

Kate Ramsay

Exploring the opportunities for moving from craft to design with the  
emergence of high technologies in a New Zealand context.

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## Abstract

The crafts are a threatened field. There is a limit to the amount of work a craftsperson can produce with their hands. As overheads constantly rise, many eventually fail to cover their costs. Industry experts advise craftspeople to either partner with industry or move into the field of design. Currently there is a strong high-technology sector emerging in New Zealand. Kotuku explores the opportunities for moving from craft to design with the emergence of high technologies in a New Zealand context.

Last year, having come from a craft/architecture background, I designed a light fitting (Kotuku) which creatively explored the tension between art, craft, technology and design. One of the projects aims was position merino as a luxury natural fibre, sustainably produced from our natural environment and marketed under the “Brand New Zealand” story. Seamless knitting technology, when informed by art, architecture and design thinking provided an opportunity to do this. It was hoped that the project would help inspire New Zealand to move away from being a wool commodity exporter to an exporting nation of high added value quality fibre products.

This year I explore the opportunities to commercialise a lighting range. I use Kotuku as a vehicle to explore what opportunities there are for me and other designers, particularly those moving from craft to design, in the early stages of our careers.

Action research was used as the overarching research strategy in this practice based design research project. Extensive literature reviews and interviews with leading industry and academic experts were undertaken to determine the capability limits of knitting technologies and the opportunities to commercialise this product. An extensive series of practical collaborative experiments were undertaken to incorporate these themes.



# Introduction



Three years ago, in my final year of architecture school, I created a suspended, hand crocheted, cocoon-like structure covered in steel mesh which held two people. I wanted to create a beautiful, soft, therapeutic space.

Hand crocheting seven kilometers of cord was a tedious and uncomfortable task, yet it taught me a lot about craft. The thought, journey and care taken while making it could be felt in the final product. Playing and empathising with materials is fundamental. *It's about being hands on and bringing together old techniques with new processes whilst pushing the boundaries to create unique outcomes* (Tanner 2010).

While I received positive feedback on this project, it was not a marketable product. Garth Clark, award-winning historian, writer, dealer, and auction specialist in ceramic art, said at a conference earlier this year, "it's not realistic for most craftspeople to make a living working alone. Clark urged craftspeople to emulate designers who partner with industry (Moses 2012)."

Although I could not sell my work, this project left me with a fascination for knit. *It is never quite a membrane but part joint, part surface, part volume and part system. It is simultaneously open and closed* (Kieran & Timberlake, 2003). Through my research, I found AUT's Textile Design Lab. The potential of their industrial knitting machines was exciting to me. The following year I moved to Product Design to explore the technology further.



In 2011 I explored the interesting tension between art, craft, technology and design.

Developments in technology are allowing the textile industry to reposition itself to be more closely allied with the fields of industrial design and architecture. As design disciplines align, there is an opportunity for textile technologies, such as the industrial flat-bed knitting machine, to emerge as significant design tools. Similar to other types of 3D additive fabrication technologies (rapid prototyping), flat bed machines could become a tool for exploring complex design possibilities. Kotuku was an exploration of a new technology applied to a new context.

With a background in architecture and limited prior knowledge of knitting techniques or technology, I endeavoured to create a high-end lighting range with flat-bed seamless knitting technology. The research methods used were action research, a literature review and expert interviews. The sustainable framework Cradle to Cradle guided the project. Practical investigations of the seamless technology and interdisciplinary collaboration were undertaken.

I concluded that the use of the seamless technology outside of textiles and apparel holds exciting possibilities, however, there are barriers to this becoming a mainstream design too. Highly technical, this technology is currently inaccessible to designers from other disciplines without the help of a technician. The situation is worsened by lack of published literature on the subject of 3D shaping with seamless technology. Steps are being made to change this by the likes of Jenny Underwood, whose theories were tested in my research project.





I received positive feedback for the Kotuku but again I did not have a product that was ready for market. Unlike my crocheted cocoon however, it had the potential to be a commercial product.

Kotuku spoke about New Zealand's identity. NZ provided the inspiration for the form and the structure.

The material used was merino wool. One of my objectives from the beginning of the project was to add value to this natural material. Seamless knitting technology, when informed by art, architecture and design thinking provided an opportunity to do this. Currently, this technology is used primarily in apparel. It creates a complete garment without seams, so unlike the traditional cut and sew method, no finishing is required.

As well as a beautiful structure, it is also highly technical in the sense that there is a set of IP behind it, which is a result of intensive research and development and a lot of iterative testing.

The process I developed to design this light is very unique. Before being knitted, it was 3D modeled on the computer then translated to a knit structure file. Between these steps, there is a lot to and fro and a lot of drawing and adjustments being made, so that is where the art, architecture and design thinking comes in. The knit structure file is repeatable so this light can be thought of as a production piece as well as an art piece.



As a young designer in my final year of university, I need to discover where my design future lies. Wanting to commercialise my light, my options at the beginning of the year included developing and producing it myself, selling the design to a manufacturer or retailer or using the project to leverage a job in a design company. To produce it myself I would have to create a business which would include finding a partner, an investor or getting a loan. If I sold my design to a manufacturer or retailer, they would take the product to completion. They would either use my name in the branding or their own. I decided that I would attempt to take the light to completion myself.

The aim of the project this year is to explore the opportunities to commercialise a lighting range. I use my project as a vehicle to explore what opportunities there are for me and other designers, particularly those moving from craft to design, in the early stages of our careers.

### **Objectives**

- Have a brand.
- Create a business model for a lighting company.
- Have a fully resolved commercial product on the market.
- Have a new range in development.
- Capture my research with detailed documentation supported by theory.

# Moving from Craft to Design

## What is happening to craft as an area of practice?

My predicament with the crochet cocoon is not unique. It would be extremely difficult to make a living from this type of craft. There are many craftspeople in a similar position. In recent years, the crafts have struggled to remain relevant (Hughes 2011). At a conference earlier this year Garth Clark, award-winning historian, writer, dealer, and auction specialist in ceramic art said it's not realistic for most craftspeople to make a living working alone (Moses 2012). He advised craftspeople to follow designers who partner with industry (Moses 2012). Over the last three decades, the two dominant alternatives for craftspeople have been either absorption into this field of design or the 'fine arts' (Hughes 2011). Although craft, art and design have distinct identities, they share many concerns and should be considered overlapping fields with in visual culture (Hughes 2011). They all share a common theme: intellectual over the material (Hughes 2011). I will begin by defining these three areas of practice.

*Modern bourgeois culture made a sharp division between the world of arts and that of technology and machines; hence a culture was split into two mutually exclusive branches, one scientific, quantifiable and 'hard', the other aesthetic, evaluative and 'soft'... In the gap, the word design formed a bridge between the two (Flusser 1999).*

### Craft

Unique craft objects are called "free design' in Holland as they are released from the machine (Moses 2012). Empathising, experimenting and being 'hands on' with the chosen material is fundamental in the field of craft (Tanner 2010). Labelling an object as craft can be a recognition of many hours of labour, years of education or the craft and skill required to make it (Tanner 2010). It may be something that has been passed down from generation to generation, it has a story or journey behind it (Tanner 2010).

### Design

Design is intentional and it is intrinsic to all human beings as we learn through our hands (Smyth 2011). Physically shaping our environment is critical to human survival. We are *tool making animals* which requires us to design tools (Smyth 2011). This *requires an awareness of something than the status quo... awareness that things could be better and it is in our power to make it so... Design is one means we have to creatively and constructively respond to dissatisfaction.* (Smyth 2011) Generally however, contemporary design divides the designing from the making (Hughes 2011). The making is performed by people in factories who have minimal input into the design (Hughes 2011).

### Art

Art is the expression or application of human creative skill and imagination, typically in a visual form such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power (Makins 1995). For over two centuries, art has distanced itself from craft by becoming increasingly conceptually driven (Hughes 2011).

### The Future of Craft

*The crafts are a threatened field.* This argument was put forward by Garth Clark, award-winning historian, writer, dealer, and auction specialist in ceramic art, at the conference of the Society of North American Goldsmiths in May (Moses 2012). The main reason he gives is that there is a limit to the amount of work a craftspeople can produce with their own hands. As overheads constantly rise, they will eventually fail to cover their costs (Moses 2012). Clark describes this situation as self-imposed, *coming from adherence to a medieval concept of craft and refusal to employ low-key industrial techniques to produce more inventory* (Moses 2012).

There is however still demand for craft. Evidence of this can be seen in craft fairs, where people go to buy something unique and bespoke. Every piece of craft conveys a journey undertaken (Tanner 2010). When we live in a 'throw away' society, it is refreshing to have something in your home that has had a lot of thought put into it. If an object has been touched by someone in the making process, laboured over, it has a different energy to something that is mass produced. The owner knows that it is special and one of a kind.

The 'designer-maker' was a title formed by schools of Art and universities in the early 1990s (Tanner 2010). It was a reaction to craft and the work of the craftspeople changing as the creative community developed and diversified (Tanner 2010). This new title provided an ambiguity and diversity that suited the varied work of the contemporary 'crafts person' (Tanner 2010). It also served to bring craftspeople into the world of design. These establishments recognized that a fusion of design and making was necessary to establish an ongoing dialogue between maker, object, materials and processes (Hughes 2011).

*Designers and crafters do exactly the same thing; they make vases, jewelry, furniture, mugs, hats, fire irons. It's exactly the same class of objects. Both are designed. The difference is the means of production: Crafters work by hand, while designers employ industry. Designers have learned to have it all – some unique works, some limited works, and some mass-produced works. Crafters can do the same. And the market is gigantic and growing.* - Garth Clark (Moses 2012)

In order for the designer-maker to live by their profession, they must collaborate with industry. It is vital that they can achieve a lower price point than they could when making the work themselves while retaining the thought and quality behind their work (Tanner 2010). By collaborating with industry they will be able to produce work which can be bought by greater numbers of people through an increased number of outlets (Tanner 2010).



Jeremy Cole, a New Zealander who lives and works in Wellington has successfully brought craft and design together. He exports high-end ceramic light fittings inspired by flora. Following is a discussion on him and his work.

## Jeremy Cole



Jeremy Cole sees himself as an Artisan (Bendtsen 2011). For the last twelve years he has been producing delicate, flora-inspired, porcelain light fittings for wealthy clients all over the world (Laugesen 2011). He works on three founding principles: Beauty, elegance and craftsmanship (Bendtsen 2011).

A New Zealander by birth, Cole grew up in Wellington and spent many of years in his mother’s design showroom, first as a young observer and later in a more active role (James 2010). He was always very good with his hands (Laugesen 2011). At school enjoyed woodwork, metalwork and technical drawings but not art (Laugesen 2011).

When the early 90’s downturn prevented him becoming a carpenter, Cole moved to London to become a quantity surveyor (Laugesen 2011). He was 30 when in 2004, a trip to the Tate Modern exposed him to the work of Tim Gee.(James 2010). “What struck me was the translucency; it was the way the work had been photographed. I could imagine using ceramics in lighting (Laugesen 2011).” The following day he began learning more about the production of bone china (James 2010). “It’s an incredibly difficult medium to work with,” says Cole. “The challenges are exhausting in terms of finding solutions to support the ceramics when in the kilns so their shape is not lost or too greatly distorted, but the end product is worth the journey... If you start with something beautiful in terms of a material it’s hard to go wrong from there (James 2010).”

Cole’s first studio was in his living room at his house in Kew, London (James 2010).” There was a thick coat of plaster over everything,” he recalls. “I would cast the clay into plaster moulds on the kitchen bench and then sponge them in a bucket that sat in my sink (James 2010). He transported the greenware (dry, unfired clay forms) a few miles away at a local potter’s studio (James 2010). In a violent explosion of creativity, he created Aloe blossom in two weeks (Laugesen 2011). Within a month the piece was exhibited at Tendence in Frankfurt (Laugesen 2011). Positive feedback propelled Cole to quickly produce two further additions to the collection: Aloe Bud and Aloe Shoot (James 2010).

Following his success, Cole spent twelve months working at his new studio in Acton before space restraints prompted relocation to Brick Lane (James 2010). A year later, again having outgrown his space, he moved to premises on Hackney Road (James 2010). He bought larger kilns, a ram press and high pressure casting machines for this studio (James 2010). “I embrace technology, I think it is an absolute key to growing. Stand still in this day and age and you’ll fall off the radar... Where you have an evolution of product you need the tools to implement the growth.” (Bendtsen 2011)





With continuous and growing demand for his work, Cole recognised the need for a production manager (James 2010). After an unsuccessful search in London for one with a background in ceramics, he looked to UK's traditional home of pottery production – Stoke on Trent, where he met Steve Roberts (James 2010). “He is an artisan himself. He had worked for Royal Worcester & Spode for 20 odd years as production manger and we just clicked immediately... I moved everything up to Stoke on Trent and Steve set about assembling a small team to craft my pieces. Collectively they have over 150 years of experience in ceramics. The quality of workmanship is just stunning. I could not have asked for anything more (James 2010).”

Cole moved his production to New Zealand in October 2010 (Laugesen 2011). With the help of two kilns and five staff in an un-signposted studio in Wellington, Cole makes and sends off five or six pieces a week, at prices ranging from \$3000 to \$60,000 each (Laugesen 2011). Delivery of the larger pieces by airfreight from New Zealand can cost up to \$5000 (Laugesen 2011). He is FedEx's second largest customer in Wellington (Laugesen 2011).

While Cole's international success grows, he is still virtually unknown in New Zealand, where his works have never been exhibited (Laugesen 2011). He calls himself a product of UK trade investment after the British Government part-funded him to go to 12 exhibitions, opening the door to dealers (Laugesen 2011). An attempt to get help from New Zealand Trade and Enterprise proved pointless. He was put in touch with a manufacturing mentor who advised him to leave manufacturing to the experts (Laugesen 2011). He ignored the advice. “I work on the very simple principle of crafting the works myself, in house. The reason being I have ultimate control over quality (and) process (Bendtsen 2011).”

Jeremy Cole is clear about the importance of his three keys going forward; beauty, elegance and craftsmanship. “As the body of work has changed, my three keys have always stayed there. If I move too far from them I'll get lost within the realms of my existence... to lose those keys... I'd rather stop doing what I'm doing (Bendtsen 2011).” His 15-year business plan emphasizes his desire to remain a niche player with handmade products (Laugesen 2011).”

Unlike Jeremy Cole, I will not be producing my lights by hand. I am embracing high technology in the form of the industrial whole garment knitting machine. Following is a general discussion about high-technology in the context of New Zealand.

# High Technology in the Context of New Zealand

## High technology in the context of New Zealand

“New Zealand will never prosper if we keep relying on our natural resources.” This statement came from Paul Callaghan in *Wool to Weta*, in which he outlines an alternative vision for a wealthier country (Callaghan 2009). “We export commodities, but the long-term trend for commodities - as graphed by *The Economist* - shows localised peaks when times are good, but the overall trend is relentlessly down” (Callaghan 2009). He proposed instead that New Zealand should be looking to the high technology sector for its future (Callaghan 2009). I am using seamless knitting technology to add value to New Zealand Merino wool. This puts my project in the middle of an interesting and topical wider discussion. In this chapter I will briefly explore this context in which I am working in order to explore the potential opportunities that exist.

NZ’s world-class agriculture, a result of our science innovation, meant that by the late 1940’s NZ had one of the highest per capita incomes in the world (Callaghan 2009). “We have become a big international player in agriculture and we are a “superpower” in dairy exports” (Callaghan 2009). Now however, we work harder for less than the rest of the developed world (Callaghan 2009).

To equal Australia’s per-capita prosperity we would have to raise our GDP by US\$30 billion a year (Callaghan 2009). Much of what we want to buy is made offshore so it is ideal that we would earn it from additional exports (Callaghan 2009). Currently tourism is our number one export industry, closely followed by manufacturing and the dairy industry. (Callaghan 2009)

To give his readers a measure of the scale of our problem, he identifies two potential options. The first option is to multiply our dairy exports by five, the second is to quadruple the number of tourists visiting New Zealand to 10 million (Callaghan 2009). Since neither of these options are feasible, he proposes an alternative route. This alternative route is one that a number of experts in the industry agree upon; high-technology.

Greg Shanahan of the Technology Investment Network is one such expert. “Our enthusiasm for the technology sector is not based on the fact that that technology is cool or elitist. It has scalability that agriculture or tourism cannot provide” (O’Neill 2011). This echoes the key message from a conference held in Auckland in 2001, *Catching the Knowledge Wave* which aimed to build a new find a way towards a new economy dependent on high value, differentiated products and services. This new economy was to bring quality jobs and improved standards of living to New Zealanders (O’Neill 2011). Just over a decade later, a new knowledge-intensive manufacturing and export services sector is emerging. “What we’ve seen since is a gradual rebirth of industries, which have tended to be around more specialist lightweight items,” explains Professor John Raine, Auckland University of Technology’s pro vice-chancellor for innovation and enterprise (Laugesen 2012).

High technology is described as *products that embody relatively intensive research and development (R&D) inputs, either at the final manufacturing stage or through the components used in their production* (Callaghan 2009). Callaghan describes the companies that sell these types of products as one’s whose assets are the brains of their team (Callaghan 2009). They are good at unexpected things and often low-profile (Laugesen 2012). According to the Tin100 Report \$5 billion in export receipts was recorded in the year ending March 2011 by the 100 biggest high-tech companies in the country (Laugesen 2012). Considering that dairy exports earned \$11 billion, meat \$5 billion and logs (\$3 billion), the high tech sector is certainly competition with these industries (Laugesen 2012). Rakon, Fisher and Paykel Healthcare, Tait Electronics and Gallaghers are examples of such companies (Callaghan 2009).

While none of these companies beat Fonterra in terms of revenue per employee (around \$300 000 per annum), they have many advantages (Callaghan 2009). These advantages including consuming little energy, incurring no significant costs of transport across the world (their products are worth tens of thousands of dollars if not weightless) and needing practically no land mean that these businesses are sustainable, environmentally and socially benign (Callaghan 2009). “There is no limit to the numbers of such companies which we might enjoy, except to the degree that our brains and enterprise make such businesses possible” (Callaghan 2009).

### What are the opportunities?

As discussed, my lighting range uses Merino wool so it is not solely high-technology. If the commercialization process is successful however, it will have many of the benefits of one. It is light weight (approximately 350g), it embodies intensive research and development and it is a high-value-added product.

Often viewed as barrier to global success, New Zealand’s scale is also an opportunity. Creativity loves constraints and for successful high-technology companies, it seems as though our scale is driving innovation. Shanahan explains that because of our small economy, companies are developing technologies earlier than other countries to create efficiencies that are not available through scale (O’Neill 2011). “Technology offers the opportunity to develop solutions that simultaneously add value and reduce cost. This enables businesses to achieve efficiencies not so dependent on scale, establish a unique market position, and enjoy higher gross margins that enable further investment in research and development” (O’Neill 2011).

### What are the barriers?

As chief executive of Konnect Peter Gardner sees it, while “New Zealanders have always been good at innovation, we’re not necessarily as good at exploiting that innovation” (Laugesen 2012). Callaghan agrees: “Overall it’s not our capacity to innovate that’s the problem; it’s that we still think of ourselves as a largely agriculture and tourism-based society, and that permeates so much of our thinking in so many ways” (Laugesen 2012). Doug Cleaverly, founder of animal pharmaceuticals firm Argenta agrees that our innovative thinking and lateral thinking is second to none. He stresses however that it must be wrapped around that good process and thorough research procedures. He describes New Zealand companies as appalling at the compliance step (turning the innovation into a commercialised product that can be sold worldwide) (Laugesen 2012).



Another barrier is New Zealand's private per-capita Research and Development spending. It is very low by international standards, currently running at about a third of OECD levels (Laugesen 2012). Additionally this R&D spending has been very focused (Callaghan 2009). This approach is based on an assumption that because we are small, we need to focus our investment efforts (Callaghan 2009). Callaghan blames this investing in predetermined boxes approach for the largely unsuccessful *biotechnology gamble* that occurred in the 1990s. He criticizes the assistance that was given to biotechnology because it seems to be based on an observation that we are good at farming (Callaghan 2009). Callaghan is concerned that the Government will again be persuaded to throw money away on fashionable high-technology ventures that appear plausible but will ultimately go nowhere (Laugesen 2012).

"It is almost impossible to predict where New Zealand's strengths will lie in high-tech, because the successes to date have been so unexpected... (Laugesen 2012) When you are 0.2% of the world economy, you are going to succeed in very surprising ways. (Callaghan 2009) You are not going to compete in things anyone's heard about... Where New Zealand has done extremely well is where we have identified some niche in the international market where we can produce a product that is the best in the world... I always say to investors, 'If it sounds really good what a company's making, be very cautious. If it sounds incomprehensible, it's worth a look (Laugesen 2012).'"

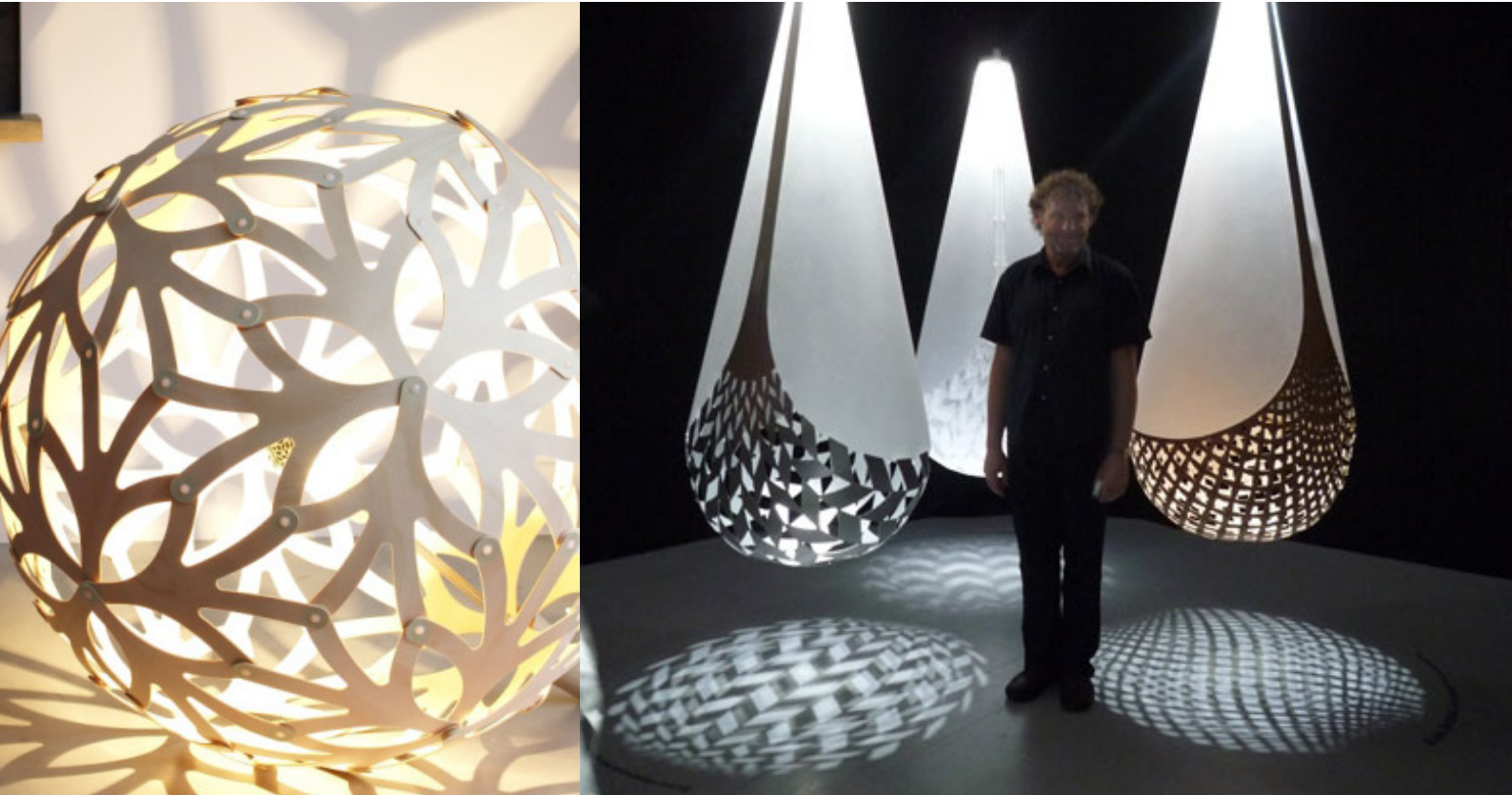
Callaghan says that he finds it extremely encouraging that young people within the high-tech sector are sensing their own potential as innovators and entrepreneurs. "Our own PhD students and grad students are starting to think, 'I want to go into business (Laugesen 2012).'"

