatial experiences. Haptic experience evolves from working with the hands and how hand-crafted designs invite touch upon surfaces. Haptic terrains embody how we touch surfaces in the spaces around us and use that as a guide when passing

over a door's boundary or threshold. Haptic terrain is also a flow-like experience where the making journey is influenced by the hand, resulting in a range of haptic surfaces. To understand the haptic terrain through my project is to understand how I continuously work with my hand (in addition to other modalities) to produce hand-crafted results. It is to realise that spaces can be understood through awareness that we gain from touching specific points on a surface, guiding the inhabitant through a threshold.

Throughout the project, haptic terrain as a methodology is influenced by my design methods. The methods get explored and repeated through the process. Each exploration gives a specific aspect that becomes one collective, the cycle repeats, and another collective gets added. When all the collectives come together, then the outcome becomes visible. Each collective represents a terrain, many collectives represent terrains, and each terrain focuses on a haptic exploration. Thus, a haptic terrain is built and developed through my project.

³¹ Buchli, ed., *The Material Culture Reader*. pg. 3

Chapter Three: Documentation of Practice

Introduction to Practice

In this final section, I will outline my approach to the practice of destabilising the general and expected properties of a door. Although heavily discussed in the earlier sections, I break down the door into two sections; the door and the door handle, but here I alter those general properties. This section reflects on my approach of using the hand as a central concept driving my project. I use my hand to continuously engage in working with touch on my created textures – which over time, builds up to becoming a door. The practice first started with relief carving, created through a process of hand chiselling. The practice approaches using the hand and materials collectively working through a series of experiments to understand the craftsmanship of making a door.

Methods:

1. Mood-boarding
2. Drawings (Hand-Drawn, Digital)
3. Prototyping/Experimenting (CNC, Laser Cutting/Engraving, 3D Printing, Digital Modelling)
4. Installation

Bark Texture – CNC Machined

In the beginning, I was interested in working with organic formations. I have chosen the material of timber to explore and use in my final design, so working with organic material, I used photogrammetry³² to replicate the texture. I then manipulated it into my own formations in order to produce a flat geometric surface plane that had texture built onto it. Even though this was working on a small scale, I was constantly envisaging it as larger so that everyone could touch and interact with it on some level. From this, I learned that I wanted to explore larger scaled work and also work with slabs of timber. I was interested in taking factory-made slabs of wood and laminating them to build up a surface that was a reference to the timber pre-factory look. A manipulation of the material that brings back its original look, bark, with the help of machinery. Working with bark and digital modelling (Figures 12-20), I created forms using a mix of software before starting my bark which I then made on a CNC machine. Working with the CNC made me

realise I wanted to continue working with it, but more significant or minor in size.

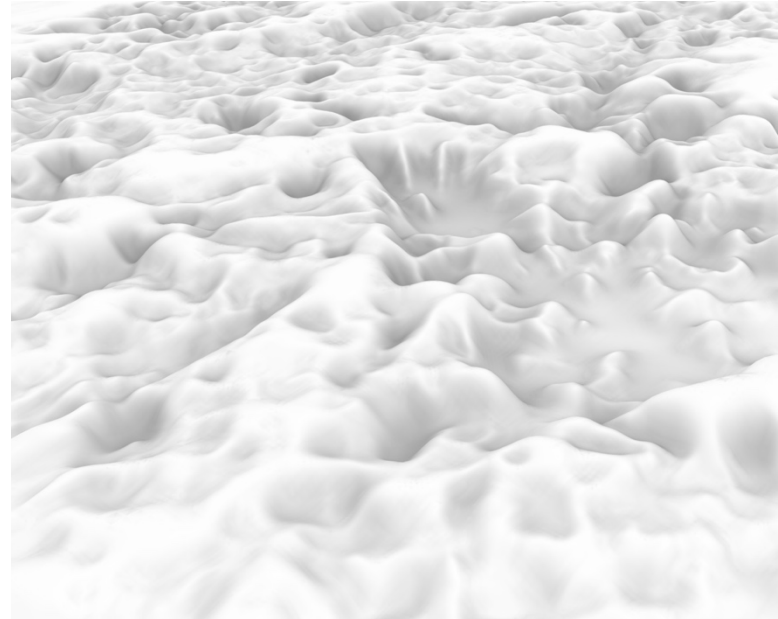
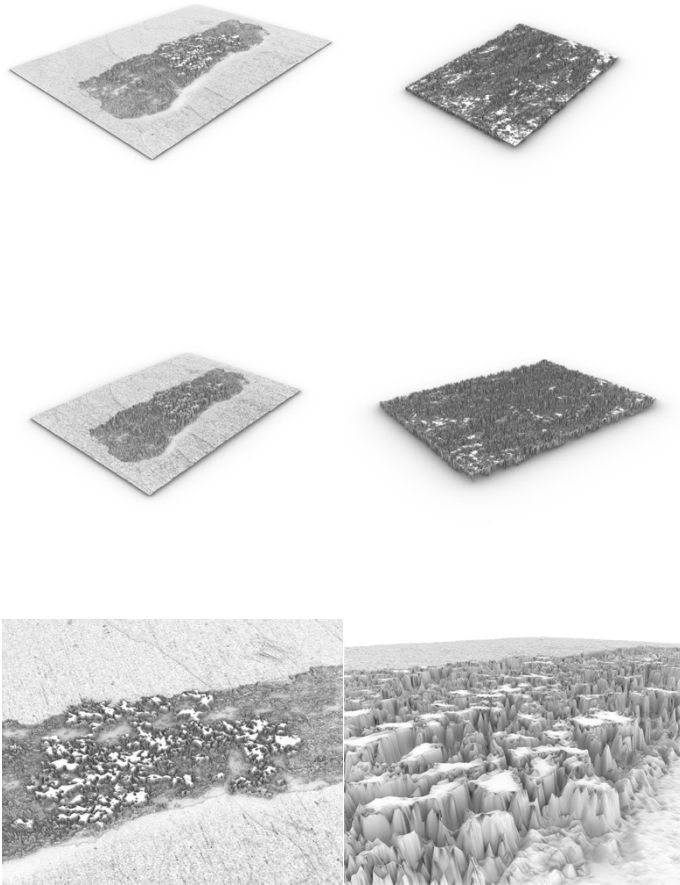