It is similarly encouraging for me to hear that investors and experts in New Zealand have these views. As I embark on commercialising my product, one that uses high-technology in an unconventional way, I have been shown through this literature review that there is openness to this kind of thing. Many investors have surely read this literature themselves and are on the lookout for different, surprising and innovative ideas that could become an export success.

If I had not moved from craft to design, I never would have had the opportunity to engage with this side of things. I can now see that there is potential to earn a living from my work. I will continue to explore the opportunities that exist for my lighting range in the Commercialisation section of my Research Documentation chapter, where I discuss my light with retail and commercialisation experts.

My next case study is someone who has not only successfully brought his craft into the field of design, he has also employed high-technology to assist him in commercialising his work. David Trubridge is a designer-maker who creates furniture and like Jeremy Cole, high-end lighting in New Zealand.





## David Trubridge

David Trubridge is a designer/maker that specialises in high-end furniture and lighting. His work is exported to countries all over the world (Smyth 2011).

Trubridge graduated from Newcastle University in Northern England in 1972 with a degree in Naval Architecture (Trubridge 2005). Over the next ten years he lived and worked in rural Northumberland, teaching himself furniture making whilst working part-time as a forester (Trubridge 2005). From here he began to develop his own designs which he exhibited around Britain, resulting in many commissions (Trubridge 2005).

In 1981, Trubridge and his family bought a yacht and commenced an open ended adventure around the world (Trubridge 2005). They based themselves in Hawkes Bay after arriving in New Zealand in late 1985 (Trubridge 2005). As an Artist-in-Residence at the local Polytechnic, Trubridge started making furniture influenced by his Pacific travels (Trubridge 2005). They built a house in Havelock North, designed by Trubridge, that lead to further architectural commissions (Trubridge 2005).

Trubridge's transition from furniture craftsman to a designer/maker really began in the 1990's (Smyth 2011). After a short placement at Kyoto College of Art, with the help of a Creative New Zealand grant, he produced a series of figurative works which retained expressive tool-marks from the making process (Trubridge 2005). This could be described as the work of an artist. Trubridge still describes himself as an artist, but one with a global outlook (Smyth 2011).

In 1999 he curated a national exhibition 'Furniture in Context', for the Hawkes Bay Cultural Trust (Trubridge 2005). In it he displayed his first Body Raft designs (Trubridge 2005). In search of a wider market, trubridge sent his work to a UK fair (Smyth 2011). The feedback he received from potential European customers was overwhelmingly positive (Smyth 2011). His design was described as 'a work of art' (Smyth 2011). However, he received requests to simplify it so that it might be manufactured (Smyth 2011).

In 2001, Trubridge exhibited Body Raft (the second version) at Salone Satellite in the Milan Furniture Fair (Trubridge 2005). When Body Raft was picked up for manufacture by Cappellini, an Italian manufacturer, Trubridges role was triggered to develop from that of a local designer/maker to an internationally known designer. He was running his own business with sales all over the world (Trubridge 2005). When difficult circumstances caused the deal with Cappellini to fall through, Trubridge was prompted to move from his garden studio in Havelock North to a workshop in an abandoned Whakatu freezing works (Smyth 2011). Here he established Cicada Works, where much of his work is now produced, with four other creative enterprises (Trubridge 2005).



Trubridge's first lighting concepts came a few years after Cicada Works was established (Smyth 2011). While teaching in Perth, he began experimenting with ways to create strong structures with thin materials (Smyth 2011). The resulting hoop pine and bamboo fittings were inspired by natural forms found in New Zealand such as flax and kina (Smyth 2011). They cast dramatic shadows and create an exciting atmosphere suitable for non-task areas such as bars and foyers.

Modern technologies play a significant role in Trubridge's work, allowing him to be prolific (Smyth 2011). He first hand-sketches his ideas then re-creates them in CAD, using Rhinoceros software (Smyth 2011). From here he used to electronically outsource the CNC router cutting (Smyth 2011). Realising however that his trial-and-error, craft based methodology required the CNC machine to be available at anytime, he acquired his own (Trubridge 2005). This allows him to move directly from design to production (Trubridge 2005).

In 2007 Trubridge was awarded the John Britten Award for design leadership (Smyth 2011). In his acceptance speech, he discussed the challenge he faced; as his international success grew, so did he his carbon footprint (Smyth 2011). He was at the time exporting one 12 meter container of products per month (Smyth 2011).

Trubridge's international success is still growing as are his collections, but he is making efforts to reduce his environmental impact (Smyth 2011). This is evident in his annual trips to Milan, which have particularly enhanced his international profile (Smyth 2011). In 2008 his exhibition pieces were bulky to ship (Smyth 2011). His works in 2009 and 2010 had to be transported as components as hand luggage then assembled on site (Smyth 2011). 2011 brought a re-launch of the kina, flax and koura and the launch of hinaki, all in kitset form (Smyth 2011). They used LED and compact fluorescent bulbs after a life cycle analysis of the lighting range revealed that the most significant environmental impact came from electricity usage (Smyth 2011). The second most significant impact resulted from transport (Smyth 2011). 75% of Trubridge's output is exported (Smyth 2011). These changes mean that 52 kits can be fitted into the space occupied by one fully assembled light fitting (Smyth 2011).

The high-technology that I am employing in my design is seamless knitting technology. The next chapter contains a description of this technology including the processes that are involved.

# Seamless Knitting Technology



## Seamless Knitting Technology

### An overview

**This is an excerpt from my exegesis last year. It is important that the reader has a full picture of what seamless knitting technology is.**

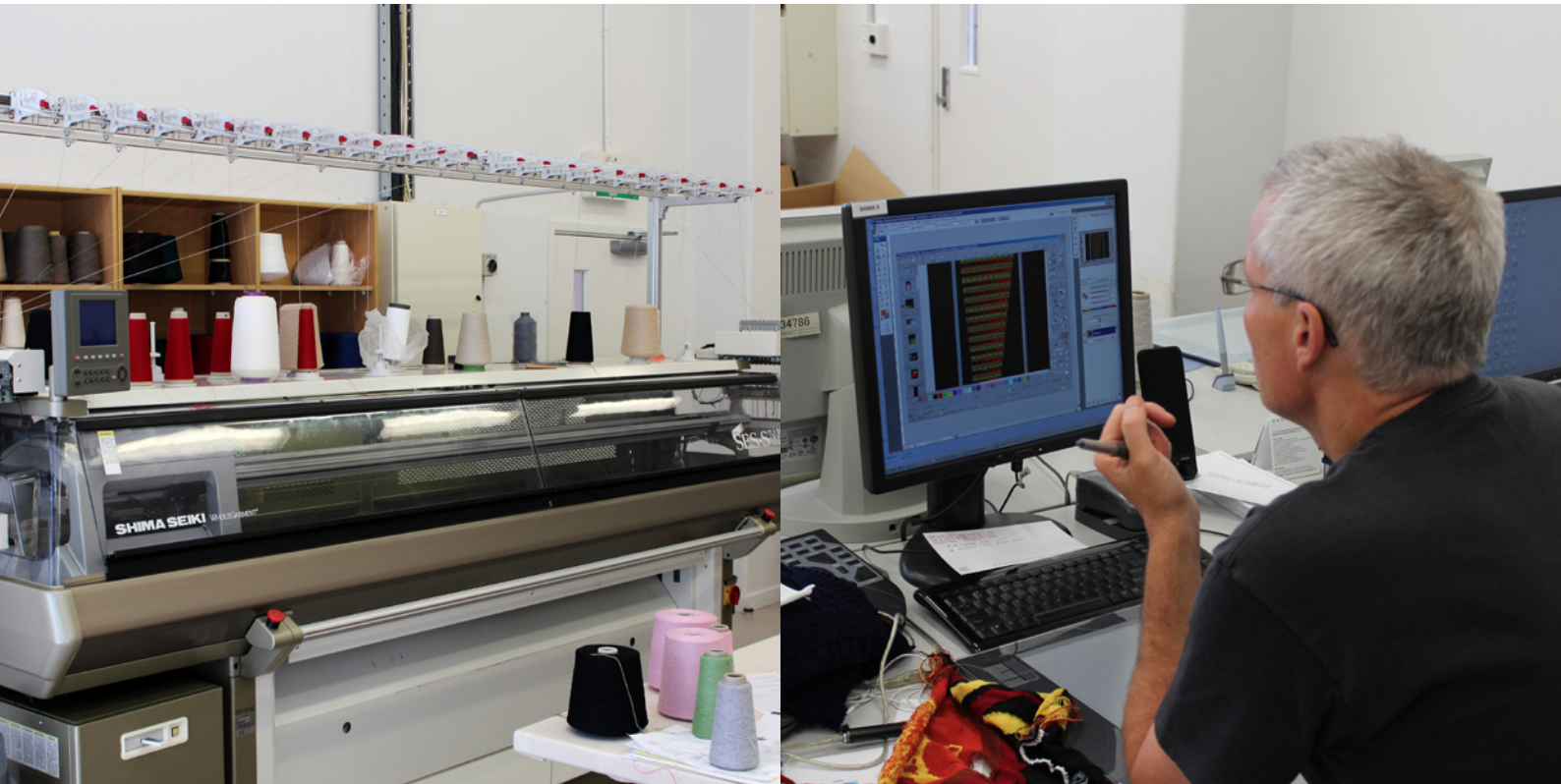
Knitting is formed by intermeshing individually made loops (Black, 2002). It can be weft or warp. In weft knitting the yarn forms horizontal loops across the fabric. One row of loops is made from one or very few yarns. I employ weft knitting as it offers the most potential for 3D shaping. Long recognised, the potential of 3D shaping is now being realised with significant flat bed knitting technology and CAD software developments since the mid 1990's (Underwood, 2009).

Needles in flatbed machines are arranged on horizontal needle beds. They combine the knitting of multiple tubes and rib transfer, allowing for variations in the width circumference of a 3D form. Recently it has become possible to knit a wide range of 3D forms in any stitch architecture (Underwood, 2009). There has been serious focus on the development of flat-bed technology in the last 15 years especially 3D seamless knitting (Underwood, 2009). Seamless knitting creates a complete garment without seams. The leaders in this technology are Shima Seiki and Stoll who developed WholeGarment and Knit&Wear respectively. Their programming language correctly indicates that the technology is primarily used in apparel (Underwood, 2009). Seamless knitting offers the potential for cost saving, mass production and customisation. Using this technology, my lighting pieces will require little to no finishing. Once designed, they can be mass produced in an infinite number of variations (Choi & Powell, 2005).

New technology is produced by demand. Europe has seen extensive migration of apparel production to low-cost countries (Rieder, 1996). The European textile industry is now seeking new high-tech products and markets in non-apparel sectors (Rieder, 1996). The development of a highly skilled workforce and the creation of high-value-added textile products in non-traditional market areas is the industry's future (Underwood 2009). With disciplines becoming closely aligned, there is an opportunity for textile technologies, such as the industrial flat-bed knitting machine, to emerge as significant design tools (Underwood 2009). 3D seamlessknitting is an additive fabrication technology. Additive fabrication involves incrementally forming an item layer by layer (Kolarevic, 2003). Similar to other types of 3D additive fabrication technologies, such as rapid prototyping, flat bed machines could become a tool for exploring complex design ideas (Underwood 2009).

Digital knit programming on the WholeGarment machine involves a series of steps to translate the envisaged design into a computer language or code using the CAD/CAM system; design preparation, programming, processing and knitting The data is then transferred to the knitting machine (Underwood 2009).

Design preparation is the initial planning and development of design ideas. It includes inputting the design into a CAD system specific to the industrial knitting machine. Shima Seiki uses SDS-ONE. The knit preparation programs are Knit Paint and Knit Design (Underwood 2009). Technical knit programs are constructed, processed and checked through the knit simulation tool in Knit Paint. 2D stitch architectures are designed in Knit Design. The programming requirements for seamless knitting are complex. The program must simultaneously represent the 2D surface and 3D form (Underwood 2009). Consequently Shima Seiki developed Package Software, a library of packages and colours (Underwood 2009). Design processing is a semi automatic procedure carried out through Knit Paint. It involves imputing specific information into the program such as yarn carriers and economisers and converting the program to a compatible file type (Underwood 2009). The knit program is tested for conflicts and correct yarn carrier directions. Finally the design program is sent to the knitting machine. Knitting involves selected yarn threaded through the tension devices to the yarn carrier. The knit program is selected, read, and knit parameters are set (Underwood 2009).





# Methodology

## Methodology

Research projects are generally knowledge directed (Archer, 1995). They aim to either produce new knowledge or to test existing knowledge (Archer 1995). Sound and rigorous research projects are undertaken strategically (Collins 2010). The nature of the problem will determine how the research design should be managed (Collins 2010). Observations and data are collected accurately and recorded. The end product will be exposed to external critical examination (Archer, 1995).

Action research was used as the overarching research strategy in this practice based design research project. Extensive literature reviews and interviews with leading industry and academic experts were undertaken to determine the capability limits of knitting technologies and the opportunities to commercialise this product. An extensive series of practical collaborative experiments were undertaken to incorporate these themes. Case studies were undertaken to enrich my learning around my research area.

### Action research

Action Research brings research and practice together (Collins 2010). It is Inductive research which by its nature is collaborative and depends on critical examination and reflection (Mctaggart 1988). Action research involves gathering data and questioning action in order to generate theory which results is the development of more educated action. The researcher invents, tests, explains or exposes information, thoughts, forms or procedures and generates communicable knowledge through practical action in and upon the ‘real world’ (Archer 1995).

There are a number of reasons that make action research the most appropriate research strategy for my project. Firstly it was incredibly collaborative. I needed technical, academic and manufacturing input in the form of knowledge and expertise. Secondly it involved a significant amount of critical examination and reflection. I produced large documents every fortnight for my supervision sessions which I reflected on throughout the year. This assisted my research in a number of ways. As well as a helpful communication tool, these documents revealed patterns in my work. I was able to reflect upon them which helped in my decision making.

### Literature Review

A literature review involves examining reports of earlier studies that relate to the topic of interest (Cooper 1998). A literature review firstly ensures the researchability of the topic (Hart, 1998). From here the researcher can narrow their subject which makes their project more achievable, more likely to be a success and more likely to contribute to knowledge (Hart, 1998). A literature review helps the researcher form a comprehensive picture of current practice. From here they can build on the work of others instead of covering the same ground (Hart, 1998). I reviewed literature around high-technology, craft and design. I choose recent texts in order to get current information on these topics. I reviewed literature on my chosen case studies which gave me a deeper understanding of my topic.

### Case studies

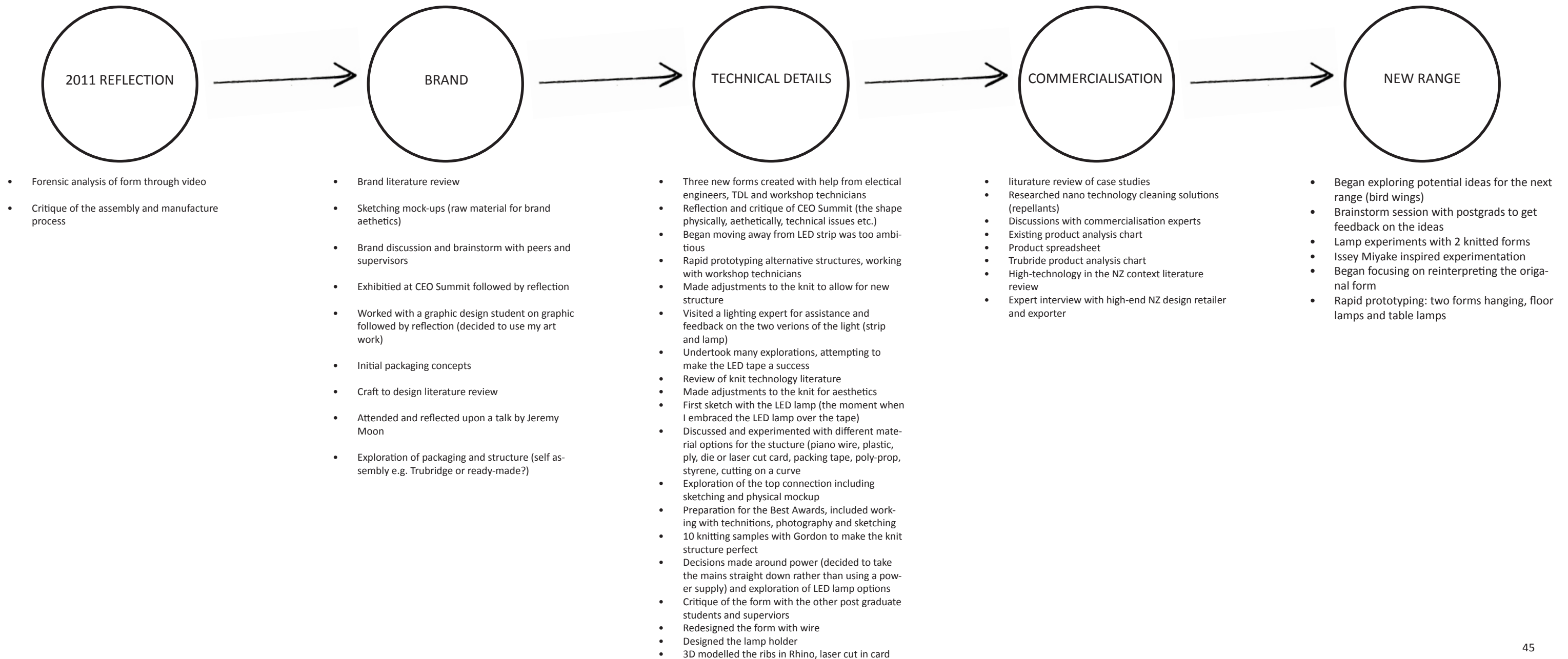
A ‘case study’ is an intensive examination of a single unit such as a person, a small group of people or a single company (Collins 2010). It can enable the researcher to explore and understand relationships, issues and problems (Collins 2010). I have undertaken studies of professionals who work in New Zealand. They have moved to design from a craft background and furthermore, specialise in high end lighting. By becoming familiar in how they operate, I can increase my chances of a successful outcome for my lighting range and better understand my research area.

### Expert interviews

Interviews are used to gain an understanding of the underlying reasons and motivations for people’s attitudes, preferences or behavior (Collins 2010). A researcher may interview an individual or a group (Collins 2010). I interviewed professionals working in the areas of retail and product commercialisation. All are interested in promoting New Zealand design and exporting it. I asked them questions specifically regarding the commercialisation of my light and more broadly, about moving from craft to design in the context of New Zealand.

### Visual research

Visual research conveys information and findings through maps, photo journals, sketches, diagrams and visual diaries (Collins 2010). A visual diary or research journal serves as a record of the research process, documenting the researcher’s actions and decisions (Byrne 2001). I used diagrams, sketches, photos and mind maps throughout my project. These helped me to make decisions and organise, clarify and communicate my thoughts.



# Research documentation

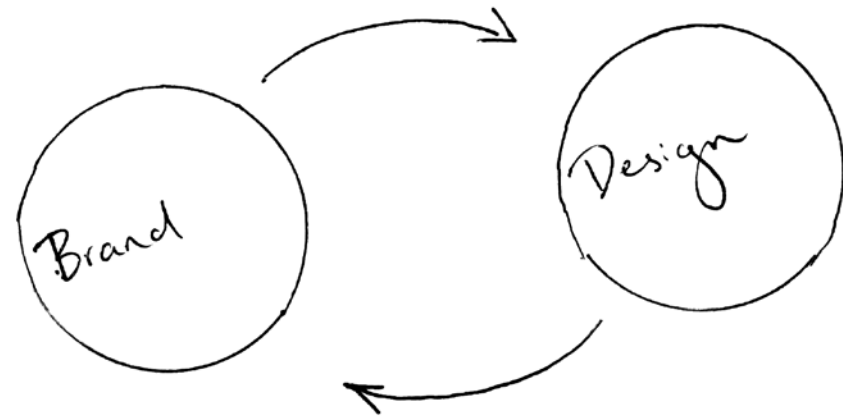
## Reflection on 2011



- Personal
- A lot of work was lost minute throughout the year. I was both idealistic and naive. This resulted in a beautiful, interesting light which was not ready for market.
  - I struggled to see how the knowledge/IP I had was valuable.

- Product
- The transition from night to day is beautiful.
  - Aesthetically it received a huge amount of positive feedback from our exhibition and Art in the Dark.
  - It 'surprises and delights'.
  - It has a long way to go before it can be manufactured.
  - I received positive feedback on its potential commercially.

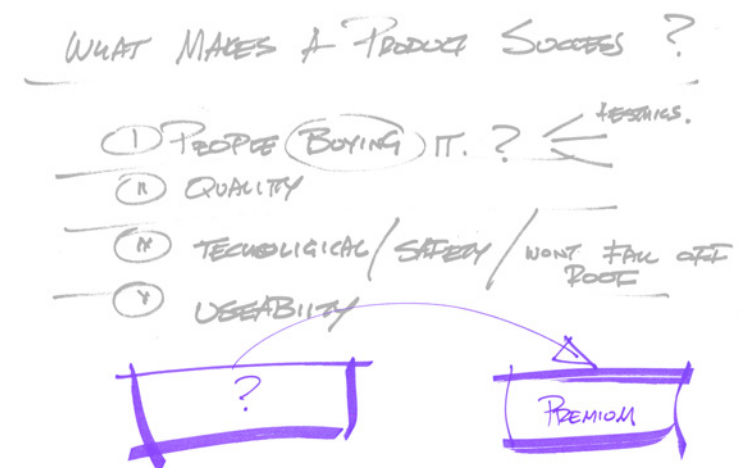
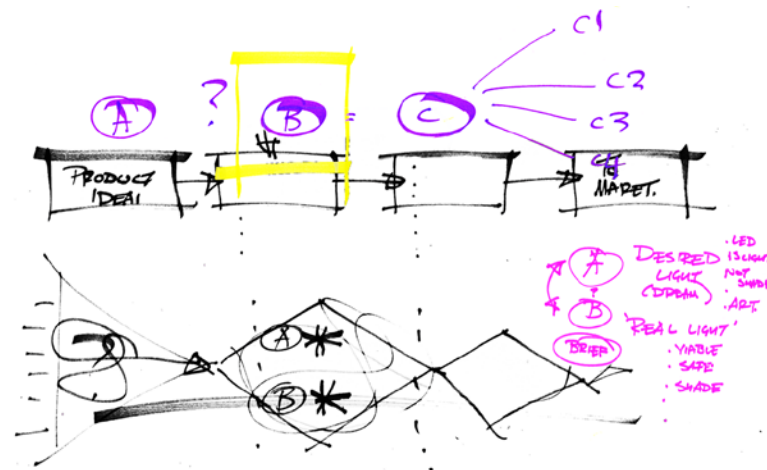
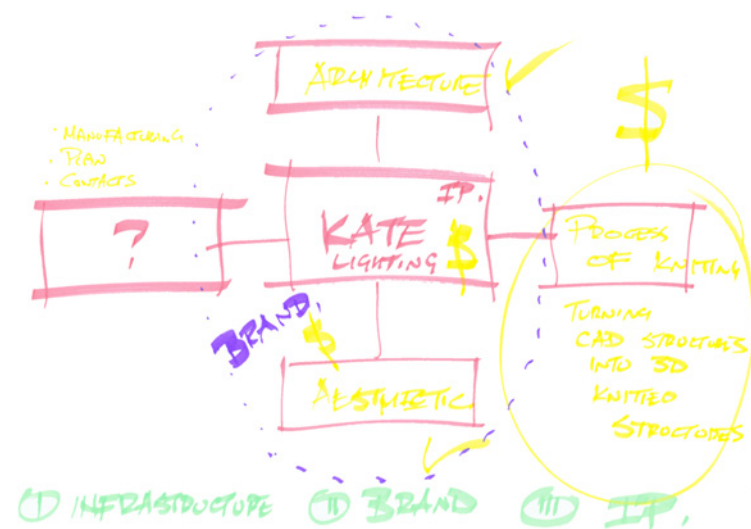
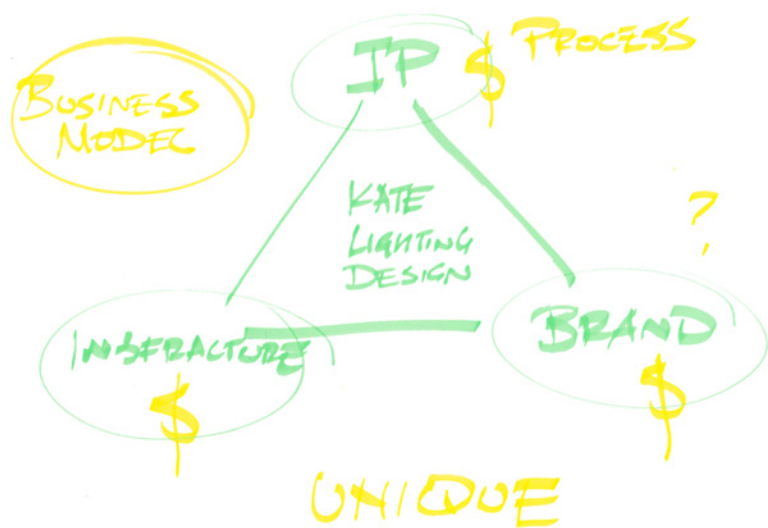
- Technology
- Although this technology has incredible potential, it took an incredible amount of time and experimentation to reach the outcome. It is inaccessible without a technician.



## Exploring the role of brand

This section documents the exploration of how my design and brand interact









## Brand

There are many definitions for the term brand. Its meaning has evolved over time.

Historically a brand was a mark, signature or symbol on a product which signified its origin or ownership (Danesi 2006). In 1993 Phillip Kotler defined a brand name as a term, sign, symbol or design, or a combination of these, which is intended to identify the goods or services of one group of sellers and differentiate them from those of competitors (Kotler 1993). In 1994 Richard Kock described it as a visual design and/or name that is given to a product or service by an organization in order to differentiate it from competing products and that assures consumers that the product will be of high and consistent quality (Kock 1994). More recently, three American consultants Sam Hill, Jack McGrath and Sandeep Dayal have defined branding as creating a mutually acknowledged relationship between the supplier and buyer that transcends isolated transactions or specific individuals (Danesi 2006).

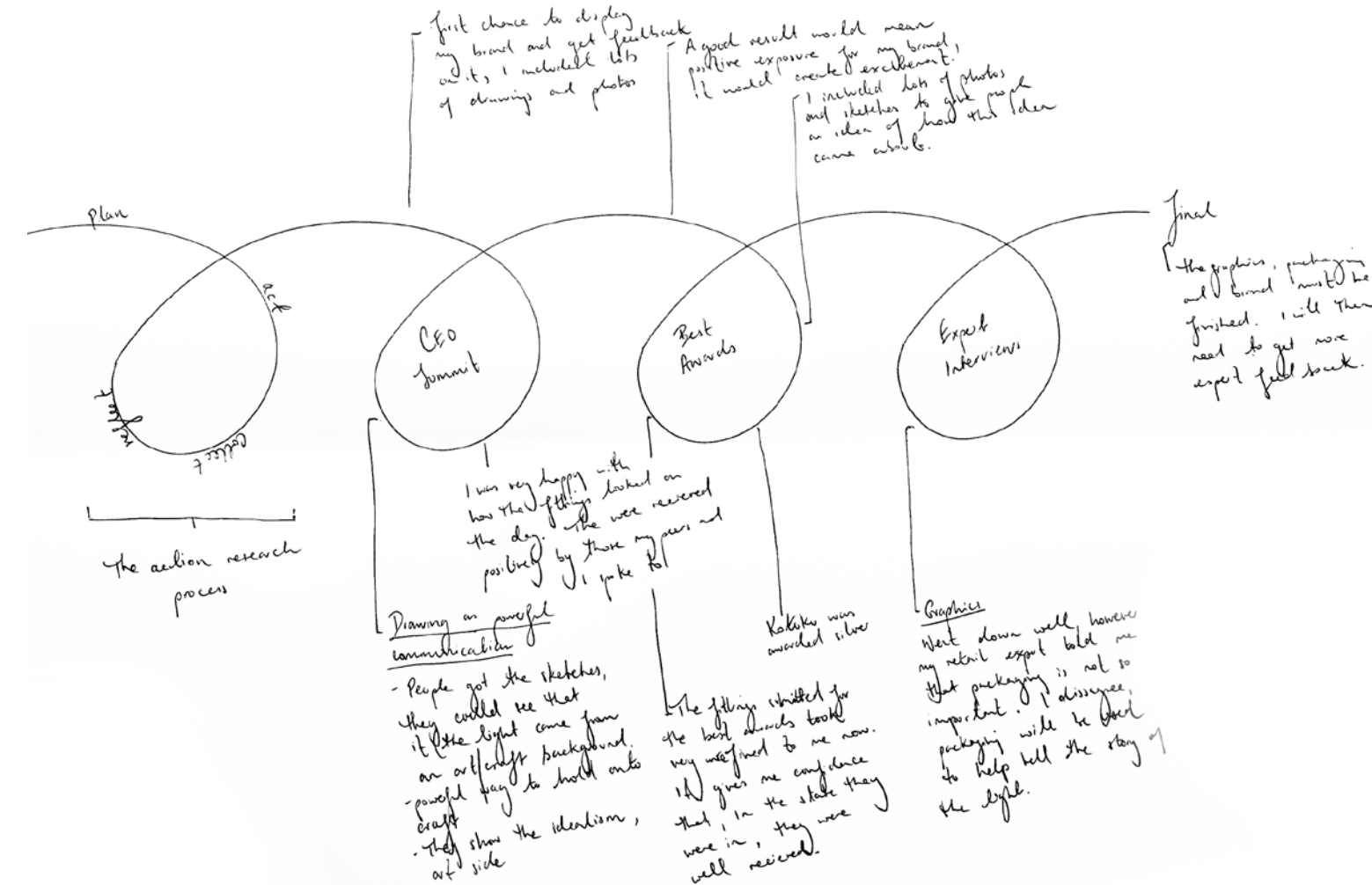
That branding is now pinned around a relationship rather than a product reflects a significant shift in our understanding (Danesi 2006). In 1999 Leslie de Chernatony, a professor of brand marketing, said the brand is, through the staff, an active participant in any relationship, be it between customer and brand, employee and employee, employee and customer, or employee and other stakeholders (Churnatony 1999). Consultants Booz Allen & Hamilton more recently released a very practical definition: Brands are a shorthand way of communicating critical data to the market to influence decisions. Across a multitude of consumer-focused industries, brands are an important means for differentiation and competitive advantage (Danesi 2006).

The current understanding of the term is well put by Richard Branson: Brands exist as a means of communicating what to expect from a product or service (Branson 2011).

## Branding

Branding may be described as adding value to a product or service over and above its retail price (Danesi 2006). This is achieved through branding strategies including the creation of a psychological and physical relationship between the consumer and the product, a brand identity and brand values (Danesi 2006). It is the articulation of a brand's persona. (Morrow 2007) Its persona is the personality (the) company wants, or needs, to portray in order to connect with target audiences (Morrow 2007). This persona represents the culture and attitude of the organization and is articulated through consistent visual and verbal elements in a way that clients will recognize and remember (Morrow 2007).

(Left) Results of exploration: a group brainstorm session to explore what brand meant to me and this project.



## What should brands do?

Brands should simplify decision making for the consumer and provide a guarantee of product safety and quality (Evan Davis 2003). They do this by offering predictability and consistency (Evan Davis 2003). A good brand will have a unique look and feel, a voice and tone that matches the personality of its product/service, standardized color palette, typefaces and graphic elements and consistent use of wording, brand promise, theme lines and key messages (Morrow 2007).

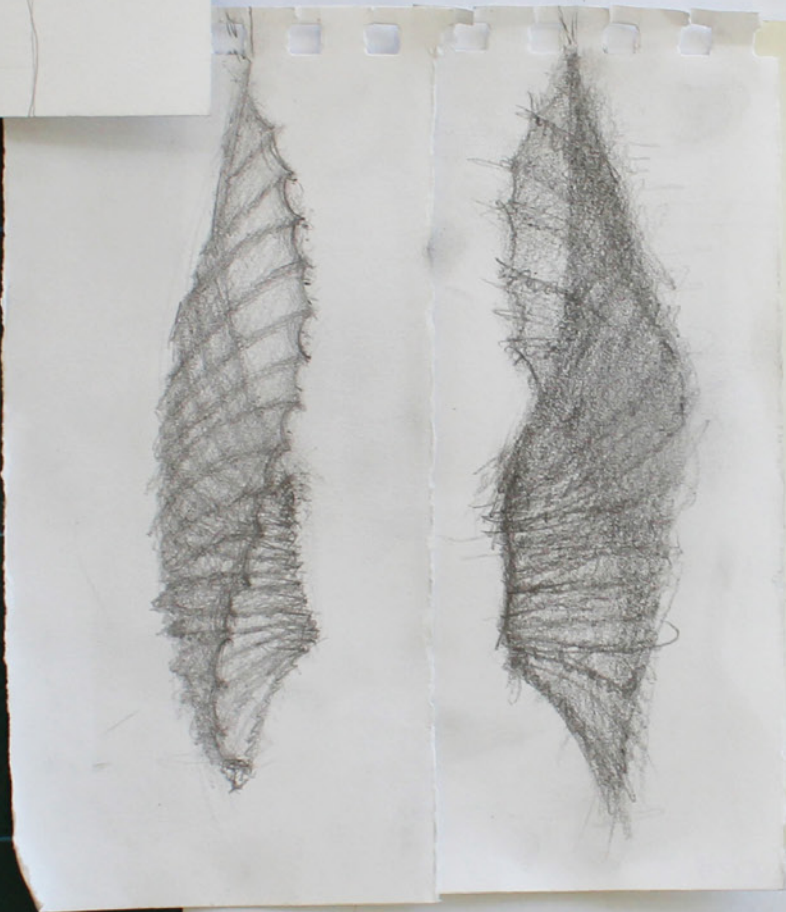
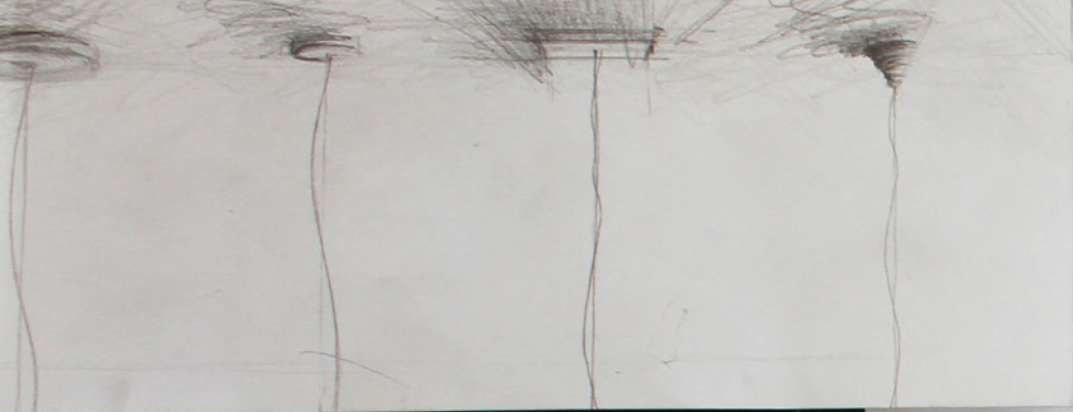
## Why are brands so important today?

With so many choices available to people on a daily basis, they become overwhelmed and look for simplicity, authenticity and clarity (Morrow 2007). As competition increases, and as the bond between companies and their customers becomes less powerful, the need for businesses to communicate their value proposition in a clear, compelling and consistent manner becomes all the more important, says Pat Lynch, director of member services for the Oregon Telecommunications Association (Morrow 2007).

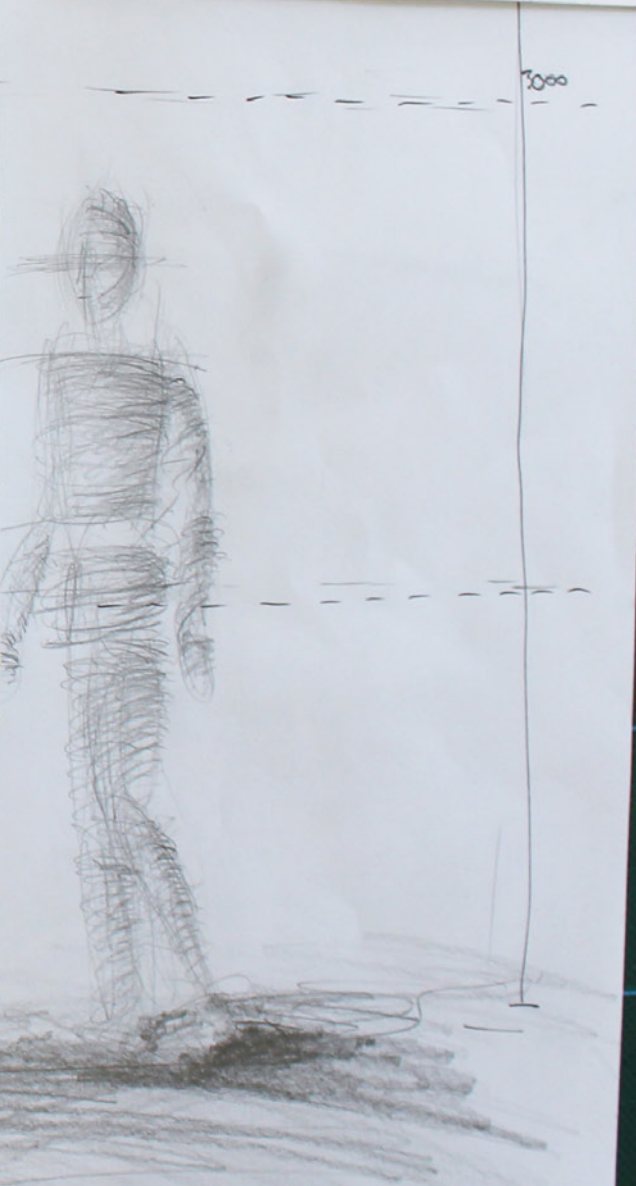
## Brand Discussion

This discussion (previous page) was held in March with my supervisors and postgraduate product design students. We started with a short discussion on what a brand was then explored the components that may start to make up my brand. This exercise has helped me to visualize my finished product and brand. It also serves as a useful guide. When I am having difficulty making a decision, I can refer to this brainstorm to confirm that the path I am taking aligns with the personality and ideals of the brand I am developing.





\*  
light  
center



all the same light,  
or slightly  
forward









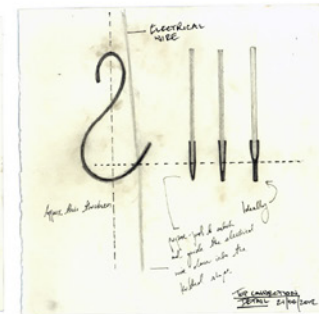
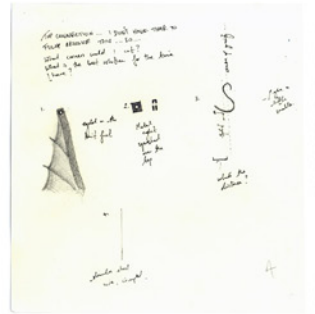
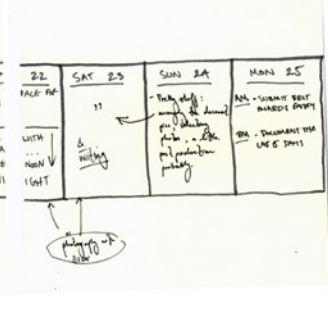
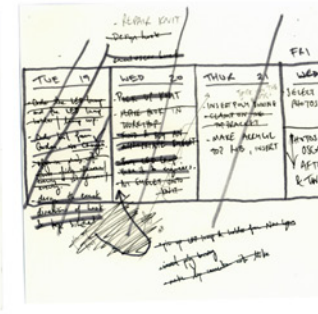
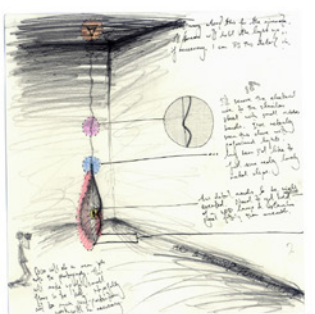
## Sketching

Sketching is the easiest and fastest way for me to get ideas out of my head and into physical form. This allows me to get feedback from others at an early stage.

Sketching physical mock ups is a very effective way for me to critically analyze them. When I find something that I want to change in my sketch, I know that it is something that needs to be altered on the physical form.

When I interviewed the expert that sells and exports high end New Zealand design, she commented that the drawings that I have created certainly add richness to my product. She was enthusiastic about them and referred to them as 'raw material' which will be particularly useful in a video promotion.

She spoke about how brands develop in the market place. Other sources say that while this is true, it is wise to design the brand strategy fully before putting it into the market. When you consider brands such as Icebreaker, it is clear that strong brands are often well thought out before they develop in the market. A strong brand has a personality, feel, looks and particular ideals or vision. Regardless of this, it is clear that the sketching is likely to help me sell my products as well as assisting me during the design process.



New Zealand's Best Product Design.
Student

Search

Auckland University of Technology. Kotuku

Student / Kate Ramsay

Tutor / Steve Reay / Murray Pilcher. Design Team / Kate Ramsay.

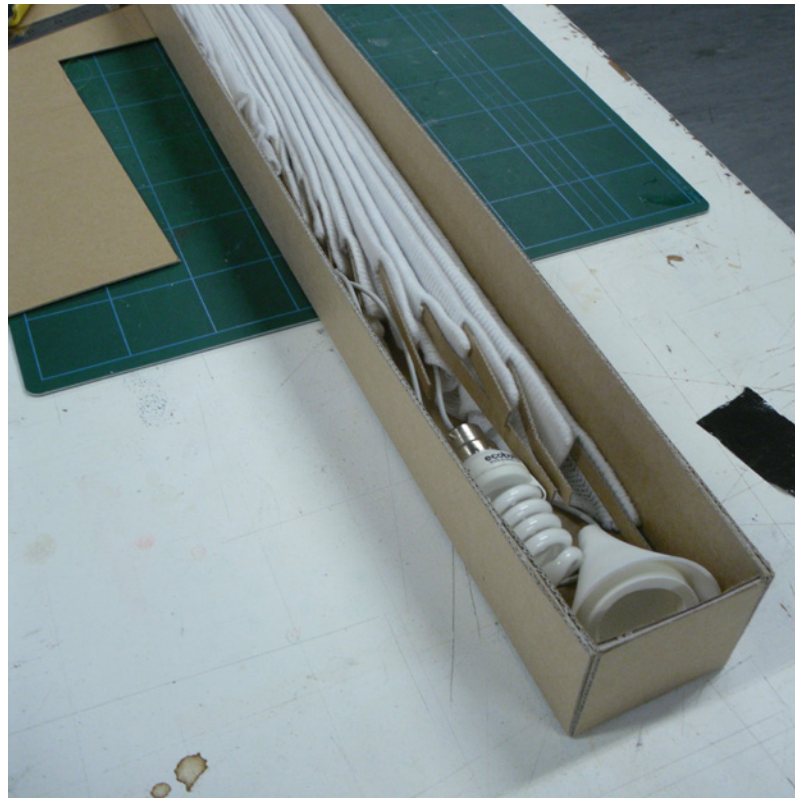
Award / Silver

Graphic
Interactive
Product
Spatial

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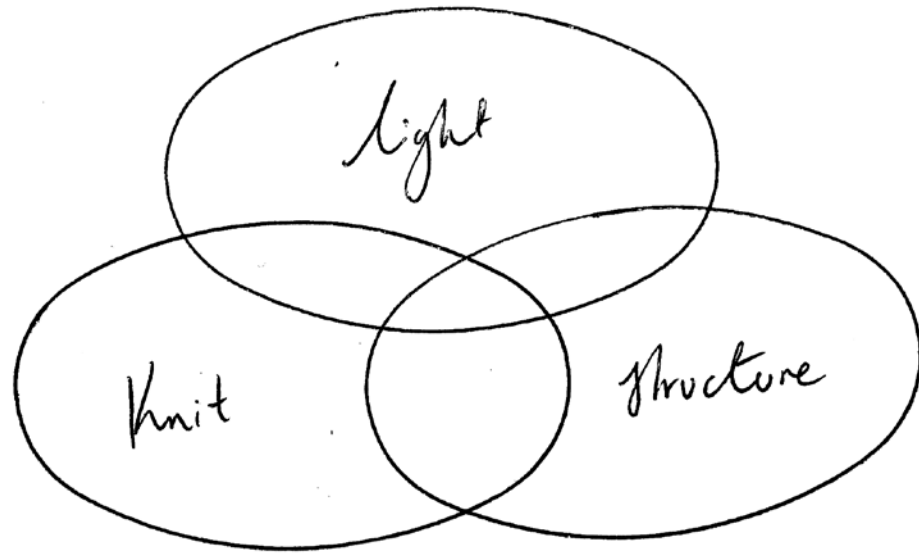
My initial packaging ideas (previous page) were made early in the year. This was important because the structure and knit development depended on it.

The light fitting could either sit straight and flat in a long, slim box or lie in a crescent shape. The first option would require the user to slip the structural ribs into pillow case-like ends of the knit. This option was not ideal as I did not want the customer to have to perform this awkward job. I preferred the second option where the structure is already in the knit. For this option, a 400 x 400 square box works well.

I have received positive feedback on this packaging idea. The retail and export expert was enthusiastic about it but said that beautiful, well designed packaging is not of huge importance. Her reason was that the customer will not be influenced by the packaging, they will buy the piece because they have seen it hanging in a store or advertised. I disagree and intend to make the graphics very beautiful. I want the experience of opening the box to add to the excitement of the purchase and enhance the user experience.

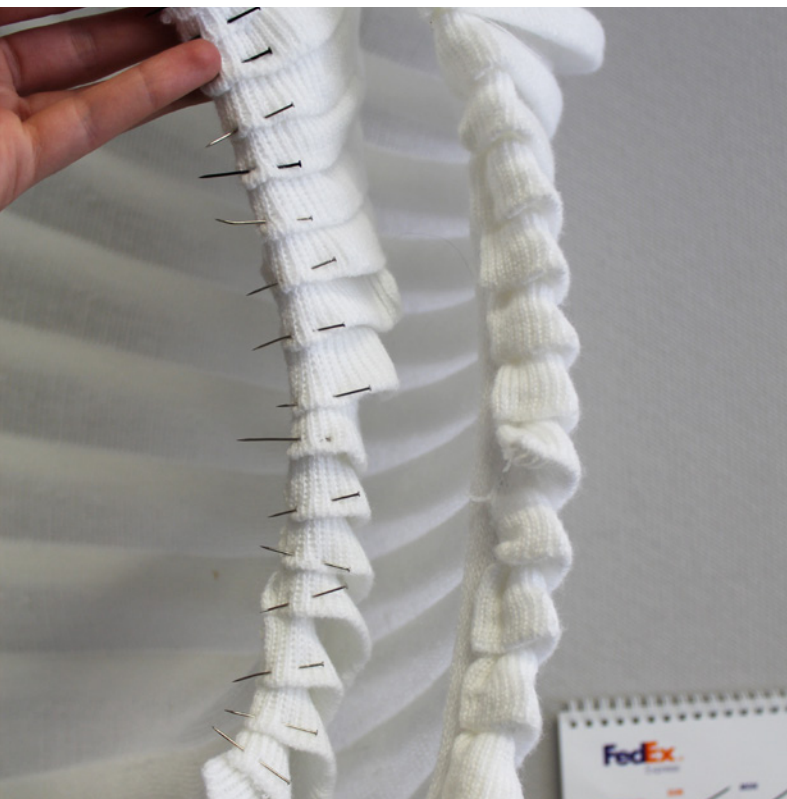
I want to develop the box and graphic for the end of the year exhibition.





## Technical Details

Development of technical knitting expertise  
to identify commercialisation opportunities



#### **Last year (far left)**

- I used acrylic yarn
- The piece took 45 minutes to knit
- To achieve a tight inner edge, I hand sewed it

#### **Early this year (left)**

- These are my first attempts in merino wool
- The ribs are too far apart. I wanted to make the ribs close enough together that there would be no need to sew them



Through much trial and error, the technician and I achieved the desired result (left). The ribs are now close together. They look neat and tidy and it means that the knit needs absolutely no finishing. Aesthetically it is far more effective because sweeping lines of the ribs are more dramatic.

It was a difficult process to achieve this. While the machine knits between the ribs on the inner edge, there is a huge amount of pressure on the knitting needles and the yarn. The following page contains the technical details of this. As someone who is not trained in knit, I found it useful to gather relevant literature, highlight it and add my own pictures and reflections. This helped me to really grasp what was going with the technology. This significantly helped me to understand and communicate with the technician at the Textile Design Lab.