Figure 12: Phoebe Halliday, Heightfield Texture, 2021, Digital Model

³² Photogrammetry a mix of Art and Science used to extracted data from overlapping photographs to create a 2D or 3D model of an environment or physical object/building.



Figures 13-18: Phoebe Halliday, Same process; different outcome, 2021, Digital

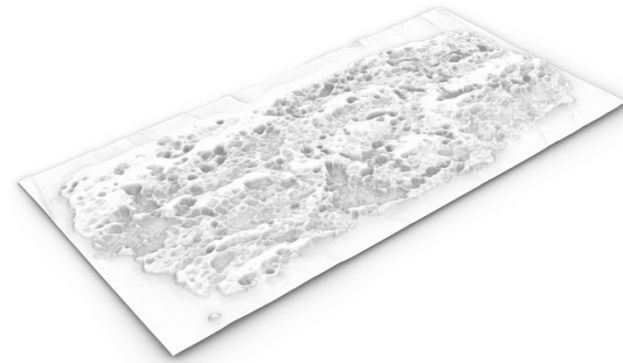


Figure 19: Phoebe Halliday, Crafting bark, 2021, Digital Rendering



Figure 20: Phoebe Halliday, Crafted bark, 2021, Cnc machined redwood

Bark Texture – Laser Cutting

Moving forward, I had learnt how to chisel and was highly interested in working with my hands to create relief carvings. However, I was still very intrigued by using machines to generate softer carvings that I found I could make with chisels. Exploring new machinery that I could learn, I next moved on to the laser cutting machine. Although this wouldn't get the softness that comes with the chisels or the CNC, I found this exploration has exciting results. Figures 21-23 show how once again, the bark is a critical starting point for my textures. Taking images to the laser cutter allowed me to engrave the wood producing three levels of surface texture. Each image after the first is laser engraved at a different depth, the bark image being the reference image. I was still interested in working with machines to produce an organic-like texture on factory-made pieces of timber. I was impressed by the outcome of this test experiment and may continue to experiment with laser cutting in the future of this project.



Figures 21-23: Phoebe Halliday, Different depths, 2021, Laser Engraving on Redwood

Dough Surfaces – Tactile

Lockdown caused a shift in my project. I didn't have access to the facilities where I could continue a deeper exploration into the CNC machine or laser cutter. I decided to go back into exploring making with my hands again. The project builds on the idea of how I use my hands to determine what something is or how I use my hand as a guide between spaces. Still interested in surfaces and textures, I worked within restrictions of sizes that could be handheld as something began to happen when I worked with small dimensions. Figure 24 -27 shows a series of images that were all focused on texture created through imprinting; some were made using clay carving tools, which I could create soft carving – similar to chisel work. Figure 25 was an imprint made from a tree branch. I was still trying to figure out ways of incorporating wood into this new design approach. Picking up and feeling the wood before finding a spot to imprint made me realise that not only was working with hands vital but also exploring timber more as a material through hands. This shift caused me to view how my hand can design for the hand, from the hand.



Figures 24 and 25: Phoebe Halliday, Lockdown Making, 2021, Playdoh



Figures 26 and 27: Phoebe Halliday, Lockdown Making 2, 2021, Playdoh

Contouring Dough – Tactile

As a continuation of Lockdown making, Figure 28 and 29 explores a further exploration into working closely with the hand(s). As I was still very interested in organic shaping and textures, I decided to explore that further here. This process relied heavily upon the use of my hands – which is the ever-present design process that drives me to create—rolling out the dough, feeling it for thickness, smoothness, and roughness before picking it up and carefully forming it into this billowing surface. This process certainly reminded me of my work with the chisels and just standing there, chiselling away and feeling for the smoothness and roughness of the carves. I made a fundamental discovery here that working with my hands as a tool certainly needed to stay as a vital role in my work and that although this helped open my thinking to working with other materials, I still felt a connection to working with my hands paired with wood.