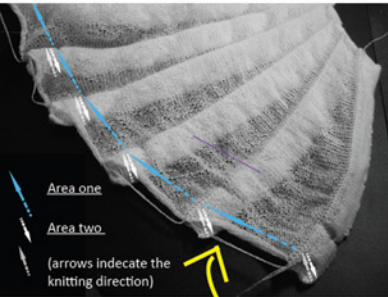


## Knitting Technique

The most useful knitting techniques for 3D shaping on the Wholegarment knitting machine can be divided into five main groups: Suspended stitches, transfer stitches, Tubular knitting, Stitch architecture and Miscellaneous. (Underwood 2009)

For this project, I am using Suspended stitches. This is also referred to as flechage knitting/course shaping/partial knitting/ suspended stitches. I'll refer to it as flechage knitting.

Flechage knitting involves stitches being held on a needle. (Underwood 2009) *During the knitting sequence, knitting is isolated to selected area(s) while the remaining stitches are held and do not knit.* (Underwood 2009)



The above diagram show the direction of the knitting. The blue sections are knitted then held while the ribs (white arrows) are done. No stitches are lost by casting off, they are all stored to be introduced at a later stage. (Underwood 2009) This ensures that the isolated segment is still linked to the rest of the fabric. (Underwood 2009)

By suspending stitches, the number of courses changes within the fabric length. The technique can be described as knitting in which the wales (or length) within the fabric contain differing numbers of stitches. This can cause the direction of the knitting to change and/or a raised or three-dimensional area within the fabric to be formed. This technique is also referred to as course shaping, partial knitting or flechage knitting.

### 4.1.1 Progressively increasing/decreasing held stitches

Also known as the 'bore' principle of knitting (Brackenbury 1992, p77), this is a very versatile method of forming 3D shapes. Within the course being knitted, the number of wales is progressively diminished or extended, by storing (and reintroducing) stitches either by one stitch or small groups of stitches at a time (Figure 4.1). *The resulting knitting area being produced is a triangular shaped segment, and causes the direction of the knitting to change on areas within the fabric.* (Underwood 2009)

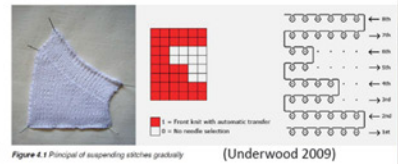


Figure 4.1 Principal of suspending stitches gradually (Underwood 2009)

I've talked before about the time Gordon has to spend getting my files ready to knit. This is essentially because my files are too complicated for the knitting machine to automatically check them. Instead Gordon has to go through the rows one by one to check that they are travelling in the right direction. This next passage explains the importance of this:

The direction of the carriage is critical in forming the shaping segment and the holding sequence. The carriage (yam carriers) must begin and finish on the correct course of knitting (Figure 4.2 (1)). In general if starting from the left hand side, then the carriage is travelling to the right for odd numbered courses, and the yarn carriage is moving to the left for even numbered courses, and stitches are held from the right to left. This ensures there are no long floats of yarn between the selected groups of held stitches, particularly if groups of stitches are being held at a time (Figure 4.2 (2)). (Underwood 2009)

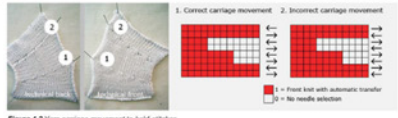


Figure 4.2 Yarn carriage movement to hold stitches (Underwood 2009)

These are 'floats' of yarn. They cannot be avoided. They need to be snipped and pulled back into the rib by hand (a crochet hook or knitting needle works well). This takes at least 10 minutes. By pulling them into the rib you ensuring that they're not pulled (would unravel the knit) as well as hiding them.

Given the potential issue with floats of yarn, generally two courses are knitted between placing stitches on hold. By doing this any number of stitches can be placed on hold and no floats will occur on the back of the fabric. However the segment will have steps as such, and small holes can result when knitting recommences with all stitches. This can be overcome by inserting a single tuck stitch where the step occurs (Figure 4.3). (Underwood 2009)



Figure 4.3 Design of stepped segment to reduce holes (Underwood 2009)

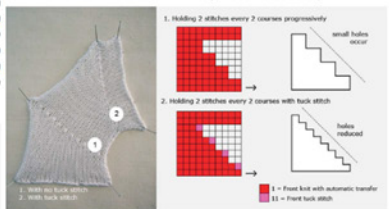


Figure 4.4 Angle of course shaping segments based on holding pattern (Underwood 2009)

The shape (or angle) of the knitted triangular segment being formed is determined by the holding sequence, which is how many stitches are held (H) over how many courses (K) (Figure 4.4). For example a triangular segment formed by holding 2 stitches every 2 rows progressively will have a larger segment angle than a segment formed by holding 4 stitches every 2 rows progressively.

There can be some degree of variation on the angle formed. This variation is caused by loop distortion of the stitches being held. The degree of variation can be attributable to how many courses the stitches are held, the stitch architecture and the yarn type used. (Underwood 2009)

Holding Sequence	Angle of shaping segment (in degrees)
(1) H1, K1	80
(1) H2, K2	31
(2) H2, K2	22
(3) H3, K2	16
(4) H4, K2	13
(5) H5, K2	11
(6) H6, K2	9
(7) H7, K2	7
(8) H8, K2	5

Figure 4.4 Angle of course shaping segments based on holding pattern (Underwood 2009)

Repeating all or part of the shaping segment allows for greater flexibility and design options (Figure 4.5). If the shape segment is repeated then the segment must have an even number of courses, to ensure continuity of the carriage movements.



Figure 4.5 Repeating the shaping segment (Underwood 2009)

### What are the benefits of the suspended stitch technique?

The technique of suspending stitches gradually can create a variety of 3D shapes with little or no seams required. By varying the way in which the knitting segment occurs over the width of the knitted fabric, this method is potentially very versatile.

The significant benefit of the suspended stitches technique is it can be used to create a wide range of shapes, with little or no seams required. The technique is also very reliable with less fibre damage occurring and less potential of dropped stitches, compared other shaping techniques that may involve for example continual transferring of stitches. As well, the techniques can be applied to double bed fabrics (rib, interlock, etc) that are stable balanced fabrics, allowing for easier handling once the shape has been knitted. In addition, the machine requirements are minimal, even when applied to double bed fabrics; only requiring a standard double bed with sinkers. Therefore it is possible to use this technique on older models of industrial knitting machines. (Underwood 2009)

### What are the limitations of the suspended stitch technique?

The main issue relates to the physical stress the stitches (and fabric) are under when being held. This is directly influenced by the type of takedown system of the machinery. With a number of stitches being held at any one point, while other needles are knitting, takedown across the needle bed needs to be varied. The sinkers and stitch pressers can assist in addressing this, allowing the tensioning and takedown to be minimal and not affect the knitting. (Underwood 2009)



These two photos are of Gordon's first attempt with the new merino wool. You can see in these two photos that the takedown wasn't correct. The physical stress that these stitches and fabric were under while being held was too great.

(Side-note/reflection) It's really interesting talking to Gordon about these problems. Of course I'm starting to really try and accurately document the knitting process, so I want to get a lot of information out of him - Like Andrew was saying a few weeks ago, it's important to almost design the process (drawing/sketching an idea -> CAD -> Wholegarment machine) that I'm using (own it and protect it etc). It's hard sometimes to get specific information out of Gordon when so much of what he does is just 'mucking around' with the settings. He's an expert so he has a feel for the machine and just fiddles around with it until he gets it right. I have to do a lot of reading so that I can ask him very specific questions (e.g. did you slacken the takedown to fix that? etc).

With all the benefits of the suspended stitch technique, my shape is actually particularly problematic, as explained by this next passage:

The takedown and tensioning of the knitting is particularly important if the holding of stitches occurs at or near the edge of the fabric. These held stitches are under the greatest amount of stress. As a consequence there may be some distortion of the stitch length and its shape. Stitches most frequently held, particularly on the edge of the fabric, may be elongated compared to stitches within areas that are continually being knitted. This can distort the angle of the shaped segment. (Underwood 2009)



You can see the distortion happening in the above photo of the inner edge of the knit....

Since I want the inner edge to be condensed, I want the ribs to be as close as possible to each other at the inner edge, to make strong contrast with the splaying out the happens on the outer edge. This is a challenge for the machine:

In general, the greater the angle of the shaping segment being formed, the more potential there is for problems with knitting to arise, such as fibre damage, yarn bursting and stitch distortion.

### What is the greatest angle I can achieve then?

No definitive formula can be given as to what knitting angle can be achieved before these potential issues occur, as it depends on the fibre and yarn choice, the stitch architecture and the type machinery being used. It is because of this complexity that little has been documented in the literature. Ultimately the maximum angle needs to be determined on a case by case basis.

(Underwood 2009)

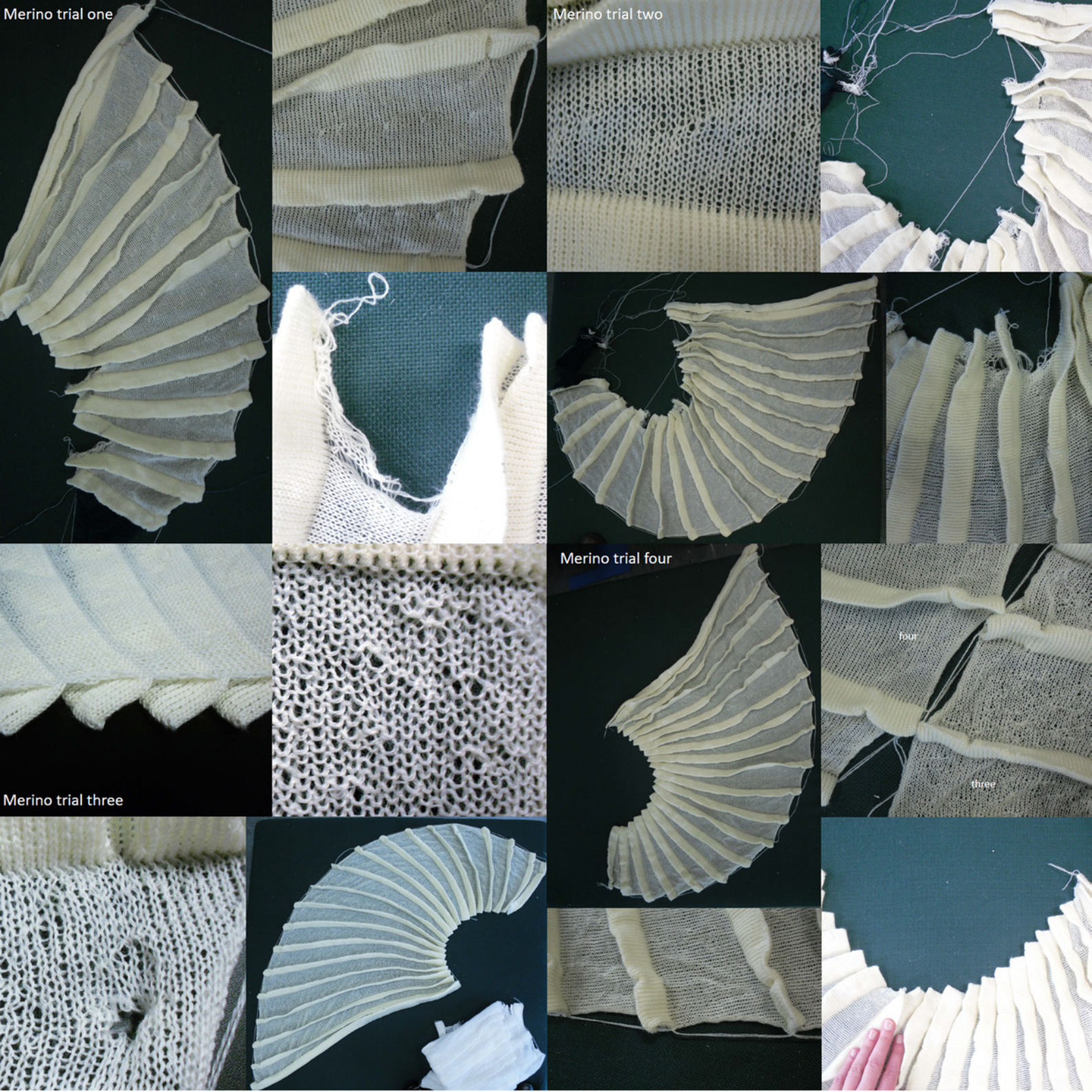
### What are the possible solutions for this problem?

A number of measures can be taken to overcome or at least reduce this stitch distortion. Firstly the take down tension must be addressed. Ensuring the right tension with the rollers is critical. The main roller needs to be slackened off, and excess fabric moved away from the needles by the sub roller. As well, with the advanced technology of machinery, special takedown systems and a Digital Stitch Control System (DSCS) can control the length of the loop being formed. The use of sinkers can also assist with to reduce stitch distortion. (Underwood 2009)

To solve my problem, like this text advises Gordon slackened the main roller so that the take down tension was reduced. He tightened the stitch and put 'second stitch' in. With 'second stitch' and a really slow speed setting while working on the inner edge the knit has dramatically improved:





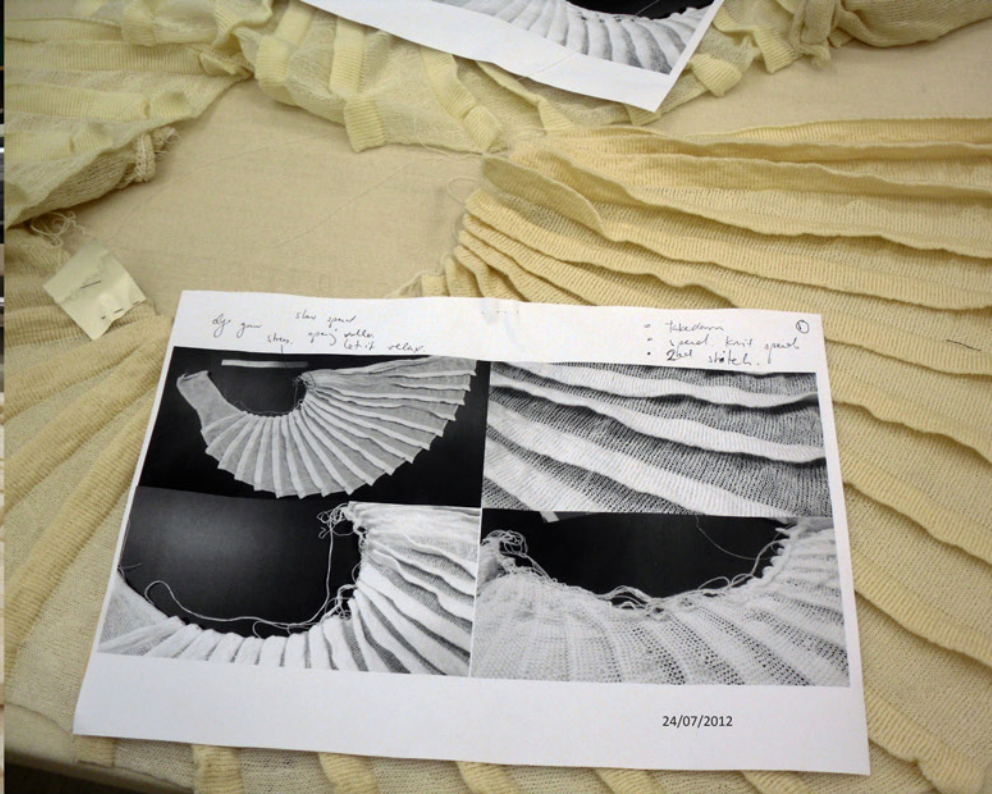
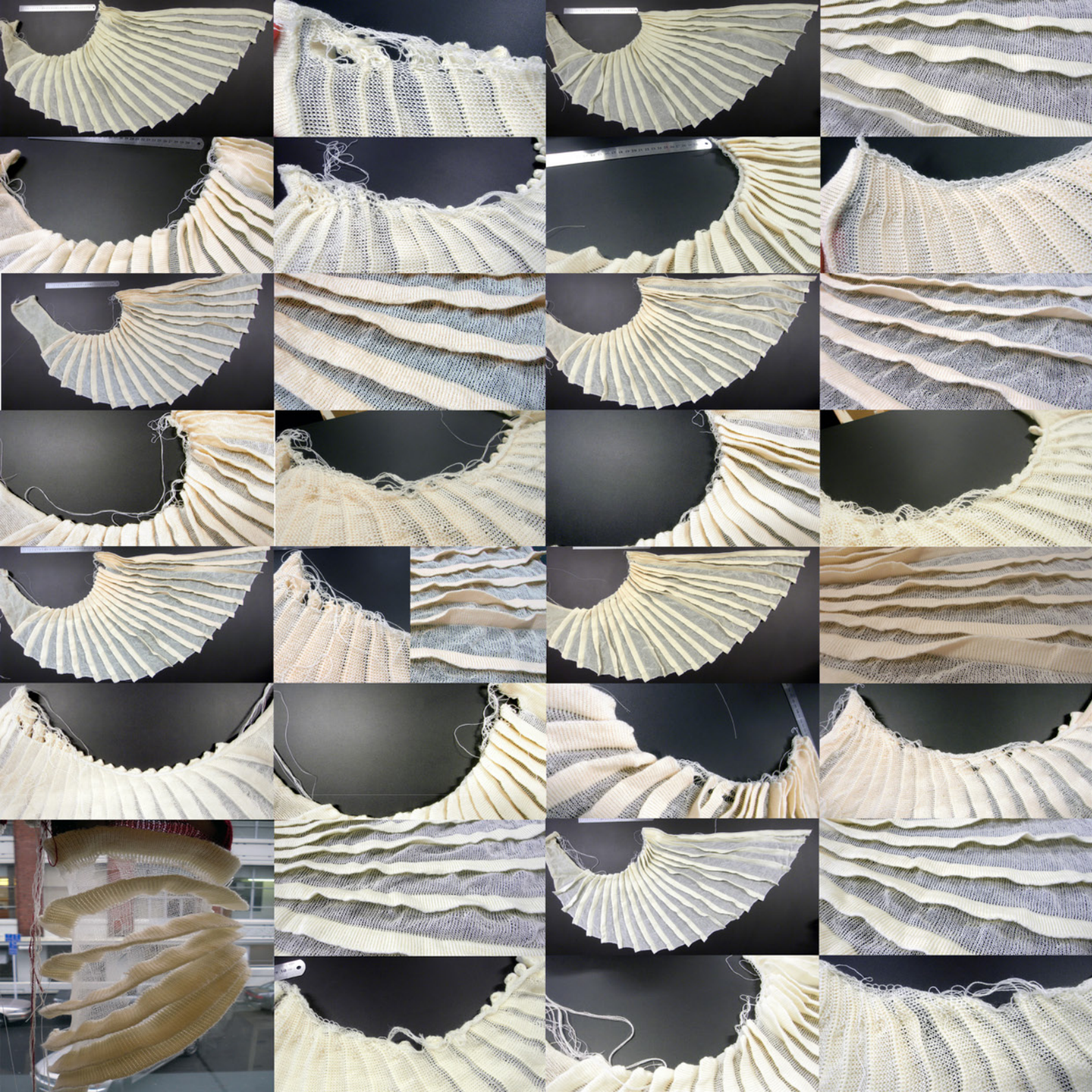


Throughout this process, we had to work with merino. We needed to find exactly the right settings for this shape and yarn. All yarns react differently.

The following pages give an idea of the process. It is very much trial and error. The technician analyses each piece and adjusts the machine settings and knit file accordingly.

We eventually reduced the knit time to half an hour. Any lower than this and the machine began to drop stitches.

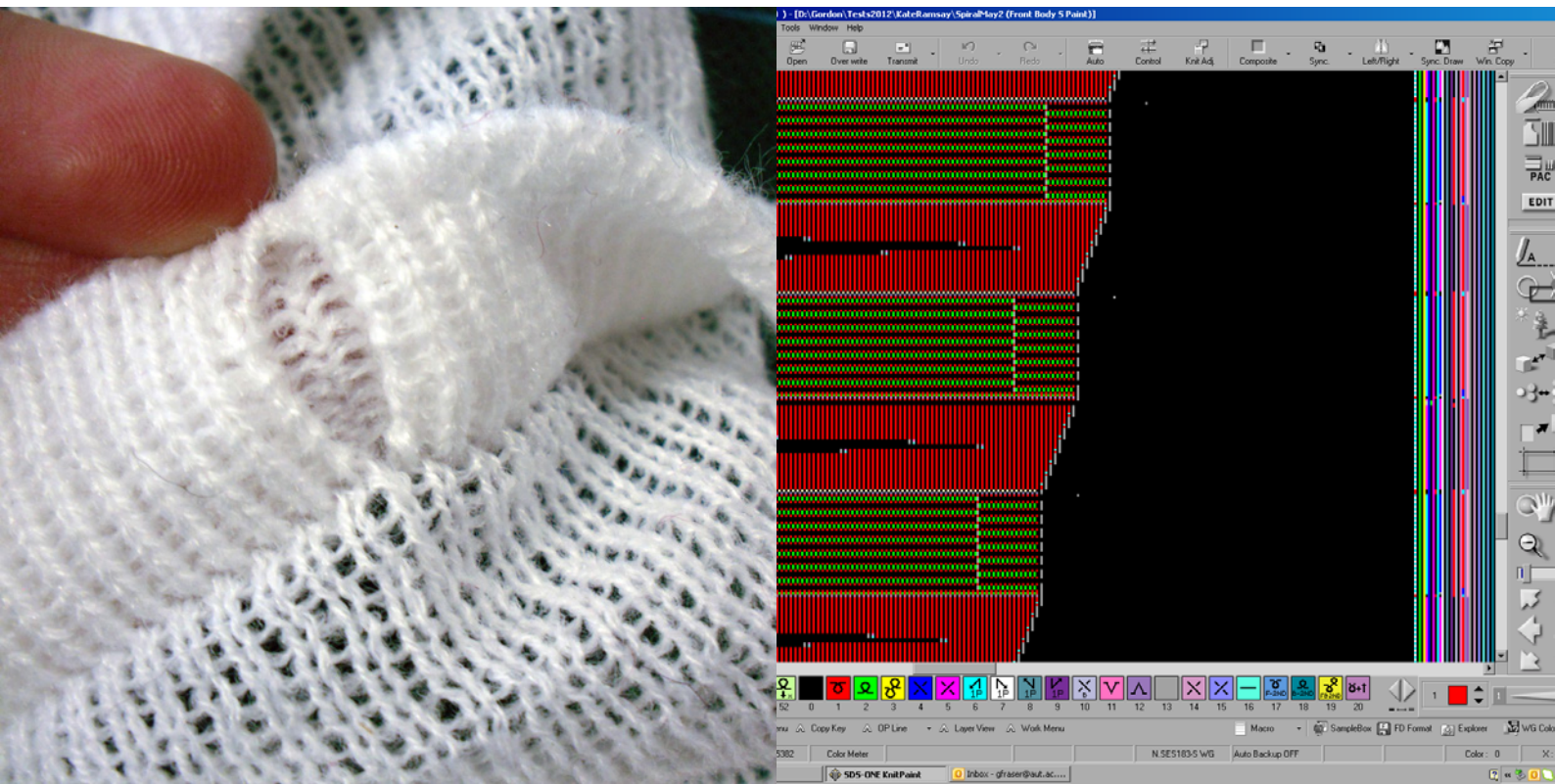




We ran a very fine strand of lycra with  
 the merino in between the ribs. This was  
 to see if the problem with the inner edge  
 was down to the strength of the yarn.  
 This version was almost perfect so we  
 know now that this is the case.

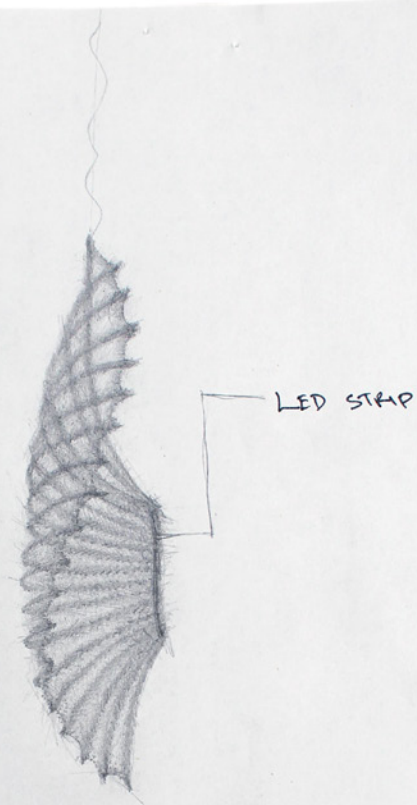
24/07/12





Slits were added to the ribs so that the structure can be inserted.