Figures 28 and 29: Phoebe Halliday, Lockdown Making 3, 2021, Playdoh

Hand Grip – Texture

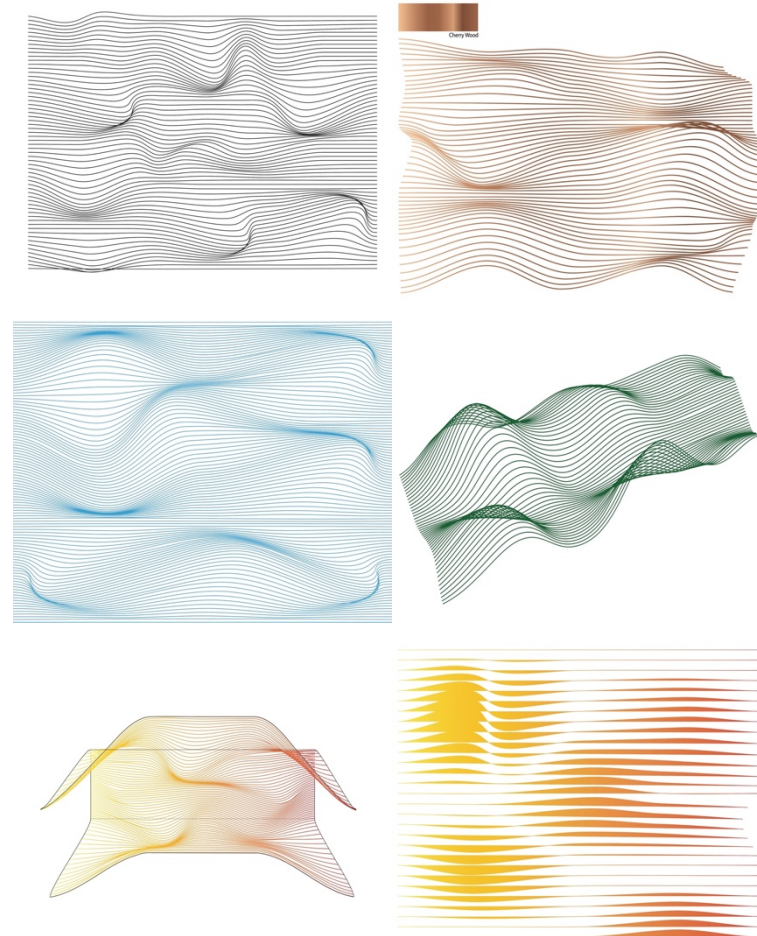
After working out that the hand needs to be a constant factor in my design outcome, I moved forward in thinking about how the hand works in different ways. A hand not only feels but also grips. When the hand grips something, it leaves behind a trace of the person who grabbed the object—figures 30-34 showcases how I chose to grip a ball of dough. The grip left behind traces of my skin on the surface; there is the finest detail of the texture of my skin. The grip experiment amplified how I used my skin and hands to make a new texture that I could then build on later. The hand not only gives me a surface to work with but also the hand then crafts the texture - which then gets touched by my hand but also others through shared interaction.



Figures 30 -34: Phoebe Halliday, *The way in which I grip*, 2021, Playdoh

Digital Texture – Illustrator

I was still interested in creating raised contours that people could run their hands across. To explore this idea, I digitally created surfaces with smooth contouring (Figure 35). Once the lines were all drawn, it was a matter of selecting them all and controlling them through point control. This process was designed purely with no set outcome in mind, allowing for multiple different variations to happen. Working three-dimensionally was to see how they might work within spaces and how a person could interact with the surface – leading to an experience of space. Although I enjoyed how these turned out, I wasn't too sure about them getting carved by hand. However, these files could be taken into rhino and made into a surface that I could have then got 3D printed or produced on the CNC machine.



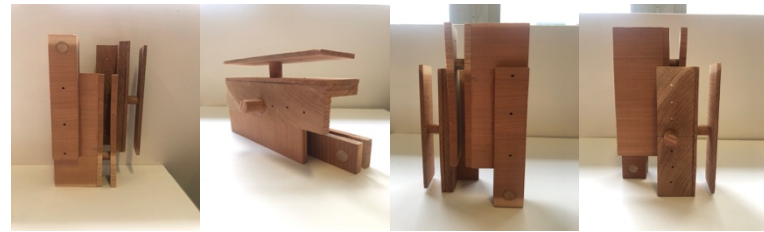
Figures 35: Phoebe Halliday, Contour Lines, 2022, Digital Drawing

Door Handle – Prototypes

My whole project has focused on how we use touch to navigate between spaces and how the door handle is a continuously touched object of the everyday. I decided to explore the door handle in more depth shown in Figures 36 to 44. Initially, I wanted to create an exciting handle that was non-textured so it wouldn't clash with the door I was envisaging. The door handles pictured in Figures 45 and 46 happened by accident. In my head, I imagined a smooth organic shape carved from a block of wood that fits with the grip of a hand; instead, I got oversized bulky handles. Although they are bulky, I enjoyed the outcome they produced. However, they hold a silent invitation of that being the touch point for everyone, which is counter to my aims.