Electrics

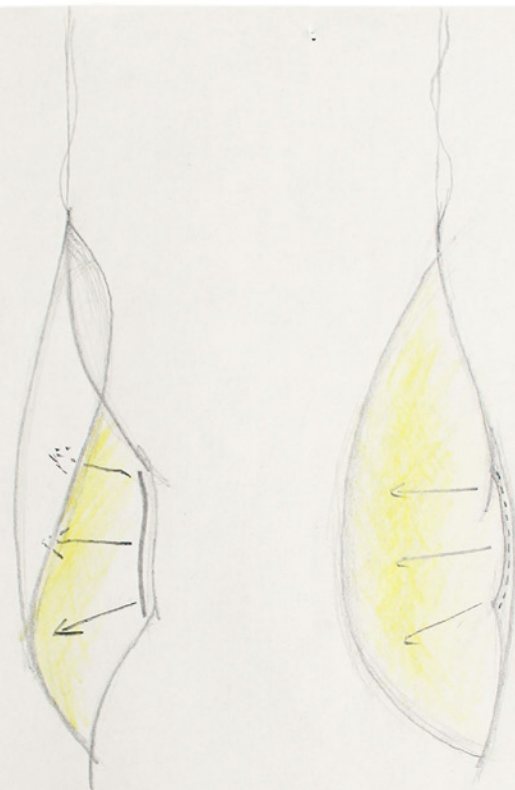


LED STRIP

The LED strip currently is really visible, not from the right hand side or from the back, but from the front and left hand side. I don't want to add bulk with a chunky diffuser. I'd like to slot a paper (filter) into whatever I design, so I can adjust it at the summit according to the lighting there.

③

13/03/2012



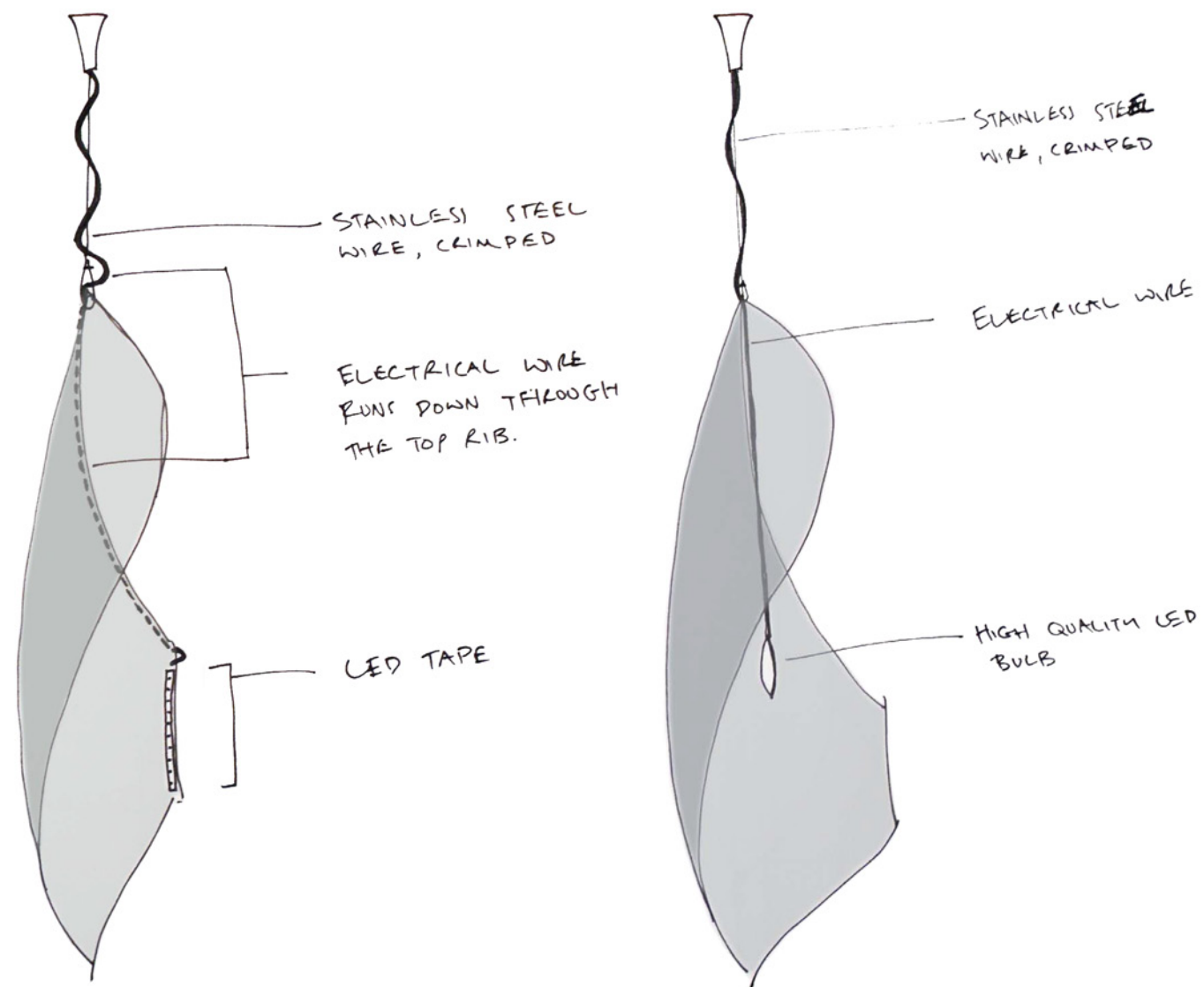
### DESIRED LIGHT DIRECTION

The basic form is already really beautiful. How do I use lighting make the most of this? Lighting from that inner edge is good because it emphasises the 'shell like' interior form. It also creates the illusion of volume in the 'cocoon' shape glowing from the back.

④

13/03/2012

Last year I used LED tape to light the knitted form. I hand sewed it to the inner edge. This was time consuming. Lighting the form with the LED tape is ideal to me because it is innovative, different and surprises people. I knew that manufacturing this detail would be difficult, but I was determined find a solution.



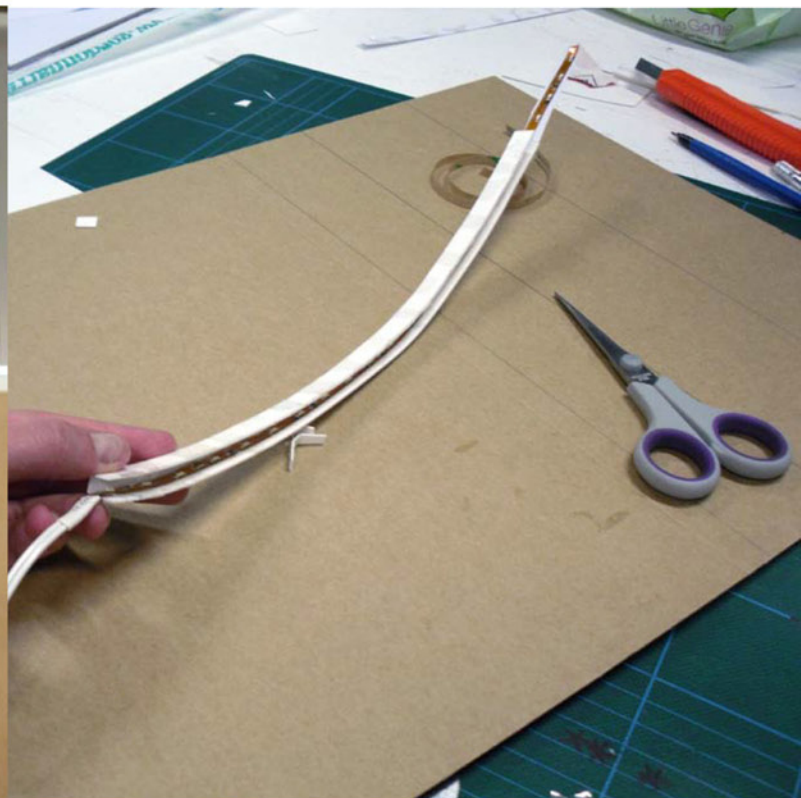
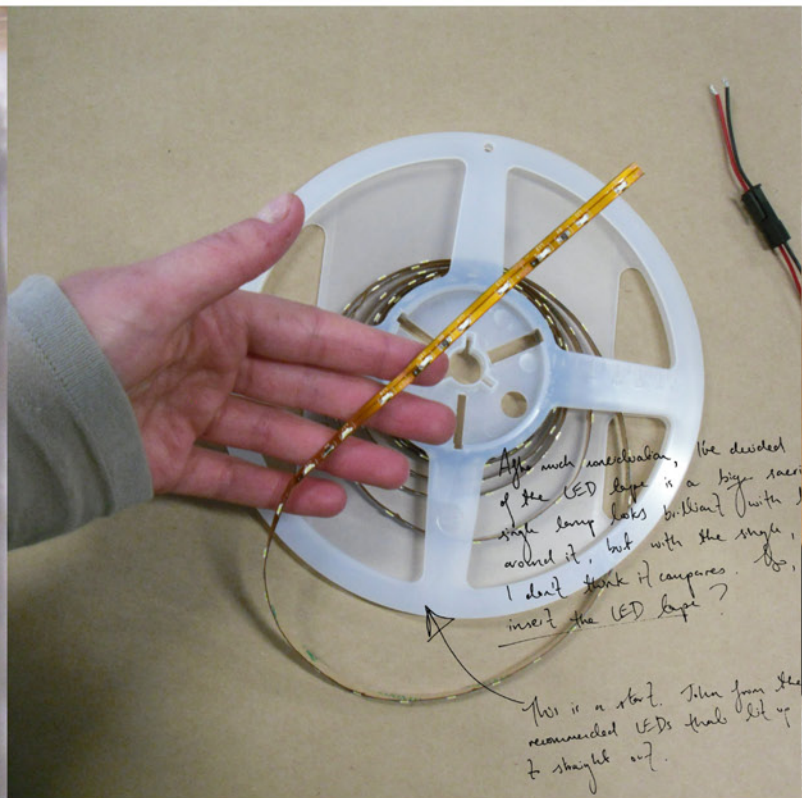
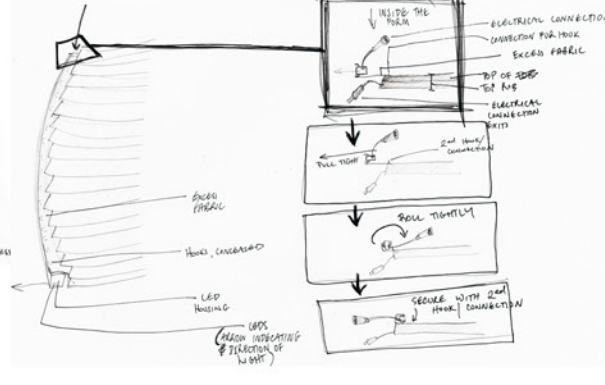
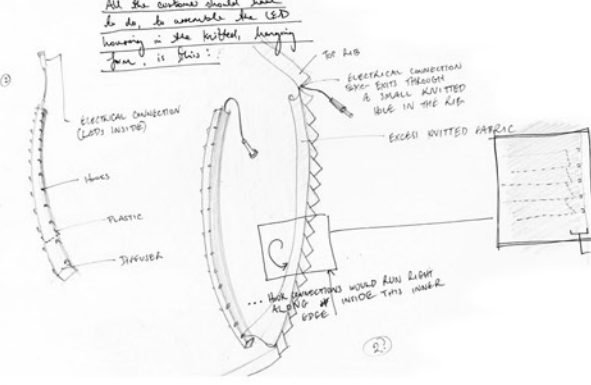
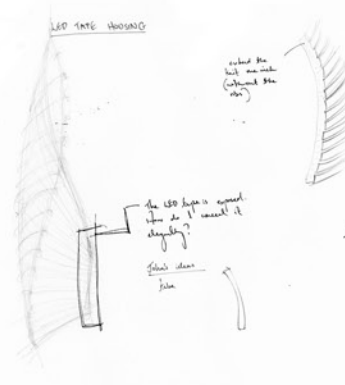
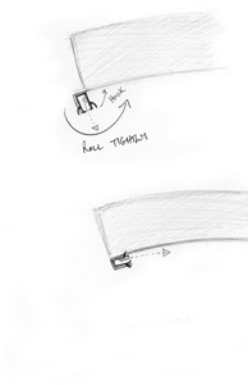
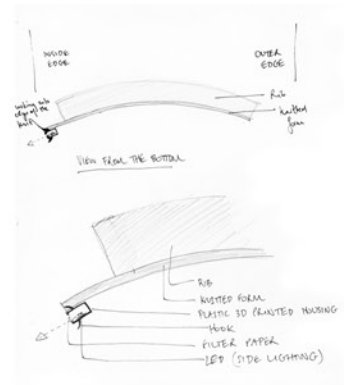
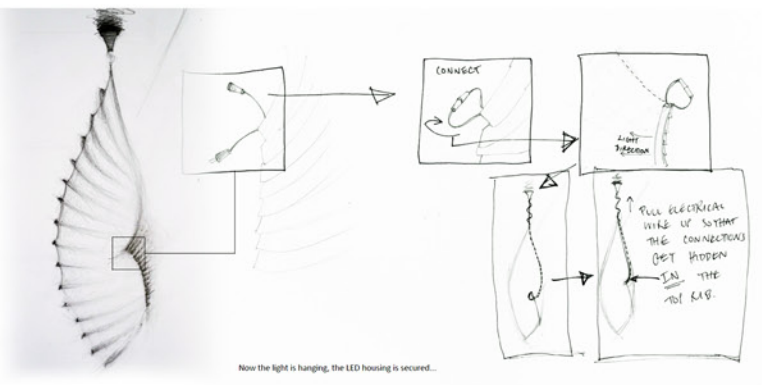
My supervisors advised the use of a single LED lamp. This would hang in the center of the form. They believed that pursuing this option would give me a greater chance of achieving my goal of selling my light by the end of the year. They advised that I put the tape version aside until the technology advances. Unable to accept this, I set out to make two versions. I was sure that when I took them to a retailer, they would prefer my ideal version.

I did not know how I would attach the LED tape to the fabric safely. How would I house it? A solid housing would make it difficult to flat pack, unless it was detachable. There were many complexities that I did not know how to solve. I needed lighting expertise so I approached two lighting designers and a lighting engineer. None of them could assist me with my LED tape version. They confirmed that the LED lamp was far more achievable.

On reflection, I should have taken these people's advice, but I was certain that my light was not worth making if I could not manufacture my ideal version. I did not think it would have a chance of selling. The positive feedback I had received last year was mainly around how surprising and different it was. I felt like hanging a lamp in the center was too predictable.

Determined to find a solution, I embarked on a number of labour intensive explorations (the next page contains a sample of these).









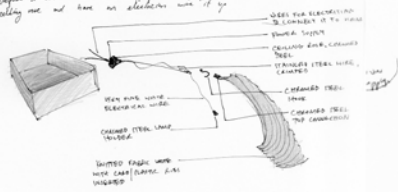
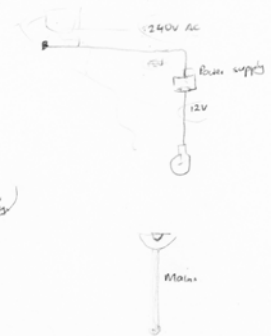
Single lamp,  
This has the potential to be  
really simple, elegant (as  
seen in sketches?).  
I now need to get the details  
right so that this translates into  
real life .....

I spent too much time on these explorations. I accepted that the LED lamp was my best chance of commercialising the project. The problem was I no longer felt enthusiastic about my design. My supervisors had told me that with the LED lamp, my project would still be innovative and effective, just in a different way. I could not see this.

As a solution I used drawing. This sketch helped me to embrace the LED lamp. It surprised me that many of my peers thought that the simplicity of the single lamp made the piece a lot more compelling. Art, combined with positive feedback, helped me get excited about my project again. After this, working on it did not feel so hard.

Basically there are two options as to how it could change the power supply to DC (from AC) at the lamp (using LED's or not). The would mean that if there is a high voltage across your running down any electrical thing, a lamp should be safe as a whole. It would mean that any electrical wire that changes the power to DC, it has a surge, it also means (because the power that running from the DC to the light fitting is AC) that any electrical wire can be thrown. People think it would be appropriate to supply the power supply to the fitting and not have an electrical wire it go.

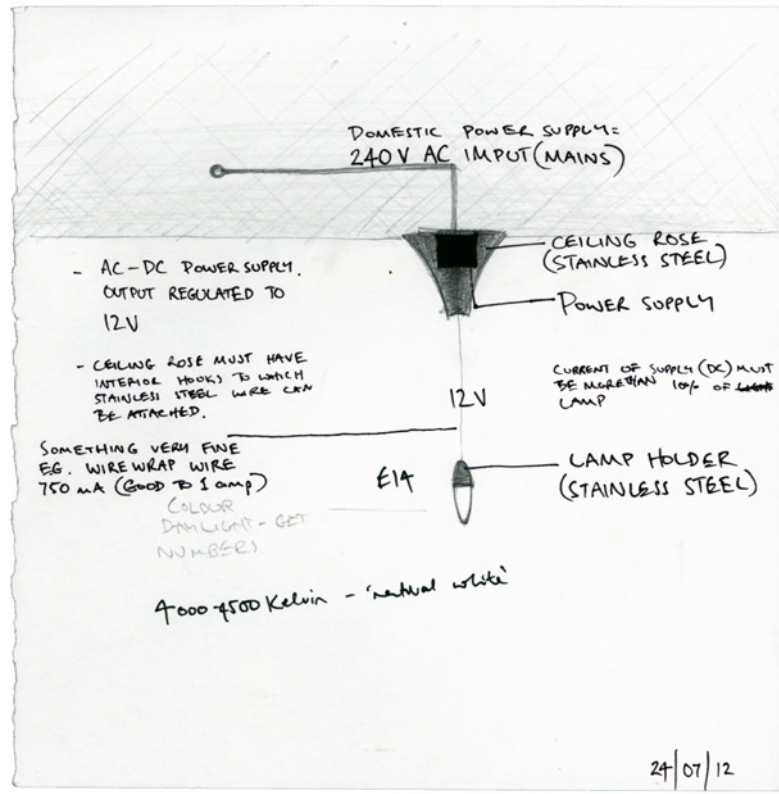
-JERRY THE ELECTRICIAN



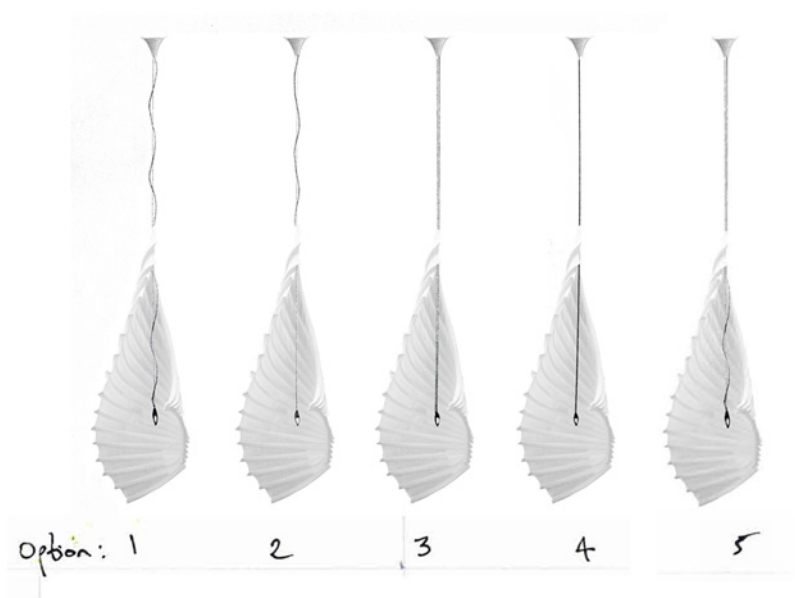
The very fine wire stringer given me  
is strong enough to carry an LED lamp  
but not my heaviest glass.

- 1/ Change to LV DC for LEDs as soon as possible
- 2/ Thickness will depend on power requirements of signal (current).  
 $P = V \times \text{Current}$   
 $50 \times 5 = 250 \text{ W}$   
 $50 \times 10 = 500$   
Frosted lead echelon lamp  
 $\frac{10 \text{ V} \times 12}{100} = 0.8$
3. Current of supply (DC) must be more than 10% of light bulb or bulbs.
- 4 Wirewrap wire 750ms (ground to 1 amp)

17/7/12



I wanted to use the thinnest electrical wire possible for visual subtlety. A power supply situated in the ceiling rose would help me to achieve this however; a compact power supply is expensive and difficult to source. It is much easier to take the mains straight down from the ceiling. I have to take this simpler option.

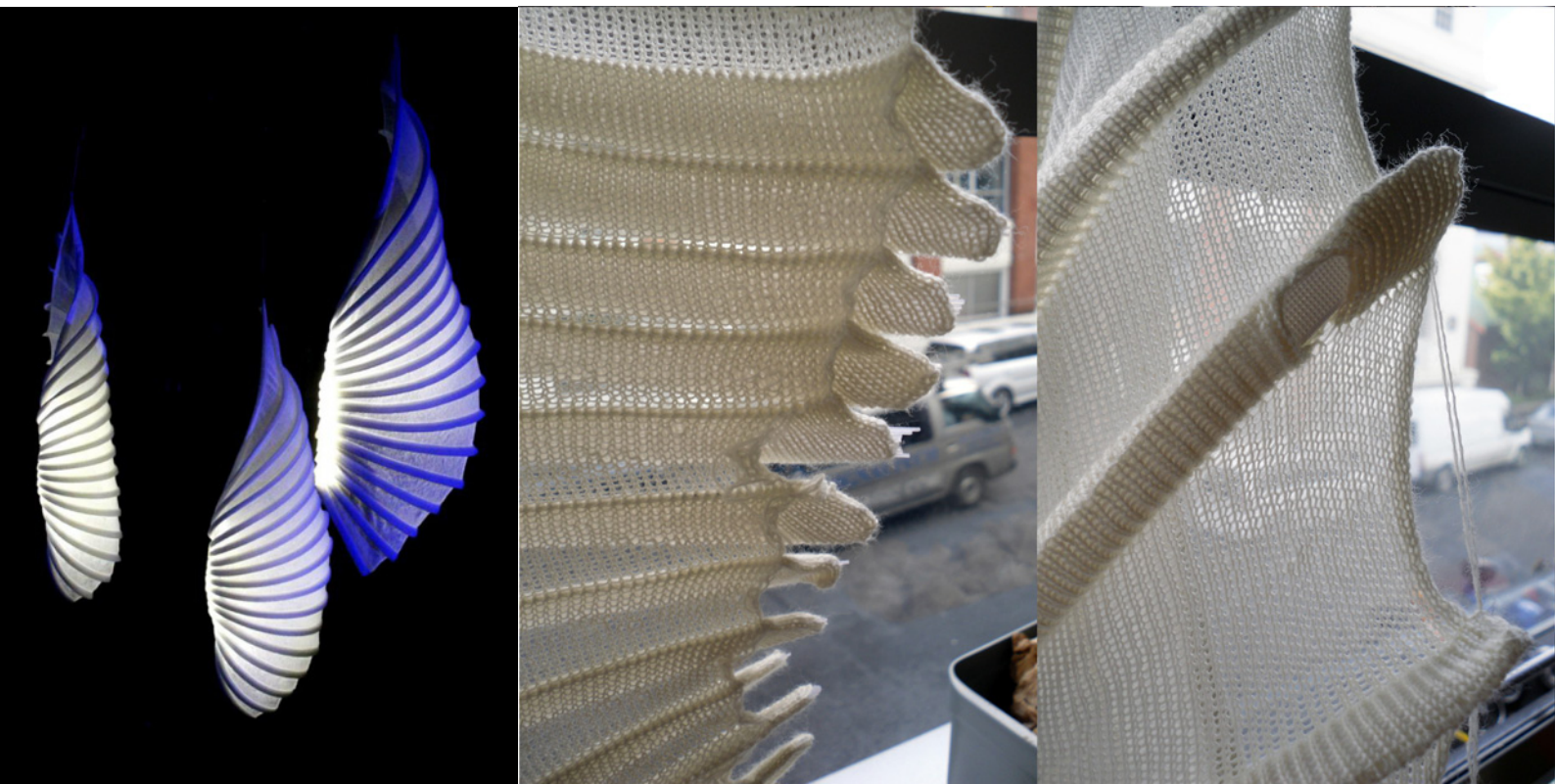


Having chosen to bring mains power down, I accepted that the cord would be thicker than I initially wanted. Again I have used drawing to help me embrace this fact and discover the best and most elegant solution. Constraints do drive creativity.