Figures 36-39: Phoebe Halliday, Interesting Handle One, 2022, Redwood



Figures 40-44: Phoebe Halliday, Interesting Handle Two, 2022, Redwood



Figures 45 and 46: Phoebe Halliday, The Handles, 2022, Real Life Context

Drawings of the Skin – Texture

The drawings process in Figure 48 came from the hands as I figured out a way to involve the hands in my work. I was looking at my own hands for inspiration. I started to section out my fingers, as pictured in Figure 47 and then drew the shapes I saw by eye. From there, I continued to go back and forth between my fingers and the notebook. Repetition of forms in different sizes appears, and the placement starts an organic flow to happen. Some drawings were a matter of stopping when I felt I had enough to move forward. Others I sectioned off into specific bounds to work within.

When I had finished some iterations, I chose to replicate the drawings on the software Rhino, Figure 49. The digital modelling allowed me to see how I have created a texture that I want to push onto a surface through hand carving, CNC, or laser cutting. I could increase and decrease the scale of the curves to any scale. I could make a series of small intricate textures or have large standout textures. These looked easy to carve. However, when taken to be laser cut, I found that the formations and smaller curves were not what I imagined regarding hand-crafted texture.

The formations were also too hard to work with one another, so instead of focussing more on the texture, I moved into exploring formations, leaving surface texture up to the chisels when the time comes.

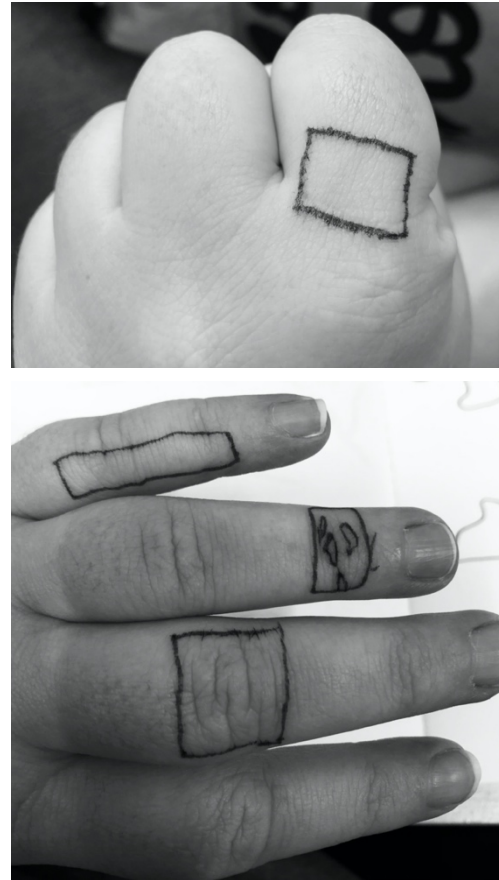


Figure 47: Phoebe Halliday, Sections of the Hand, 2022



Figure 48: Phoebe Halliday, *Drawings of the Hand*, 2022, Pen Drawings



Figure 49: Phoebe Halliday, *Tracing*, 2022, Digital Drawing

Digital Layering – Prototypes

Figure 51 is a series of digital prototypes made in Rhino, the shapes taken from my drawings. However, there are a few I combined and manipulated into new forms. I was constantly changing the positions of everything until I felt I had something I could work with and build on. I created a base for the extrusions to sit on. The extrusions are block forms of the forms I created. I'm working with layers with depth as I am taking inspiration from Caleb Woodard's door (mentioned in [chapter 2](#)). Woodard works with subtle depths and a lot of fine detailing on the surface of his works. I liked the comparison of the depth mixed with the texture, but I wanted to push the layering as far as possible in terms of materials. Ultimately, these files will be explored more as the outcome wasn't quite what I wanted, but I got plenty of new ideas to expand on.