The latest versions of the fitting with the LED lamp follow, in the structure section of this chapter.

Structure





## Structure

- The structure is critical to the success of this shape.
- Last year I used polyester boning. This material is not ideal:
- Unpredictable: it is very hard to control the curve I could not hope to manufacture uniform light fittings.
- To create the right shape, an exact length needs to be inserted into the knit. It depends on the unique curve of that piece of boning. Getting it right is very time consuming.
- It frays when cut
- It has some memory, if bend it is difficult to repair
- It gives shape to the form by pressing out into the rib. This creates an undesirable flat edge to the rib and would eventually stretch the knit.
- it is difficult to make the ribs ends sit at the right angle



Due to the inaccuracy of the curves, there is sagging between the top two ribs. The light fitting needs to look considered and intentional so I explored other options for the structure. These included ply, packing tape and wire.

Another student (following page) thought that my problem could be solved by making the top rib rigid. She found that when this rib was at the correct angle, the others followed. I tried heat molding cell cast acrylic. It was not successful.

The most successful solution was wire.





1 SDC12377.jpg



SDC12369.JPG



SDC12370.JPG



SDC12371.JPG



SDC12375.JPG



SDC12377.JPG

Again, just having the light hanging is a really good way of getting feedback. Nany has the really!



Idea that I got off looking to Nany.



How would the angle hold the knitting up?



A series of hooks that secure the knitting. Two flaps that come down of over the cord to catch the hooks.

Should be able to mount in the center.



While there's added complication designing both details simultaneously, the goal is to bring the two together more rather than late.

It might be good to get the angle and get the knitting then with a heat gun bend and would it be the right shape.

Maybe I will experiment the hooks. The angle needs to be secure (not a tip) the shoulder steel is heavy (not a tip) the shoulder steel is heavy (not a tip).

Shoulder steel the clips are the last connection, concealing the plastic hooks.

Knitting clip on knitting.

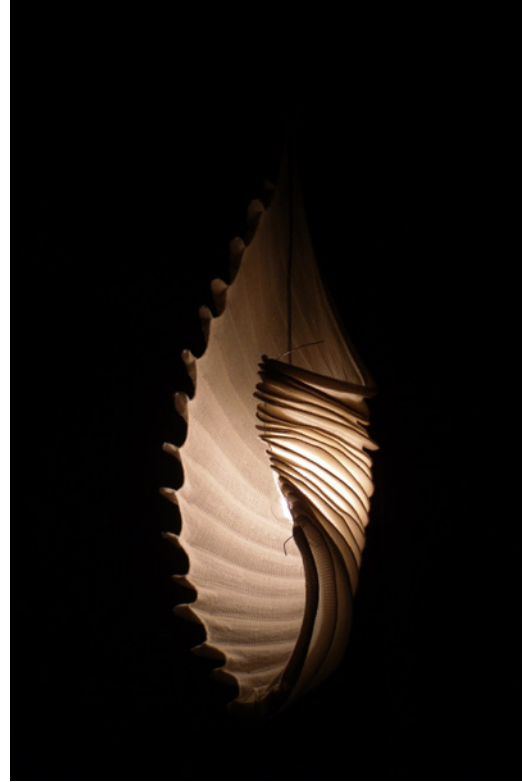


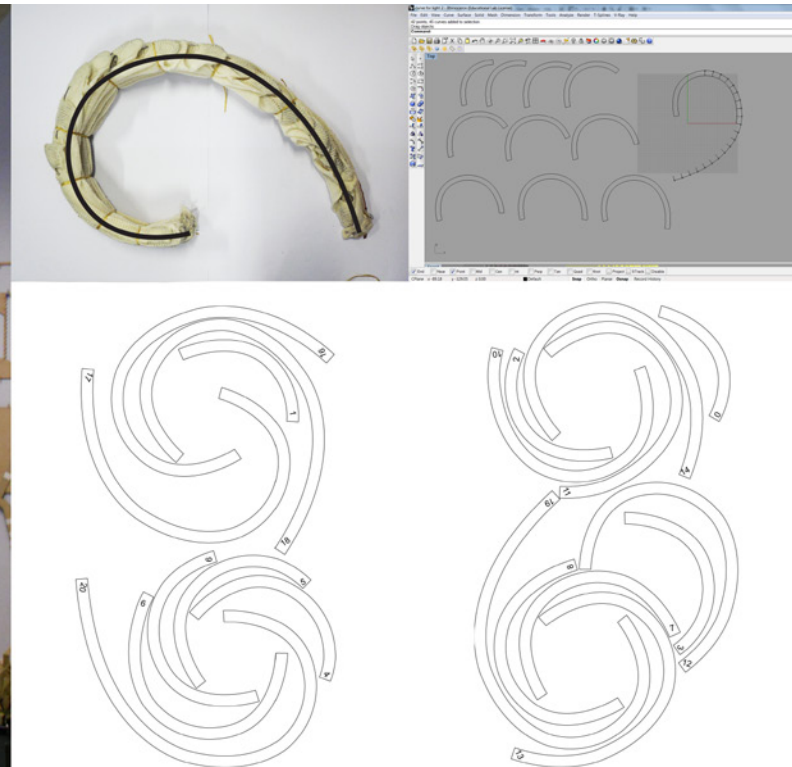
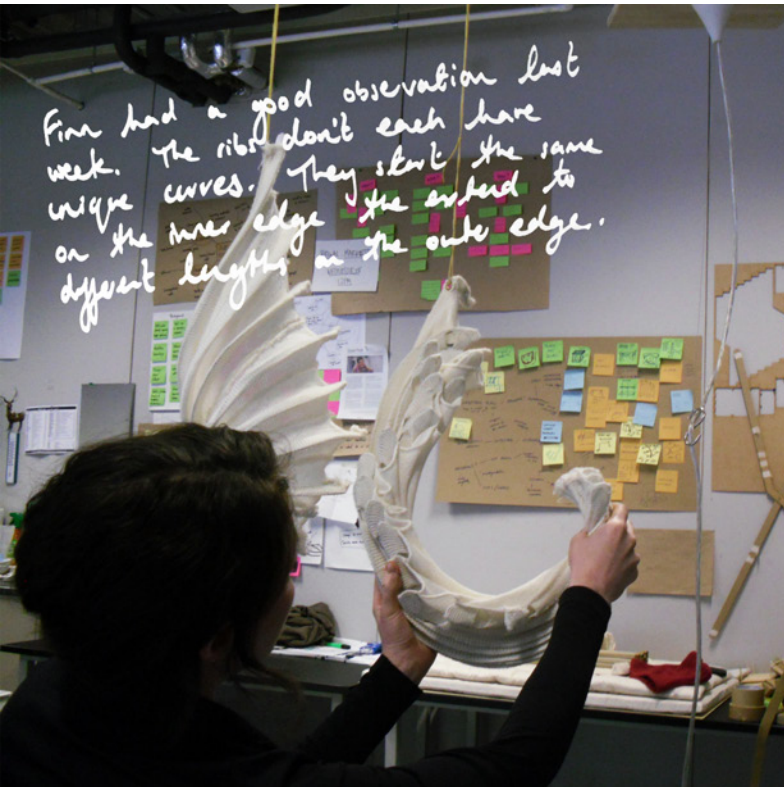


Wire here is light and it makes the ribs sit at the right angle. It is possible that I could manufacture my structure using wire however; the set up costs would be high.

Wire gave me control over the form and the ability to try many different possibilities.





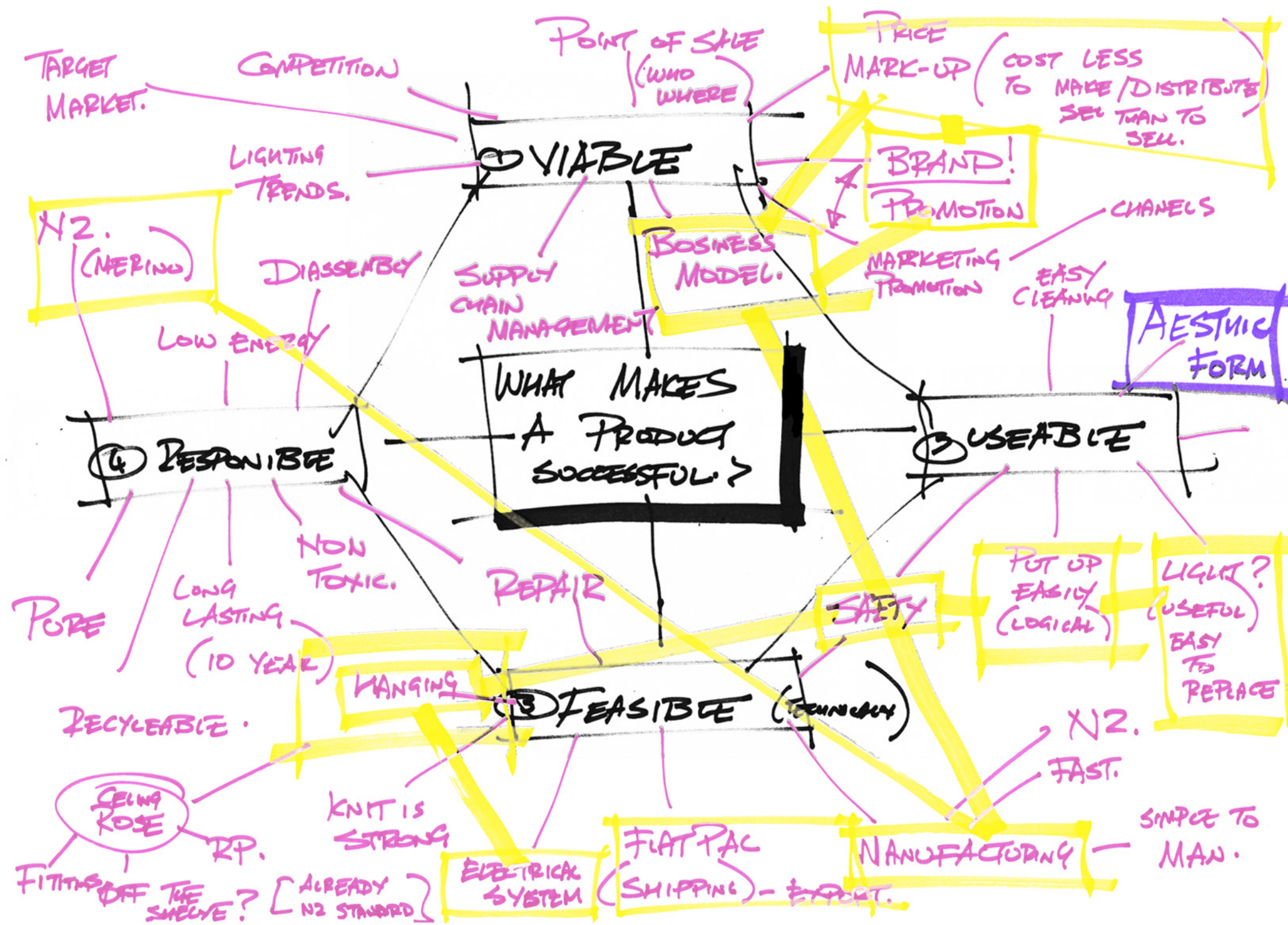


Laser cutting is a far more achievable method of manufacture for this project. I tried a number of ways to find the correct curves of each rib. This (left) was the best solution. It created a far stronger form. The ends of the ribs sit out at the correct angle and the shape finally looked intentional. I have made the first one with strong card. My next will be with transparent, matt, cast cell acrylic.

Over the next four weeks, I will be making small adjustments to the file, and laser cutting and knitting numerous components until I achieve the correct form.

Exploring the commercial potential  
of my lighting range







P.O.A

P.O.A

P.O.A

\$10 450

\$7 200

\$8 600

NZ \$3 450

\$1 820

\$1 680

NZ \$1480

P.O.A

P.O.A

\$650

\$780

\$345

\$450

\$620

\$410

\$610

\$860

NZ \$505

P.O.A

\$875

\$1 120

\$740

\$510

\$410

\$320

NZ \$580

NZ \$780

1000 mm



LOW VALUE

Norm 06 by Simon Voser \$158

Korker by Korker \$158

Norm 03 by Bill Korman for Normann Copenhagen \$230

Box 1 by Original BTC \$230

1017 by Mark \$272.40

Edg Suspension by Alessandro Mendini \$470

Beet Light by Tom Dixon \$492

Orbitale Suspension by Alessio \$476

Bell 10 by Jon & Seth Greyson \$506

Hand-finished pendant shade Paul Christensen for Klint \$650

LC Shakers by Louis Poulsen \$677

Enigma 225 by Shiroko Ichijima for Louis Poulsen \$904

Void by Tom Dixon \$608

Hand-finished pendant lamp Hvidt & Mølgaard for Klint \$510

PH 412 Pendant by Poul Henningsen for Louis Poulsen \$551

Brace Copper Shade by Tom Dixon \$664

Kora Hanging Bird by Christina Christen for Alena Light \$764

Rik 24 Jon & Seth Greyson \$715.20

Hand-finished pendant shade Paul Christensen for Klint \$650

LC Shakers by Louis Poulsen \$677

Enigma 225 by Shiroko Ichijima for Louis Poulsen \$904

Void by Tom Dixon \$608

Hand-finished pendant lamp Hvidt & Mølgaard for Klint \$510

PH 412 Pendant by Poul Henningsen for Louis Poulsen \$551

COMMERCIAL

Genie Hugs Suspension by Ros Longman for Artemide \$1207

419 Ring by Foscarini (S) \$1147.95

Random Light White by Tom Dixon \$2300

Mark by Antoni Arola for i+L Cole \$2241

Random Light White by Tom Dixon \$2300

Viscer 28 by Christophe Marret \$1850

Leaves by Antoni Arola for i+L Cole \$1985

Etch Light White by Tom Dixon 1994

Lebel by Vicente Garcia Jimenez for Foscarini \$1403

Collage Pendant \$50 house Campbell for Louis Poulsen \$1315

Midnight moon by Arco \$1204

Nighorn Pendant by Ole V. Kjaer for Louis Poulsen \$1434

Sumo Louis II by Philippe Starck for Floo \$1691

Random Light White by Tom Dixon \$2300

Mark by Antoni Arola for i+L Cole \$2241

Viscer 28 by Christophe Marret \$1850

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Midnight moon by Arco \$1204

Nighorn Pendant by Ole V. Kjaer for Louis Poulsen \$1434

Sumo Louis II by Philippe Starck for Floo \$1691

HIGH VALUE

1000 mm



# Expert opinions: Exploring the commercial potential of my range

## Commercialisation expert 1

- The trouble with the wholegarment machine is that is not feasble to compete in industry yet. It’s interesting what you’ve done because you don’t have recommended retail prices to meet. You can actually come up with something novel and price it the way you want to.
- A lot of entreprenuers struggle through the process of starting a business because their role changes as their company evolves. They start off being very technically focused they end up being basically capital raisers. Do you want to stay true to design? It’s really good to know both.
- How big can you make these? Could it become a central feature in a large hotel?

## Commercialisation expert 2

- It is good that you can colour it and pattern it. (+ different stitches, colours, digital printing)
- If you want to start the business yourself and have it as your business you’re going to have to upscale it as commercialise it. Make a commercial product from these which you’ve got now. That’s going to take some re–sources/finance. That’s one way –you do it yourself. The other way is looking at a partner coming in along side you. Either an investment partner or an industry partner that’s maybe in the space that you can work alongside. There are a number of ways you can do that. You probably need to think about if you want to do this yourself and have this as your business and there are some ways and stratergies around that (probably the more difficult way to go).
- Incubation is a great way, that’s the way a lot of companies start up. Process around incubation – it’s around finding the market, the partners to come along side you, and that sort of thing so that could help out a lot. It’s a way of getting started without committing too much in the early stages.

## Retailer and exporter of high-end NZ design

- At the right price, the light has a lot of potential.
- People would use it as their feature light, decoratative rather than functional. People will use them maybe in clusters, in an area like an entrance area, a big void.
- It is good that it is easy to customise by changing the colour, two colours to start with would be best, white for comtemporary spaces and natural to bring in the warmth for less comtemporary.
- The main angle for this expert’s business is residential and trade (interior deisgners and architects). Predicted that it would appeal to both these groups.
- residential takes 3 - 6 months before they start reacting and then once they see it published in a few places, they gain confidence that it’s the right decision to make and they’ll all want it. Until then, people in New Zealand don’t just go and change their interior, they have to have a purpose that gives them reason to buy a light fitting because it’s a very conscious decision, not very impulse driven. We do find that product needs repeat exposure and advertising in all the marketing avenues that we’ve got.
- Predicted that it would be extrememely popular with architects. For this group she talked about how it was important to take into consideration that there is a trade discount because this will be specified by a lot of people we work down from the retail price which includes GST down to a trade price which is exclusive GST and there needs to be quite a difference because that’s how some of them, more the interior designers, not so much the architects, make margin or at least show value in the service that they provide.
- Estimated retail for the original form \$700 - \$800 retail
- Another important thing for this group, particularly the architects is that there is another light in the pipeline.

## Academic experts

- If you get a business partner, you’ll learn by working with them. If you tend to be idealist you need somebody hurrying you along
- Are you driven to make money or are you driven to be an artist/designer? If it’s an artist/designer then probably you need someone with a business mind to drive the business side of things, you work together, supporting each other.
- these pop straight out of the box, flat packed, it ticks all those boxes for a global market, low on packaging, low transportation, natural material, beautiful story
- the IP sits with Kate but also with the TDL to a degree. There’s still a bit of an art in what those guys do in terms of translating, fine tuning, and tweaking different stitches to get that structure to work. There’s been a huge amount of work around that to get it to this point. This one’s almost there but there’s always going to be a bit of work from the design to the technologist. The IP is Kate’s understanding of what she does on the computer and how the wool/material reacts through the knitting – those qualities can’t be modelled... it becomes an intuitive thing I suppose.. you can’t really write it down

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
Sheet									Who	Where	10	50	100															
		Objects	Services																									
Electrics		LED Lamp						Light Technica		540	14 400	54 000																
		Clearflex electrical cord						Eunice Taylor		300	2 000	20 000																
		Clearflex approved base						AUT		50	500	5 000																
		C.R rapid prototyping								50	500	5 000																
		Lamp cover						Eunice Taylor		50	500	5 000																
		Lamp holder	Assembly							50	500	5 000																
Shade		Merino yarn						DEA yarn		200	2 000	20 000																
		Eyelet						Canvas Company		20	200	2 000																
		Insert eyelet								200	2 000	20 000																
		Laser cutting ribs								60	1 000	6 000																
		Knitting								617	617	6 170																
		Rib material (stylene?)																										
		Inserting ribs																										
Packaging / Brand		Box								240	2 400	24 000																
		Graphics								?	?	?	?															
		Pamphlet								?	?	?	?	?														
		Instructions								?	?	?	?	?														
Other		Stainless Steel wire						W.S. Laurie & Co		30	150	300	3000															
		Crimp								1	5	10	100															
		Crimping the Stainless steel wire								13.5	567.5	135	1350															
		Hook								20	500	200	2000															
		Assembling, putting in box								13.5	67.5	?	?															
		Transportation								?	?	?	?	?														
		Organisation time (ph. calls etc)								?	?	?	?	?														
		Insurance								?	?	?	?	?														
		Hourly wage								?	?	?	?	?														
Total											2145.7	10475	13622	136220														

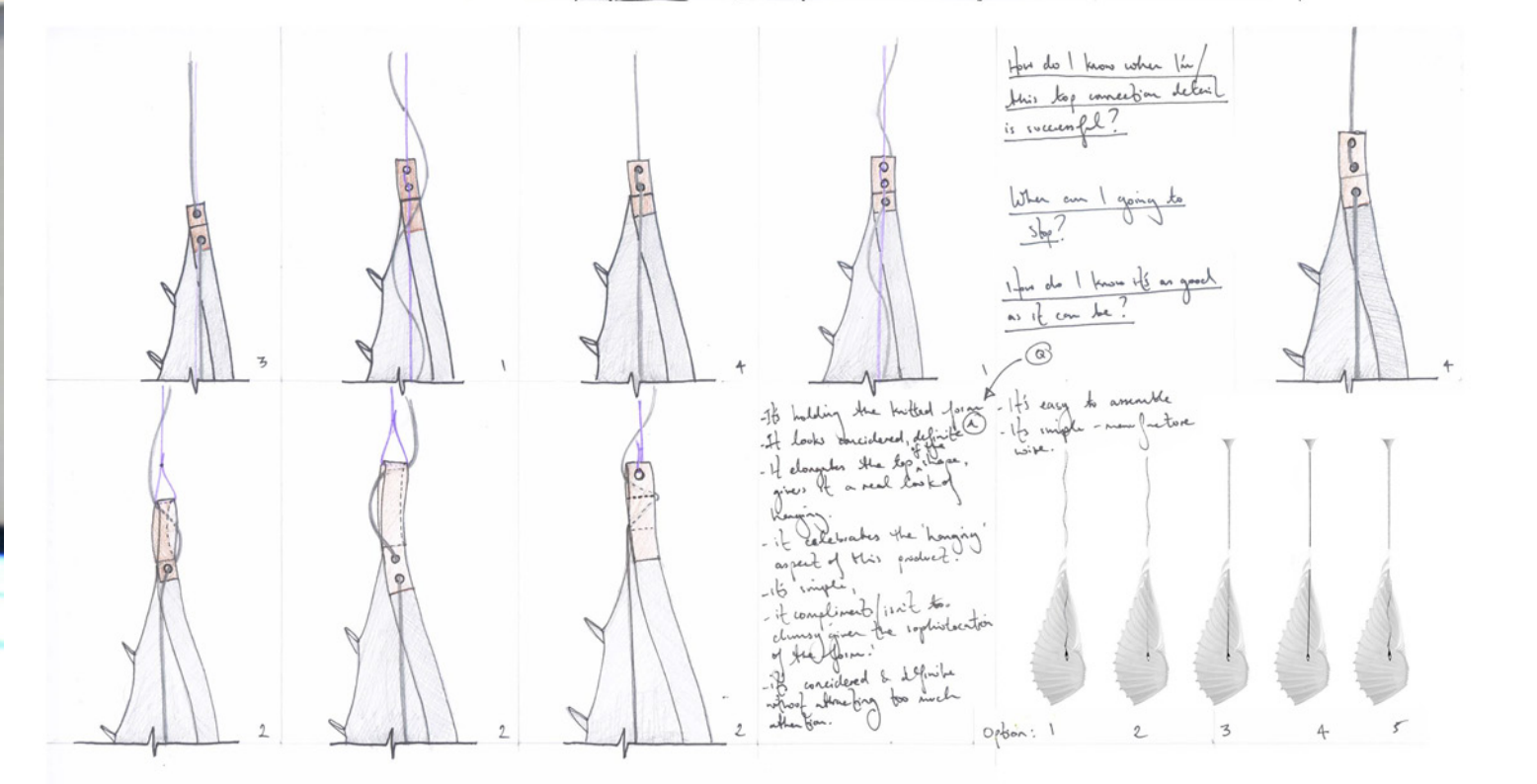
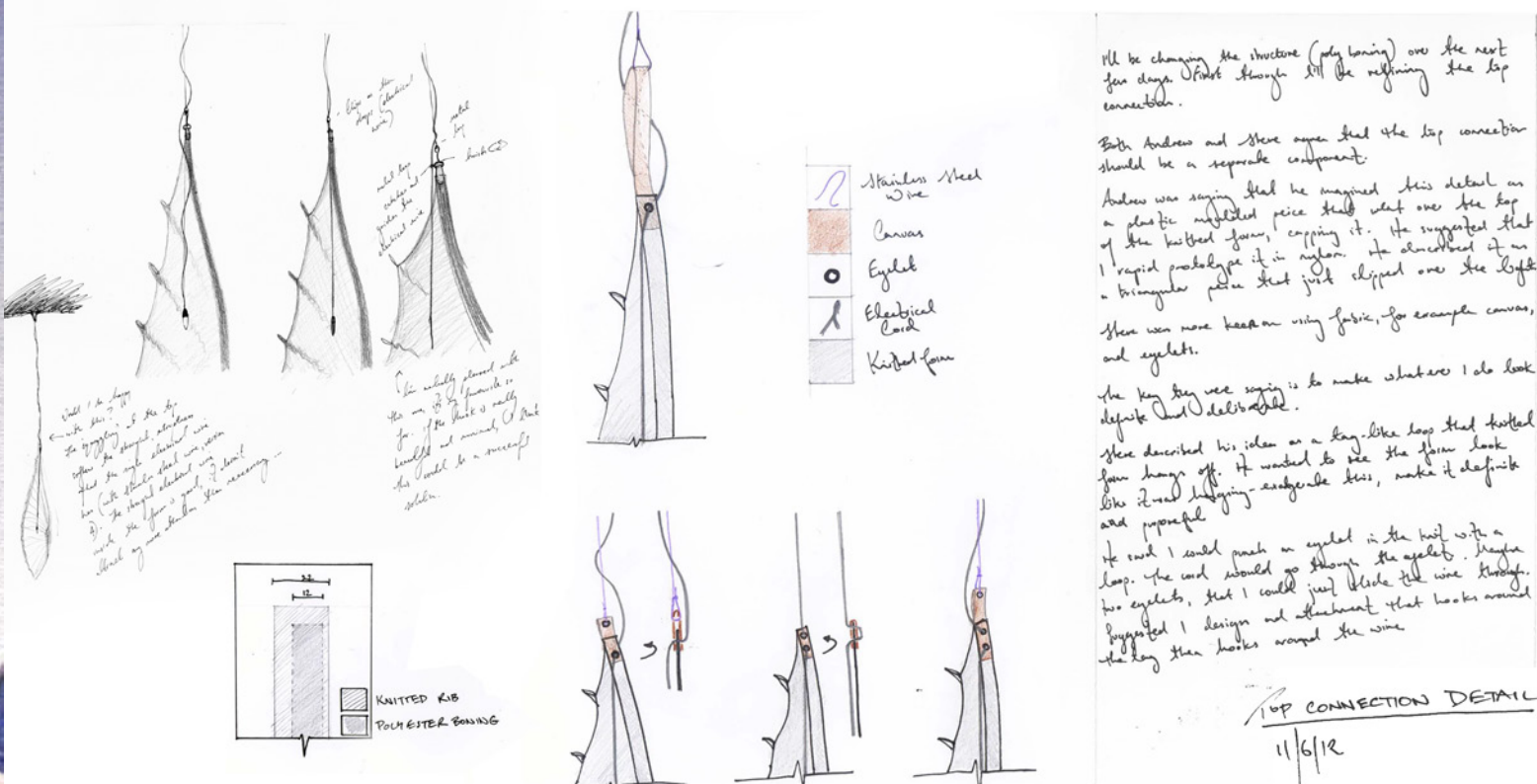
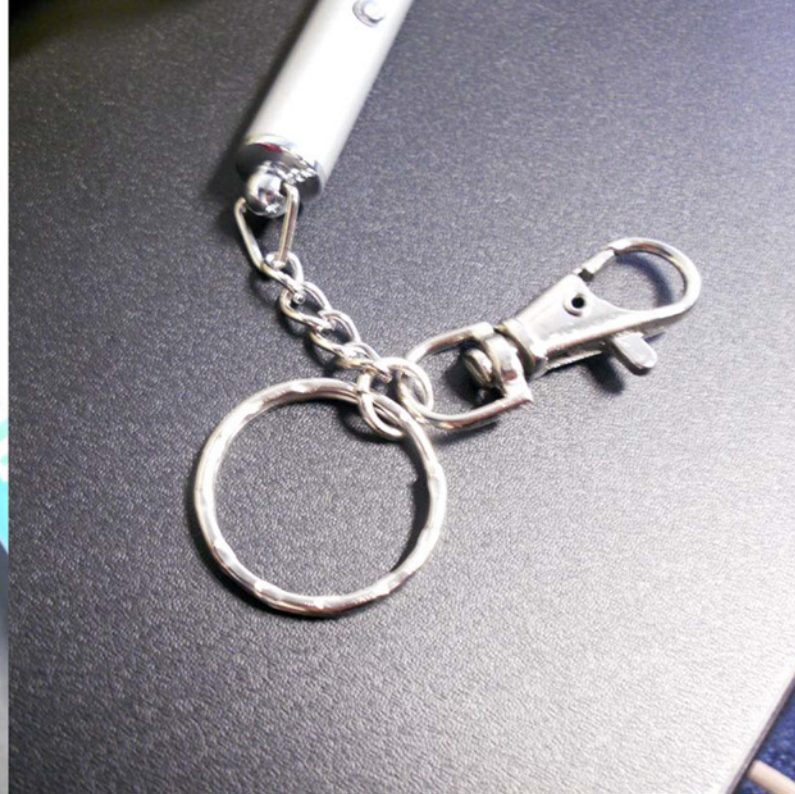
### Kotuku light costs