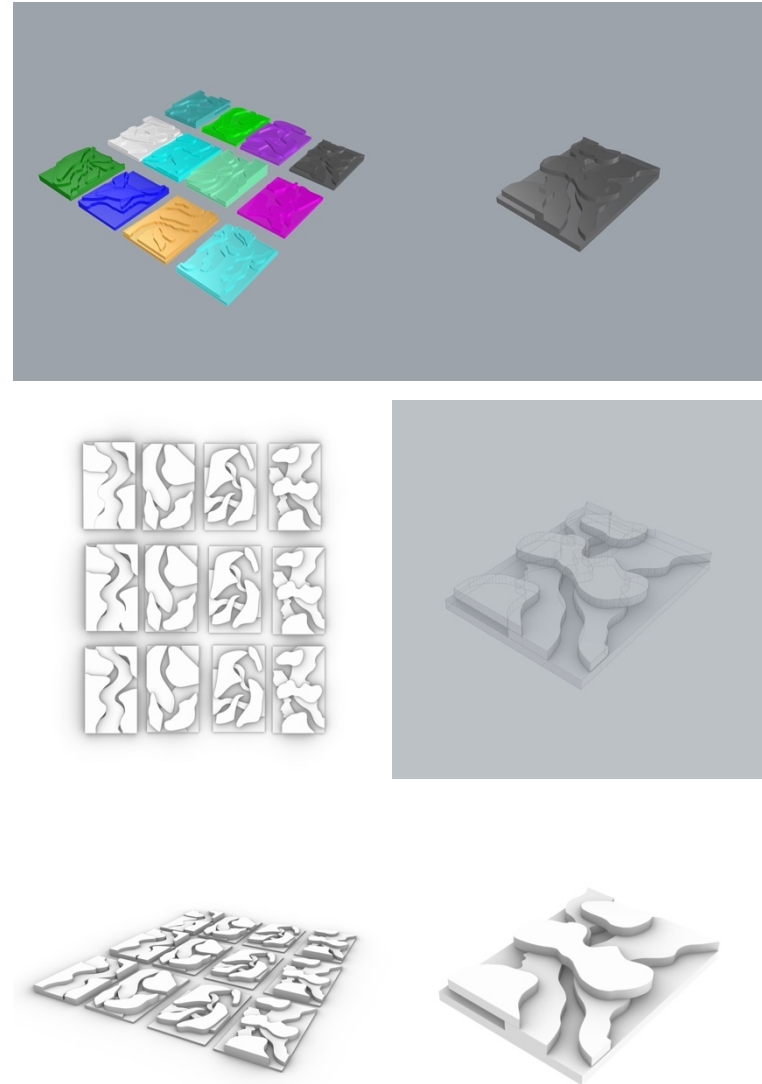


Figure 51: Phoebe Halliday, *Digital Form Explorations*, 2022, *Digital Modelling*

MDF Layering – Models

The surface prototypes in Figure 52 are the digital drawings laser cut on MDF. The layers I made were so I could place relief carvings on flat surfaces, becoming the door's touch point and potential handle. It would give the inhabitant of the space a place to touch and push – a whole-body experience with the door – but they didn't provide the vision as they appeared block-like and chunky. When picturing the three-dimensional surfaces, I continuously imagined soft curvatures leading from the top of the extrusion into the door's flat surface or base. However, it did raise the potential for hand ergonomic touch points. Some of the layers could be used as touch points, suggesting that when touching here, it would be an excellent place to push and open the door as the door surface undulates between subtle deep relief and shapes where there is no carving.

Placement of the textures on the layers is critical. I decided to focus on where the texture would go. Currently, these placements are random, which is why they do not work and make the models busy. There is too much to take in. Using my drawings' digital laser cutting files, I produced a stencil (Figure 52) to determine where to place the patterns and give a rough estimate of where the relief carvings would be, modelled in Figure 53.



Figure 52: Phoebe Halliday, Doors taking on layers, 2022, Mdf models



Figure 53: Phoebe Halliday, Doors taking on Texture, 2022, Mdf models

CNC Models – Prototypes

Testing out the CNC machine, I made small scaled doors of rough formations that I was looking at pushing forward with for my design. These tests allowed me to push the standard conventions of a regular door. All of the models have different depths moving towards a very unconventional door. These models were at a maximum thickness of 50mm as that was the thickness I wanted for the final door. Giving myself this restriction allowed me to produce quick results and understand what I could and could not do when going further with these tests. After seeing the completed models, I discovered that seeing the curves blended wasn't working as well as I had hoped. They left too many small gaps, which I would find challenging to carve in even on a larger scale. The overlapping between all the extrusions looked odd. However, the flowing curved one stood out to me the most. Instead of treating the surfaces as separate forms, why not use the flow as I aim to do for the carving? The model has moments where the shape would work for a handle, so accentuating and elongating the shape gives more flow to it, which at larger scales allows more room for the rhythmic chiselling to determine its path.



Figure 54: Phoebe Halliday, Cnc machined doors, 2022, Scaled models on Redwood



Figure 55: Phoebe Halliday, Cnc machined door, 2022



Figure 56: Phoebe Halliday, cnc machined door, 2022

Centre Point Pivot Fixing

The door will act on a centred pivot fixing, allowing the door to spin on a 360-degree axis modelled in Figures 30 and 31. The pivoting hinge allows the door inhabitants to pass the threshold from either side of the door. A central spin came from incorporating a revolving door's spinning properties with a generic door. Creating a spinning door altered how my project views the door and the shift in exploring what a door is, even when not using the standard pivot (90 degrees) or working with a specific door handle. The size of the door and the 360-degree spin also shifted in working in my domestic space where the project first took off. However, this does not exclude it from being able to be placed in a domestic space. A company specialising in pivot fixings for oversized doors called '*FritsJurgens*'³³ has helped many architects and home designers create a centre point pivoting door, similar to mine, in homes worldwide. This shift hasn't excluded the domestic space. Instead, creating a centre point pivoting door of this size

and how we inhabit the space of a door has opened the project to all spaces, domestic, public, and industrial.

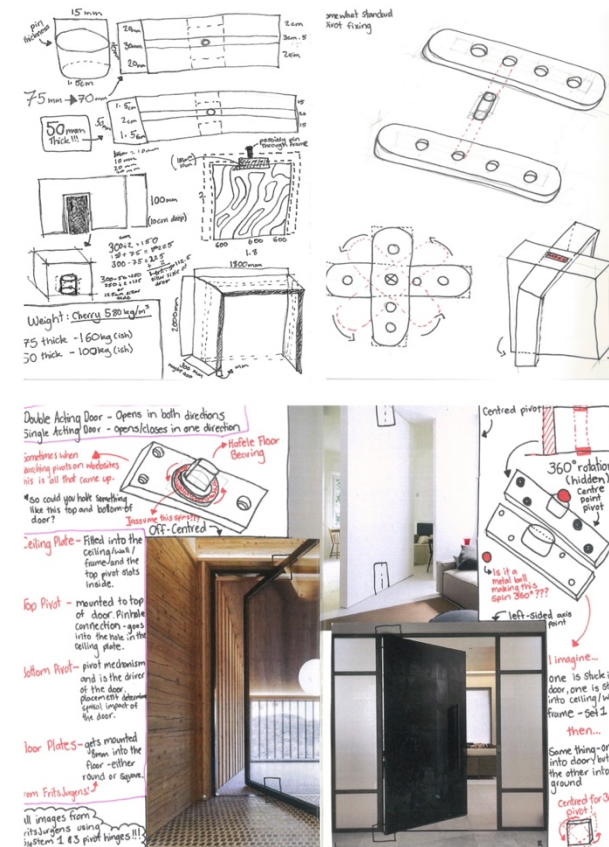


Figure 57: Phoebe Halliday, Pivot Explorations, 2022, Hand Drawings

³³ 'Pivot Doors with FritsJurgens Pivot Hinge Systems Inside', FritsJurgens, accessed 2 August 2022, <https://www.fritsjurgens.com/pivot-doors>.

Conclusion

The project, *Inhabiting doors: using haptic terrain to extend spatio-temporal awareness*, has aimed at situating a newer understanding of what a door means when it comes to space. It also seeks to develop the context around passing over thresholds and boundaries and what that means for spatial awareness in a temporal context. *Inhabiting doors* started as a base concept for using touch to learn and become aware of my surroundings. The project then moved into exploring how haptic experience can be used to bring heightened awareness that an inhabitant is passing over a threshold. Haptic terrain extends to our spatial awareness as the hand plays a vital role in moving from one space to another. The hand is the point of contact we make with the surface of a door as we push through the door, which slowly opens, giving us a slow transition between the two spaces. The use of the domestic everyday setting is where the project situated itself, which was still evident in the end. However, the oversized door I have designed is not limited to a domestic setting and can be modified or developed further for another space. This project aims to create a more vital awareness for inhabitants to realise they are passing over a threshold

through physical touch and embodiment with a door's surface. It seeks to open a conversation about Spatio-temporal awareness and invite haptics as a focal point within Spatial Design. The project holds room for further research; for now, it is an extension of exploring and connecting spaces.

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Appendix Of Images:

Gallery Exhibition and Final Outcome

DOOR:

Materials: European Beech

Finishes: Shou Sugi Ban (Charcoal), Tung Oil

Dimensions: 1800mm (w) 2000mm (H) 50mm (D)