24.09.2012

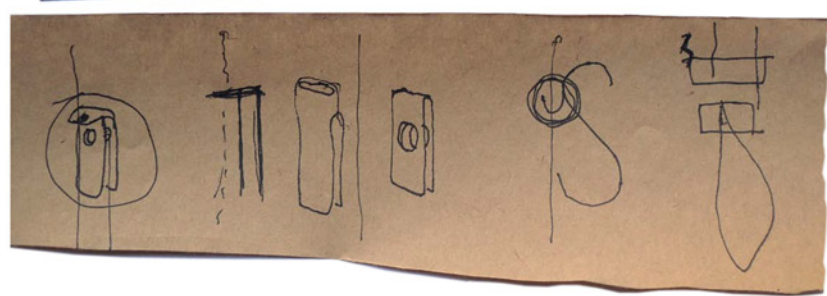
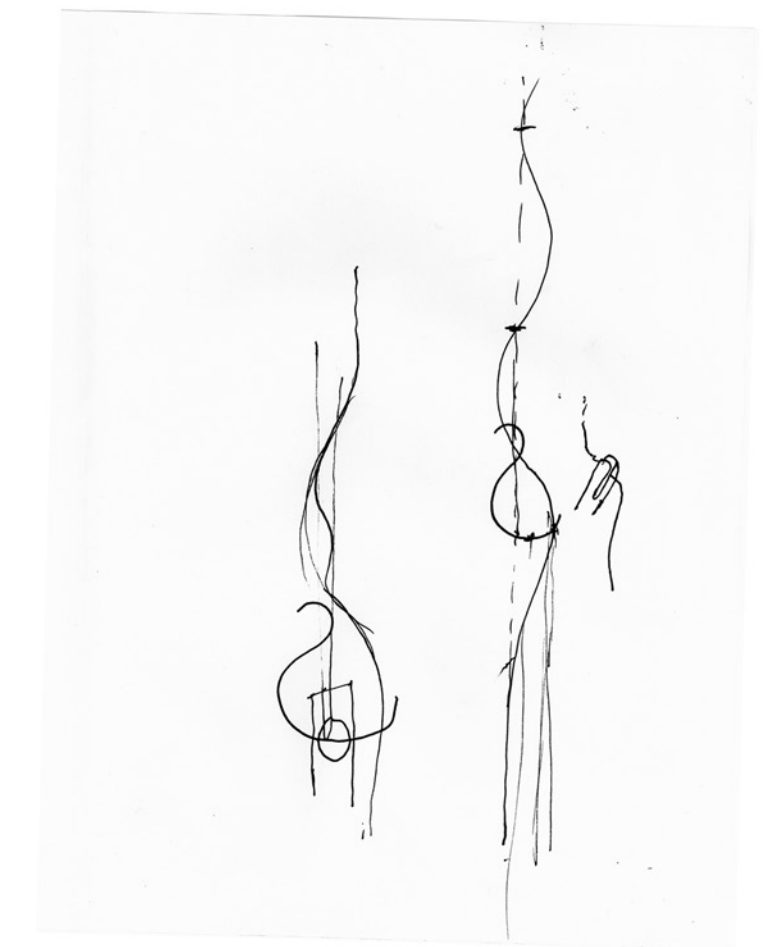
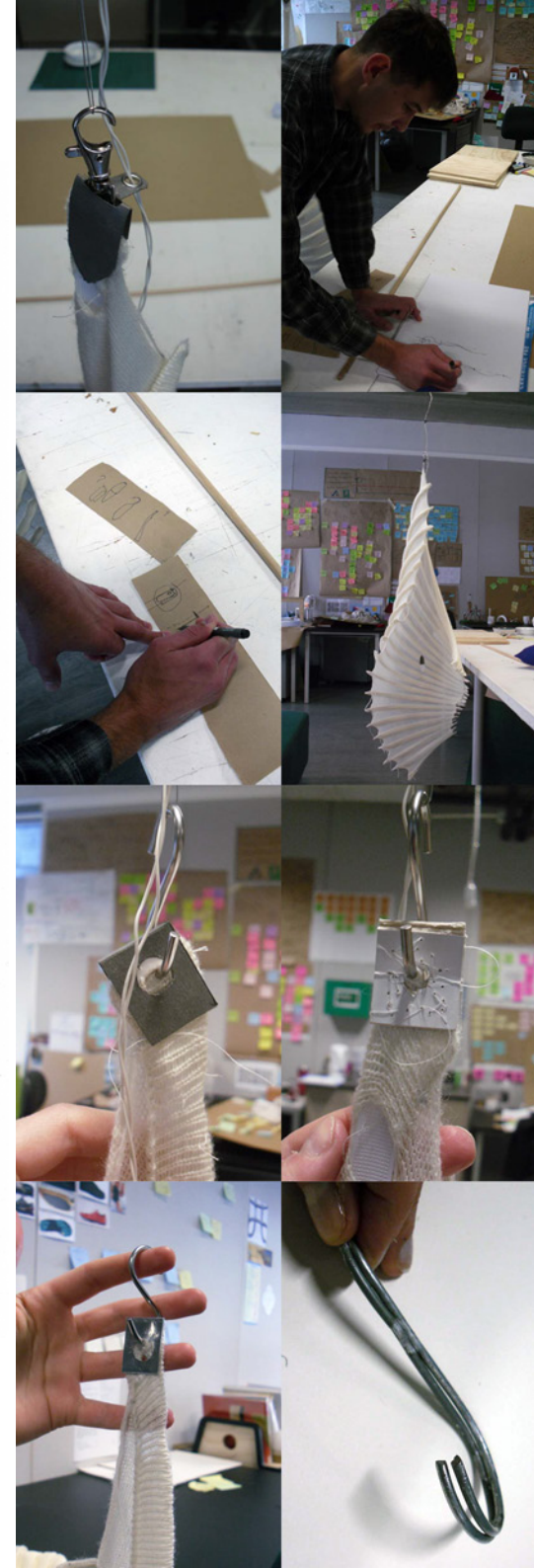
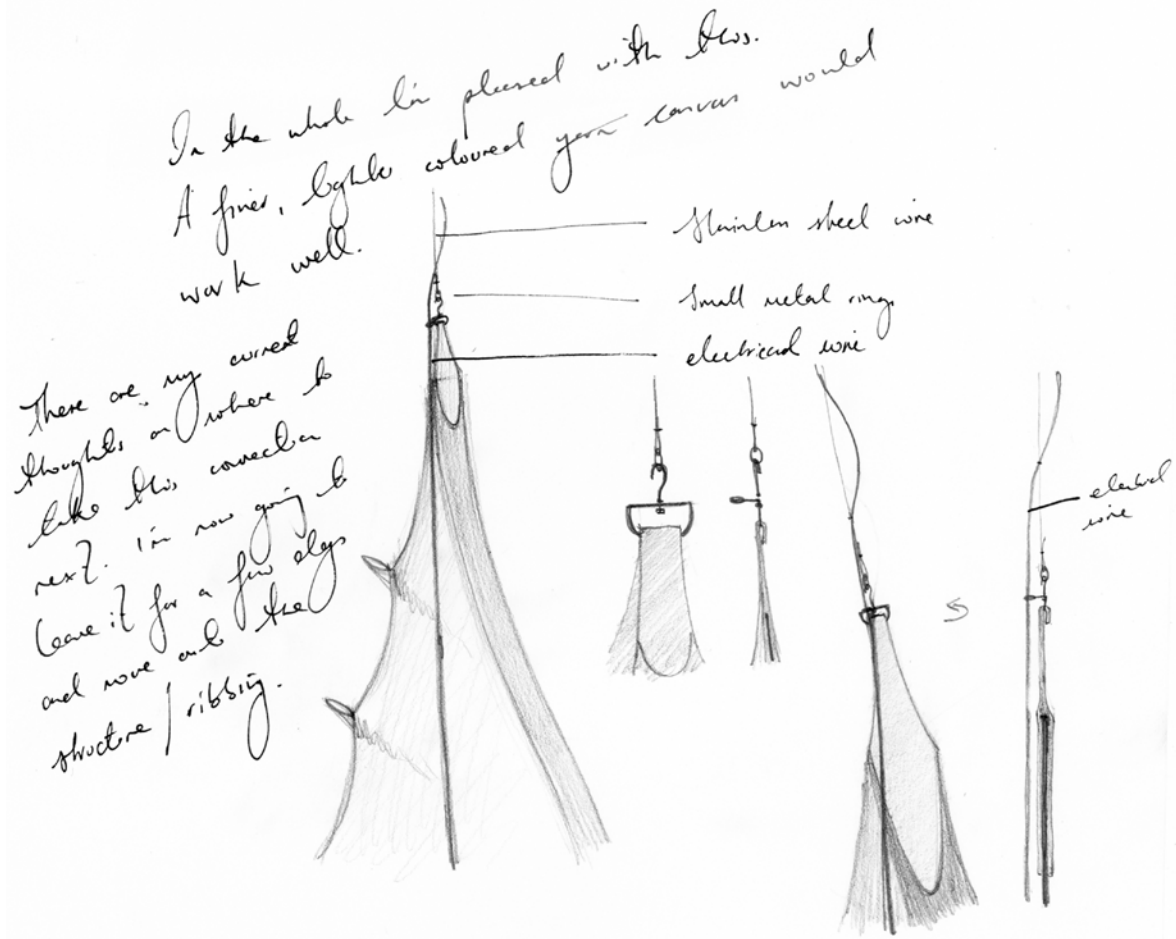
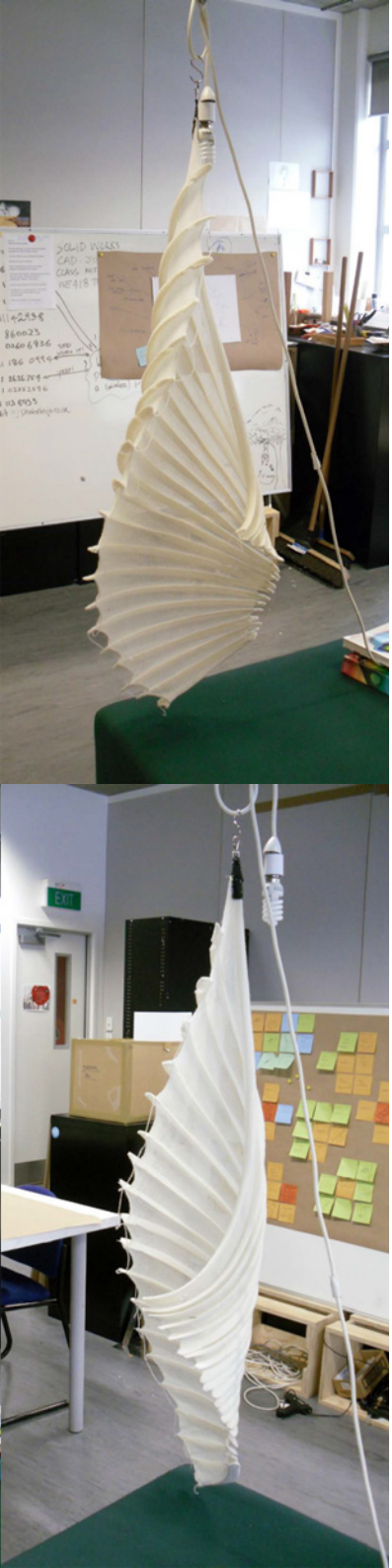
Product / Service	Who	Where	Contact	10	50	100	1000
Electrics							
LED Lamp	Light Technica	46 Barrys Point Road, Takapuna	09 486 7637	30	30	30	30
C.R rapid prototyping	AUT	34 St Paul St, Auckland	09 921 9485	5	5	5	5
Lamp cover rapid prototyping	AUT	34 St Paul St, Auckland	09 921 9485	5	5	5	5
Ceiling rose approved base							
Clear flex cord							
Lamp holder							
Assembly	Eunice Taylor	18 Honan Place, Avondale	09 828 0775	86.37	65.67	62.27	41.81
Shade							
Merino yarn	DEA yarn	12 Prouse Street, Levin, New Zealand	027 556 3098	20	20	20	20
Eyelet	Craft Online New Zealand	22 - 24 Ocean Street, Maroochydore, QLD 5448, Australia	61 7 5479 6788	0.45	0.1	0.07	0.05
Insert eyelet	Canvas Company: machine rent + person	518 Karangahape Rd, Auckland	09 373 3301	2	2	2	2
Laser cutting ribs	Precision Laser Cutting Ltd	53 Huia Road, Otahuhu, Auckland	09 270 3702	Waiting on quote			
Knitting	TDL Lab, AUT	9 Mount St, Auckland City	09 921 9999	20	20	20	20
Acrylic	Mulford Plastics (NZ) Ltd	5 Authur Brown Place, Mt Wellington, Auckland City	info@mulford.com.au	10.5	10.5	9.85	8.15
Inserting ribs	Misc	?		6.7	6.7	6.7	6.7
Packaging / Brand							
Box with graphics including instructions	Forbes Packaging	3a Rothwell Ave, Albany, Auckland	09 414 6690			Waiting on quote	
Quick Brown Box	Quick Brown Box	41 Angle Street, Onehunga		10	8		
Pamphlet	?	?		Waiting on quote			
Stainless Steel wire	W.S. Laurie & Co	Cnr. Beaumont and Pakenham Streets, Westhaven, Auckland	09 303 4033	20	40		
Other							
Crimp	Spotlight	19 Link Drive, Wairau Park, Auckland	09 444 0220	0.05	0.05	0.05	0.05
Crimping the Stainless steel wire 20 p/h	Misc	?		1.35	1.35	1.35	1.35
Hook	\$3 Japan	287 Queen Street, Auckland		0.4	0.4	0.4	0.4
Assembling, putting in box (approx 10 p/h)	Misc	?		1.35	1.35	1.35	1.35
Transportation	?	?		?	?	?	?
Organisation time (ph. calls etc)	?	?		?	?	?	?
Insurance	?	?		?	?	?	?
Hourly wage	?	?		?	?	?	?
				219.17	216.12	164.04	141.86

Connection details











These connection details will be further resolved over the next four weeks.



## Development of the New Range

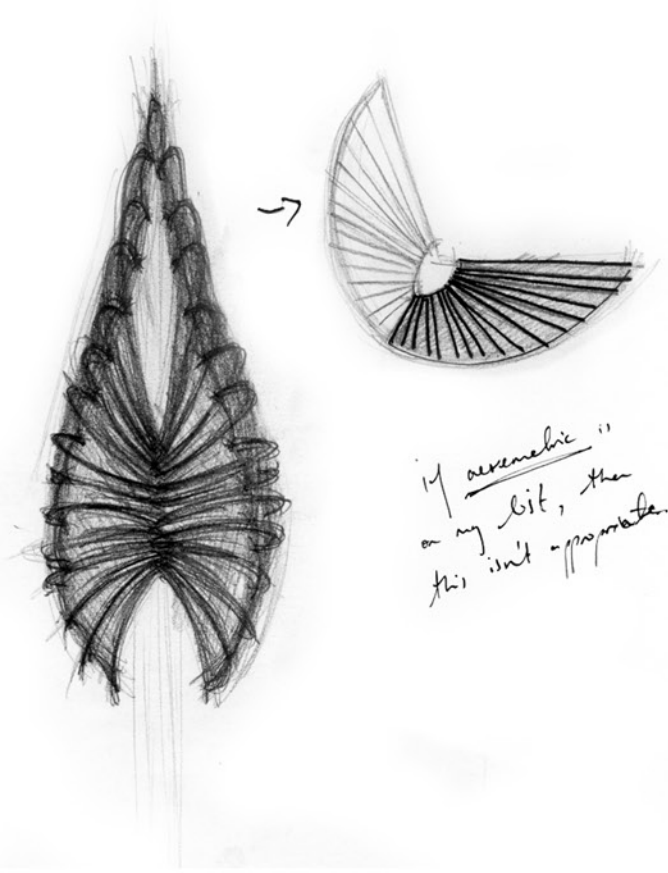


### Initial thoughts

One of my aims is to display a new range at the product design exhibition in November. I cannot build a business on one product, it is necessary that I have other designs that will quickly follow my original one.

Throughout the year I have been considering the next range in the back of my mind. My supervisors stressed the importance of sketching new ideas, revisiting old ones and thinking ahead while I worked on the original light. As I did not have time to focus on one light at a time, I had to learn to think in a less linear way. I embraced this way of working and designing the next range became an enjoyable form of ‘productive procrastination’. It would give me a break from working on the original light, which stopped me feeling stagnant.

My initial ideas were inspired by the wings of New Zealand birds. In a brainstorming session with other postgraduates, the feedback I received was negative. They preferred the ambiguous nature of the original form. They were against bringing colour into the shape fearing it would lose its simplicity.

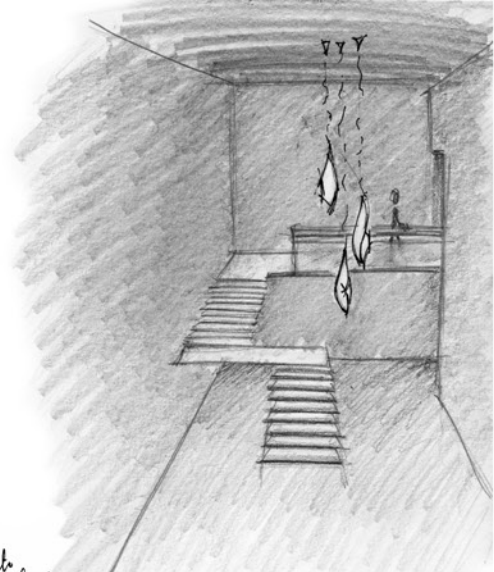
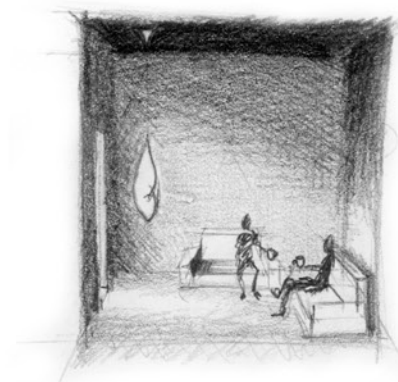


if asymmetric is  
on my list, then  
this isn't appropriate.

While this shape has potential, I think I still prefer  
the simple, but more basic. What I learnt from this  
form however is that it might be good to make 2  
versions of the small form, mirror images of one another.  
When put together, ~~it~~ it'll make some really beautiful  
forms, as they rotate.







What are the key ideas  
AESTHETICALLY  
THAT I want to  
take from my form  
and REINTERPRET?

- Calm, therapeutic movement
- nothing too harsh or abrupt
- in a calm, relaxing movement
- feels like the ribs are stretching, flexing, in a calm, relaxing movement



do I want to engage this? ...



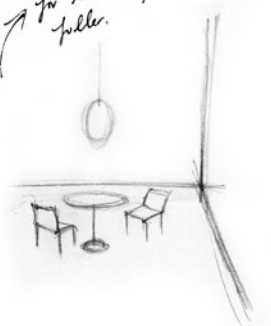
less ribs = more dramatic

... by making them thicker.

... by excluding the ribs otherwise

- Sweeping movement - dramatic lines that your eye follows as it rotates
- Rotation ... it's different from every side. Flow.
- elegant, simple. not overdone
- ppl are surprised it's so light.
- effortless. Light. floating but with balance.
- soft yet structured.

a lot of situations call for something stronger, fuller.



watching it already rotate is one of the most effective things about this product, I think. This makes me think they will have to be repeated.

do I need to make something large, for large spaces? Am I right taking the next two smaller?

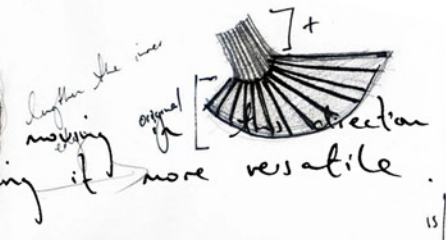
More express ... without looking like a screen



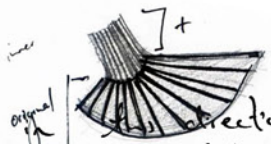
Army for different, new forms of re-interpretations of the event form.