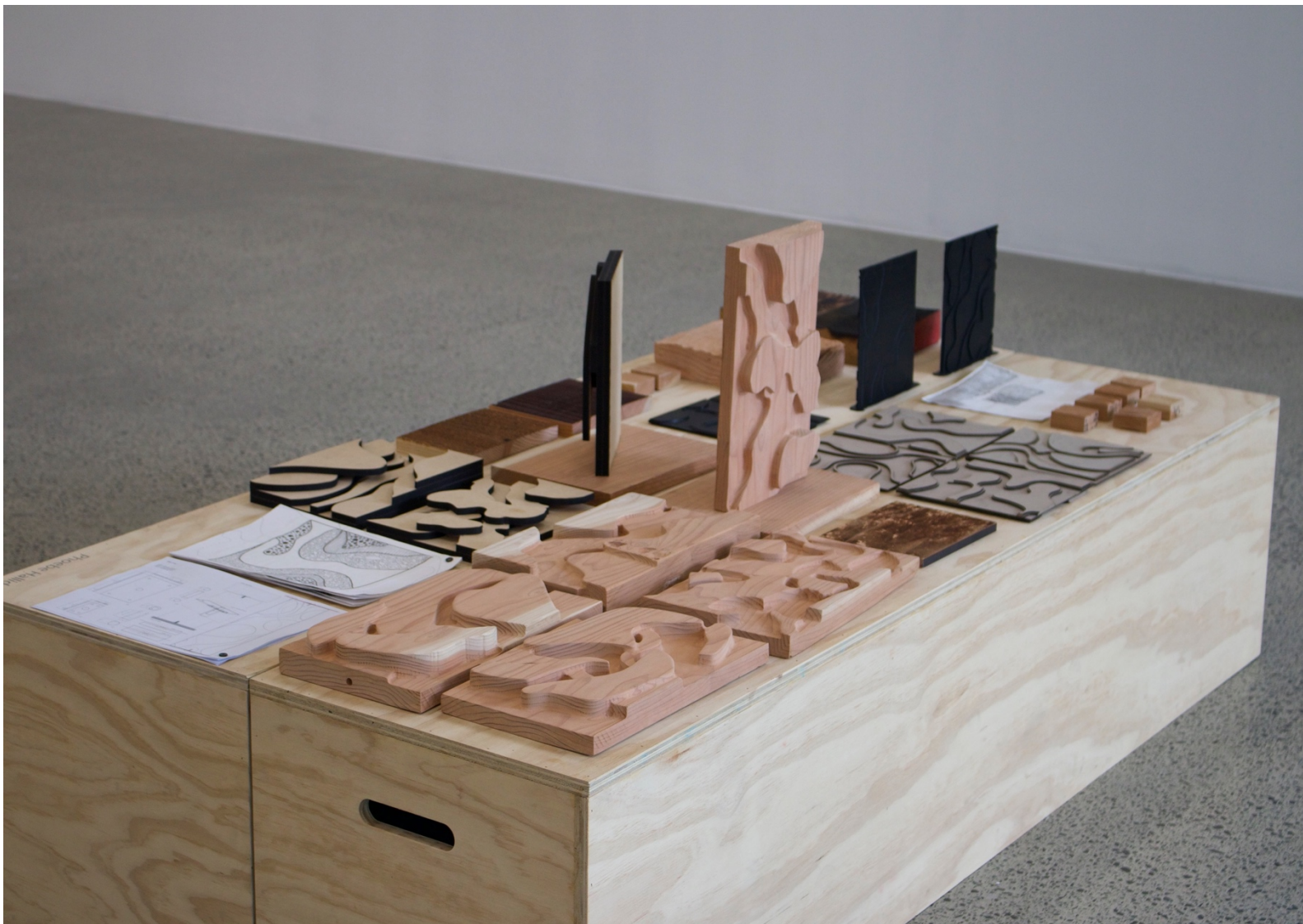


Figure 58: Phoebe Halliday, Gallery Exhibit 1, 2022, Photography



Figure 59: Phoebe Halliday, Gallery Exhibit 2, 2022, Photography



Figure 60: Phoebe Halliday, Gallery Exhibit 3, 2022, Photography



Figure 61: Phoebe Halliday, Gallery Exhibit 4, 2022, Photography



Figure 62: Phoebe Halliday, Gallery Exhibit 5, 2022, Photography



Figure 63: Phoebe Halliday, Gallery Exhibit 6, 2022, Photography



Figure 64: Phoebe Halliday, *Final Door (side one)*, 2022, Photography



Figure 65: Phoebe Halliday, *Final Door (side two)*, 2022, Photography



Figure 66: Phoebe Halliday, Detailing 1, 2022, Photography



Figure 67: Phoebe Halliday, Detailing 2, 2022, Photography



Figure 68: Phoebe Halliday, Detailing 3, 2022, Photography

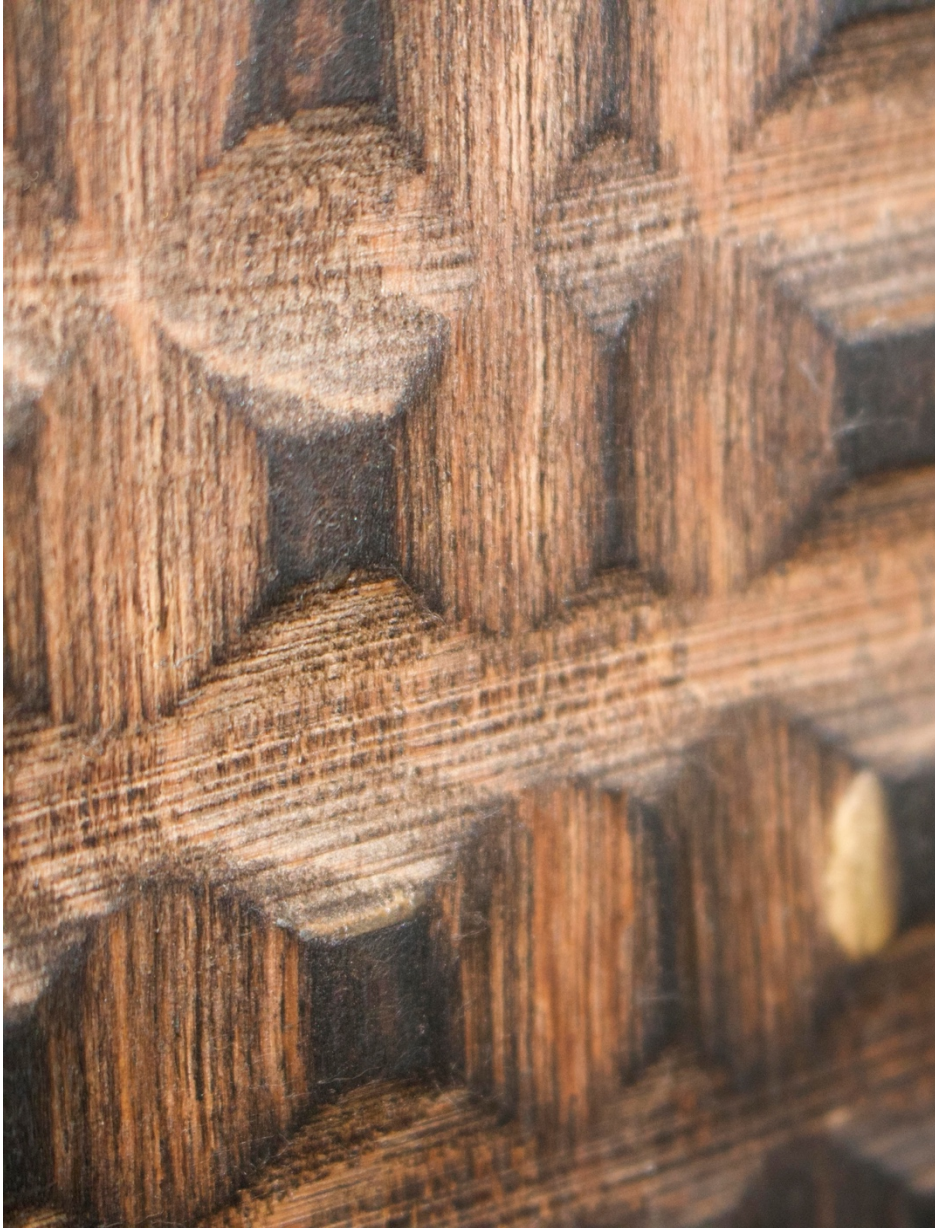


Figure 69: Phoebe Halliday, Detailing 4, 2022, Photography



Figure 70: Phoebe Halliday, Detailing 5, 2022, Photography

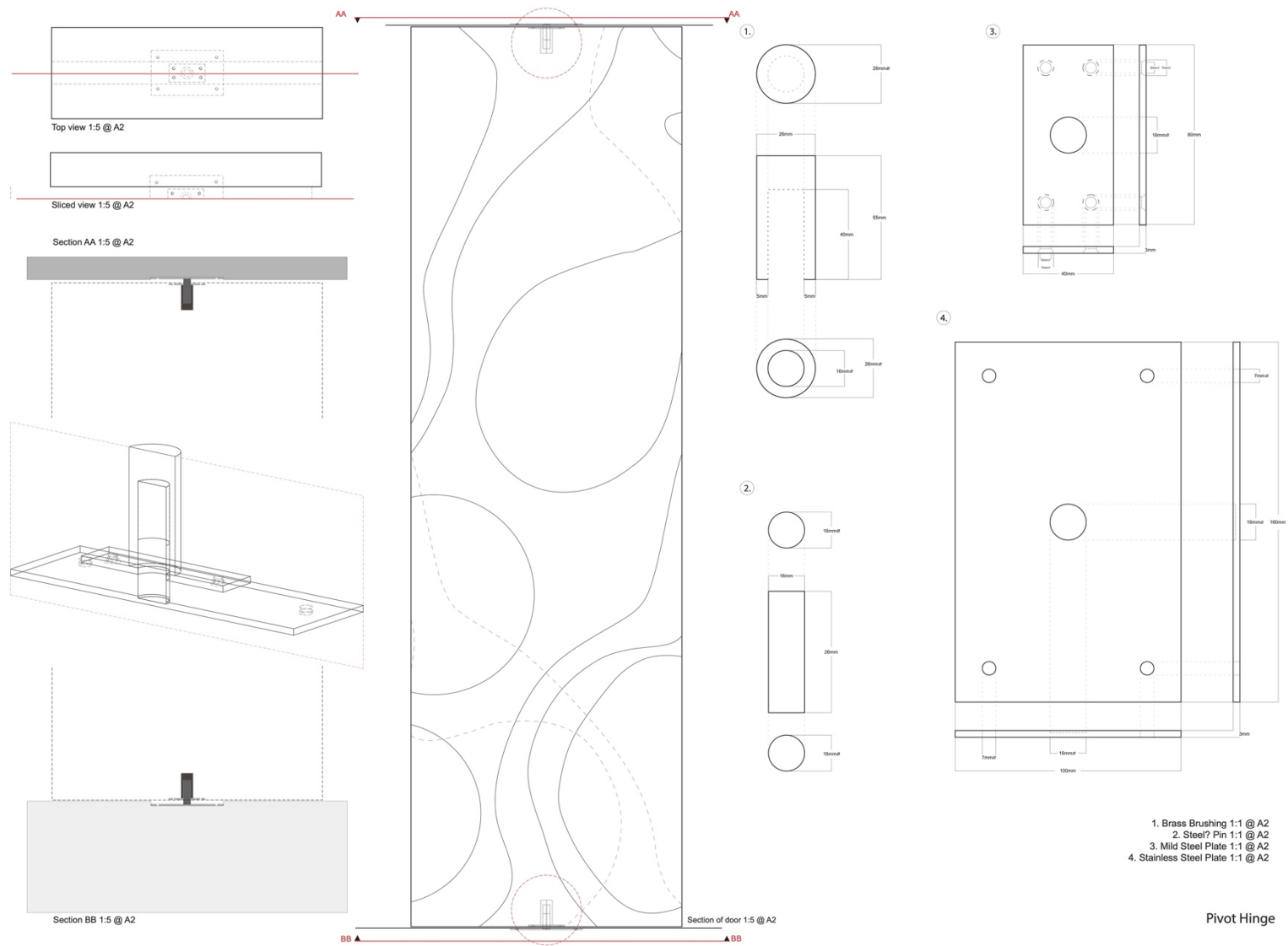


Figure 71: Phoebe Halliday, Pivot Technical Drawing, 2022, Digital Drawing