One way of working is to get the material first then develop it from there (eg with sketching), like I did last year. I think that now, knowing what I know about the form, the material etc, it's good to start with the drawing. I can then start knitting with something to give form.

like the angle more extreme

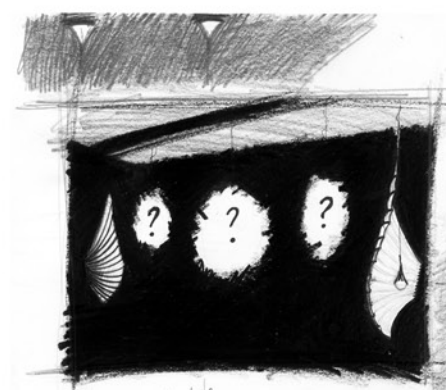


lengthen the ribs making original for this direction.



more versatile.

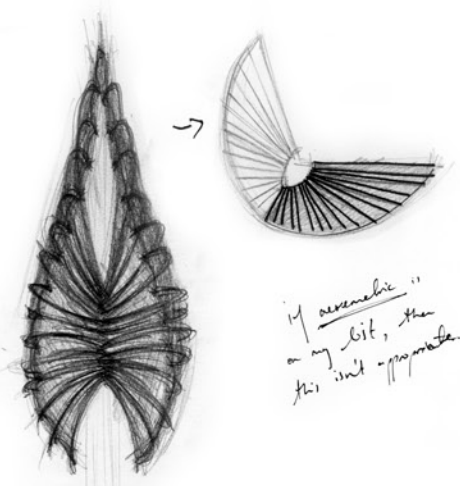
15/02/2012



Other exhibition (NY?) What would my version of this be?



I like the way Paul described the cake being as an anchor - it could act as a fulcrum for the feet to this decorative shape.

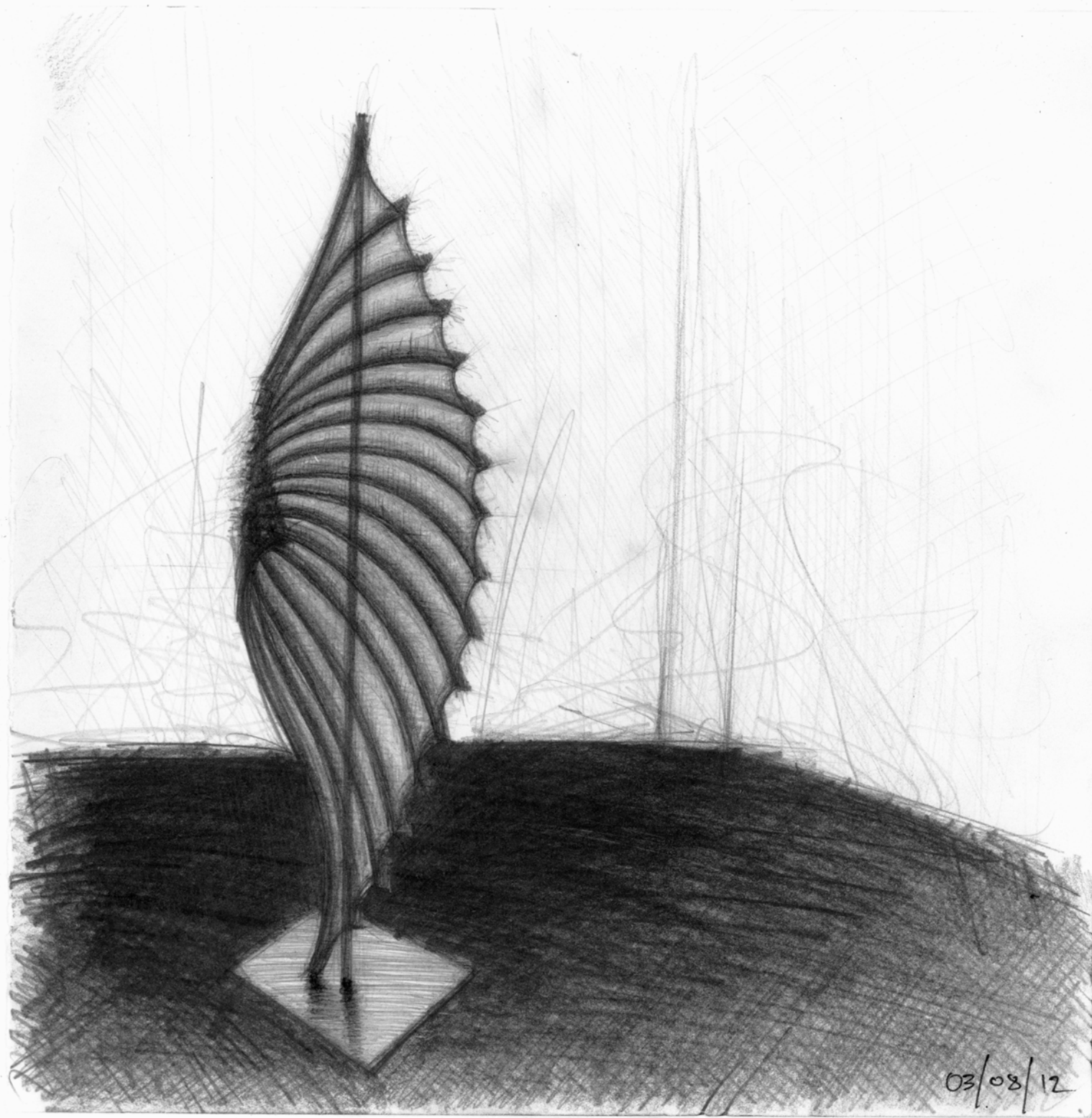


if assembly "on my list, then this isn't appropriate"

15/02/2012

Scaling - I'm keeping everything down - I'm really happy about the form while making it more versatile.



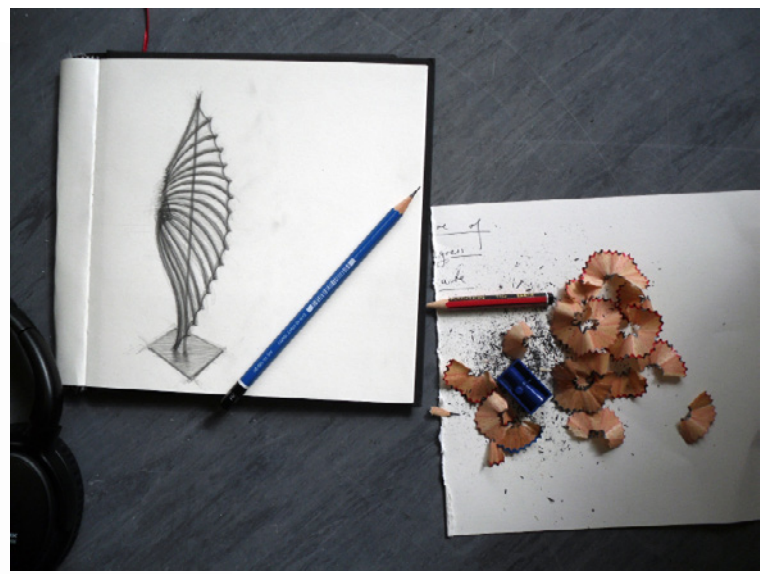


↳ sketching mock-ups

We were talking last supervision session about how sketches can be too reduced - they're sometimes not entirely honest.

Andrew suggested (as a compromise) that I create physical mock-ups then sketch from them. He thought this would be better as I'd learn more about them before I started drawing.

Though this is a time consuming task (his sketch took around two hours) I find that it's a really effective way of reflecting on my work. Drawing helps you really look at the form and once you've it when I find a point I want to correct in my drawing, I know its something I need to fix (on the form).







I think the proportions of this <sup>version</sup> would work well as a table lamp (assumption). ~ It would have to be scaled down by 50%. I don't think it would be effective as a floor lamp. It's low to the ground, so to be most effective it needs to be higher where it can catch the daylight and be viewed straight on (ideal).

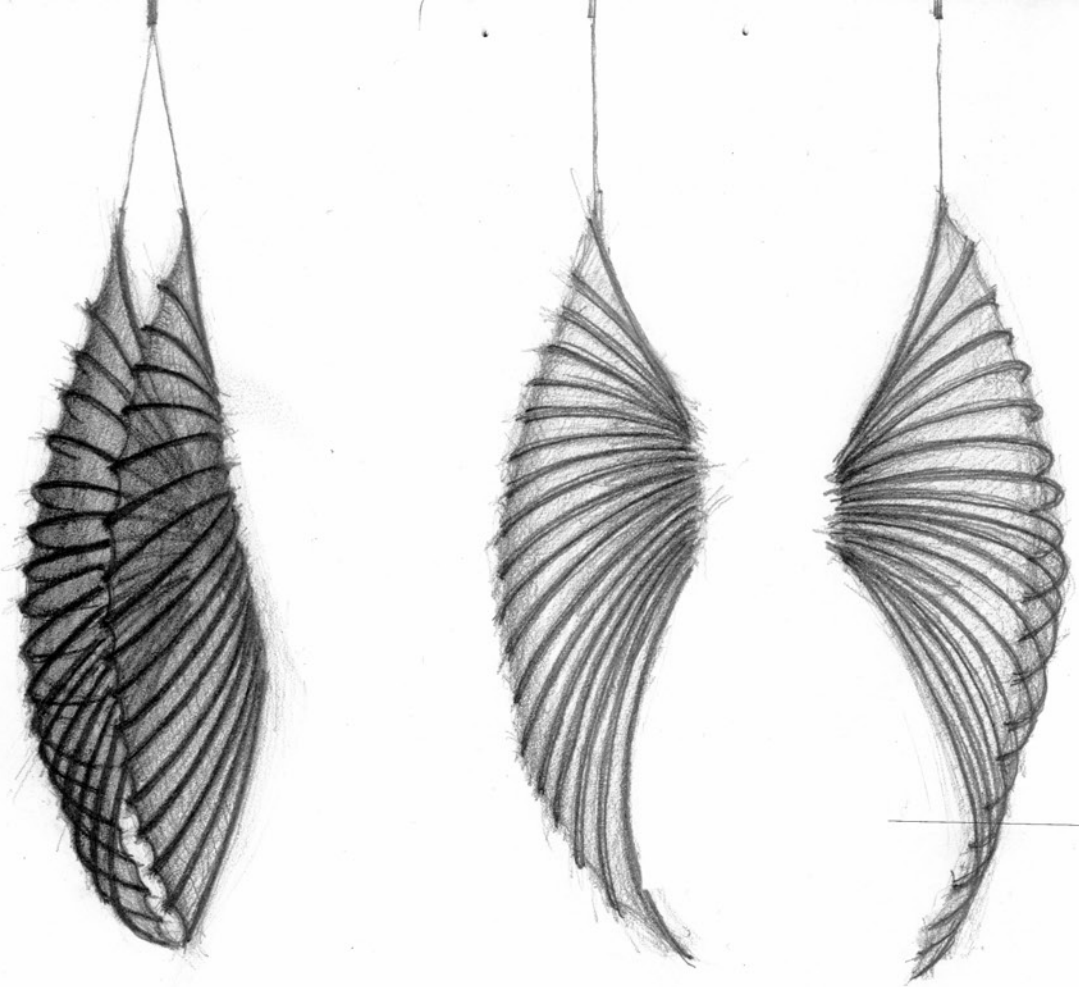


Thinking about height, what is the most effective height for a floor lamp made with this size pleated form? Too low to the ground and you won't get the full effect - it won't catch the light and it'll be seen from an awkward angle. I think it needs to be eye-level, or a little higher. The picture on the right felt like it was getting close. →

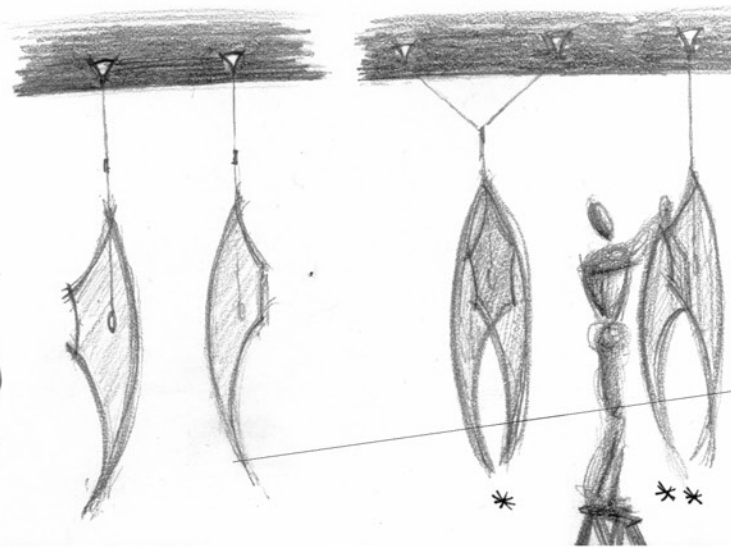




vic feeling of volume on this side →

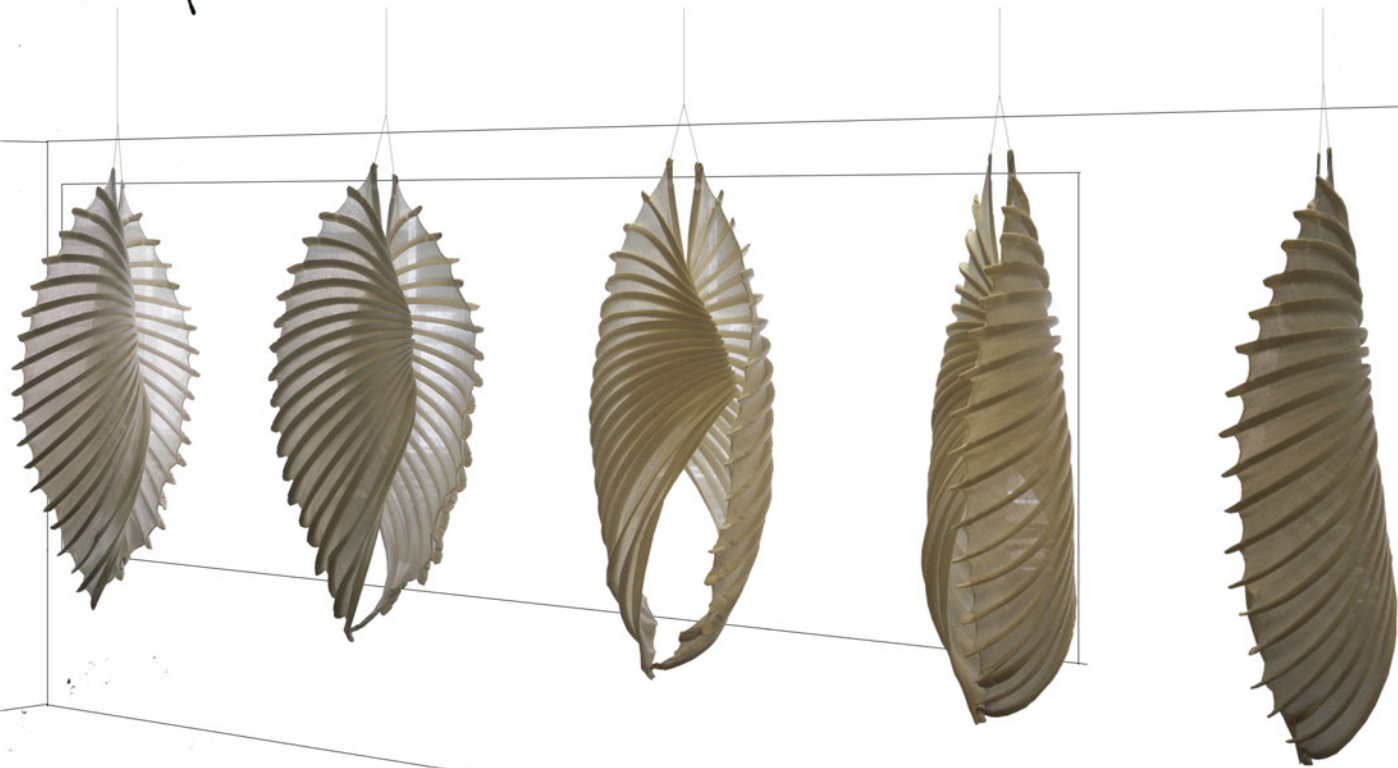


So I do give the option of joining the forms, 'complete' them. This would have the advantage of also hiding the glare of the LED lamp....



\*\* Definitely the more elegant solution... A second knitted form can be stacked - clipped on.

Of all the shape combinations I tried, this was the most effective one. Something I think is really important is how the form/forms look when they rotate in the breeze. This combination creates a really nice effect as the width of the piece changes and appears to breathe.





SDC10941.JPG



SDC10949.JPG



SDC10959.JPG



SDC10962.JPG



SDC10963.JPG



SDC10964.JPG



SDC10966.JPG



SDC10967.JPG



SDC10968.JPG



SDC10969.JPG



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SDC10972.JPG



SDC10973.JPG



SDC10974.JPG



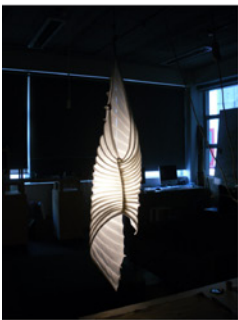
SDC10975.JPG



SDC10976.JPG



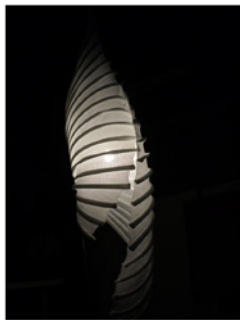
SDC10977.JPG



SDC10969.JPG



SDC10974.JPG



SDC10978.JPG



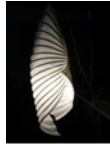
SDC10985.JPG



SDC10991.JPG



SDC10996.JPG



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SDC11000.JPG



SDC11001.JPG



SDC11002.JPG



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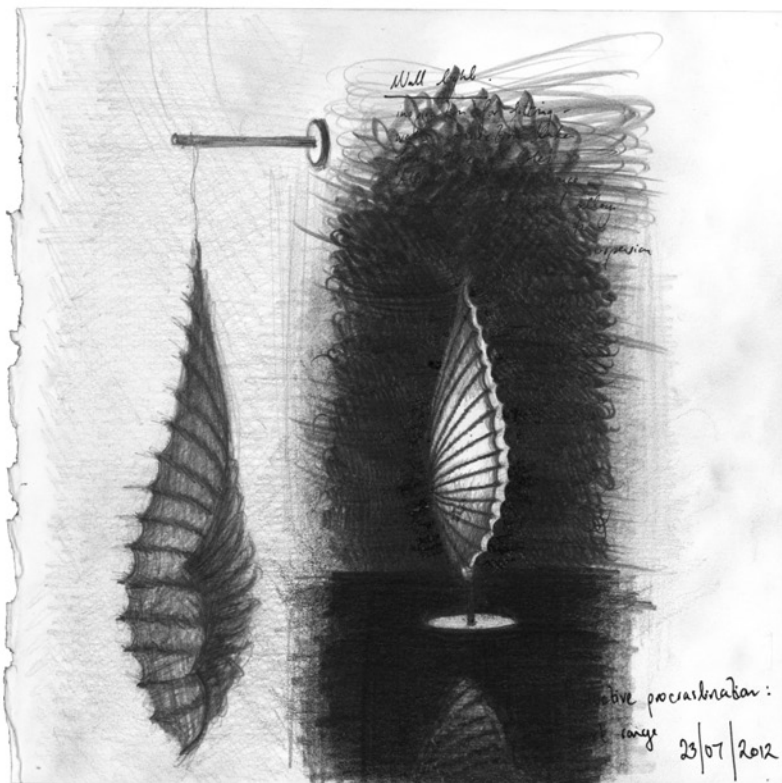
SDC11009.JPG



PRODUCTIVE PROCRASTINATION  
FOR ME

=

DOCUMENTATION &  
DESIGNING THE NEXT RANGE







(25 | 08 | 19) Now that the original shape has changed ~ perhaps this, smaller, simplified version is enough of a reinterpretation?



In the last meeting, Steve talked about the need to find a way of quickly prototyping the next forms. This method was good: sticking the original kart, cutting away at it and sewing. It was good to have a steady print







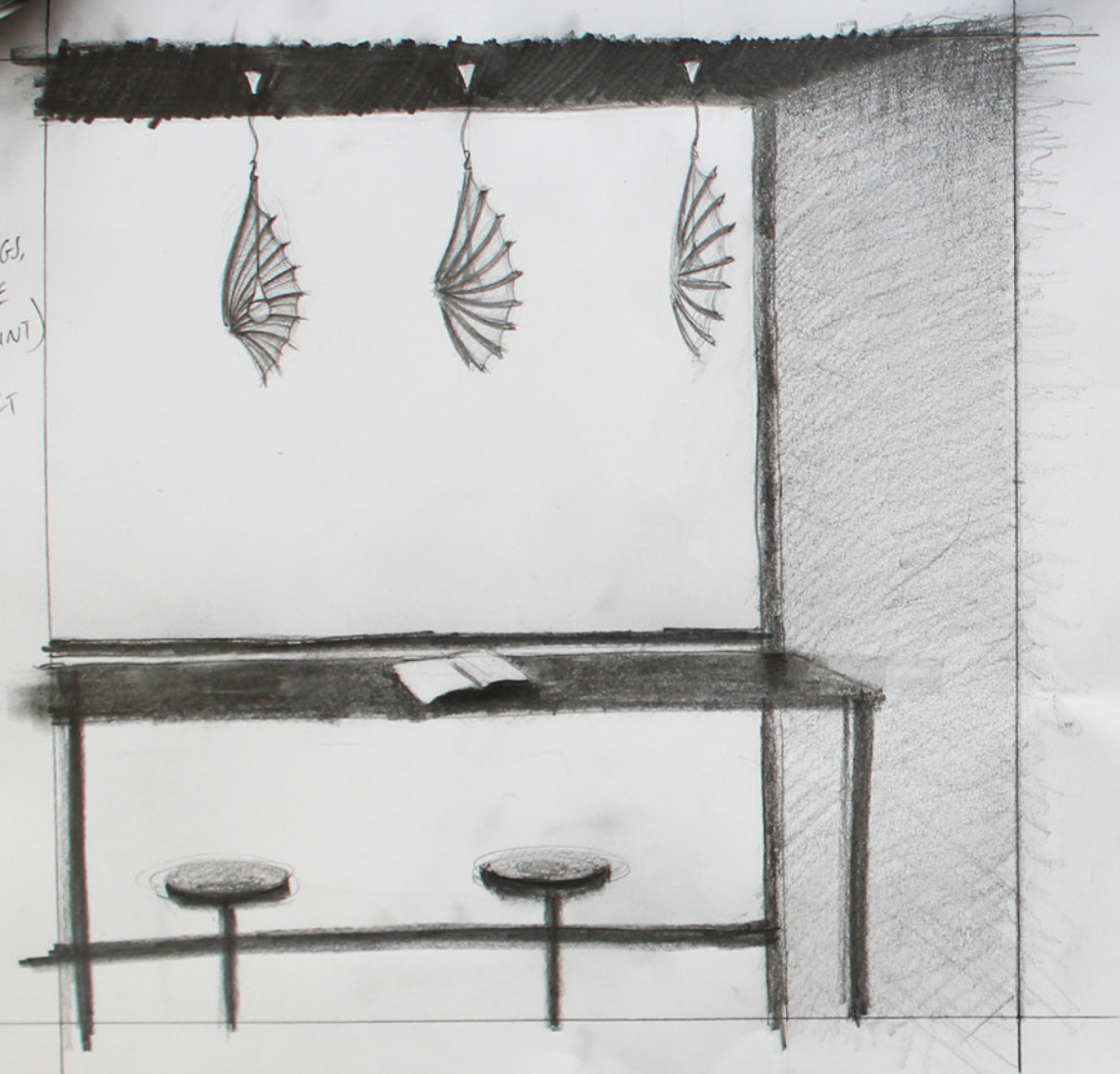
An interview with a retailer and exporter of high-end New Zealand design confirmed that to be working on the next light fitting was very important. They said that ideally while one product is in the launch stage, the next should be in production. For lighting this is particularly important when selling to the architectural market. They need to have confidence that more designs will follow shortly.

I did not tell this expert that I had already designed a small version of my fitting. It was reassuring therefore when she suggested that I make a miniature version. I showed her sketches and photos of the mock ups for this new design. While I gave away more information, I also received more feedback and as they got excited about the potential of my next product which was encouraging.



DAYLIGHT =

CLEAN,  
WHITE FITTINGS,  
GLASS, OVERSIZE  
LAMP (FLUORESCENT)  
STRUCTURED & SOFT  
CLEAN, SHARP  
COOL, CALM,  
THERAPEUTIC



TRANSFORMATION →

EVENING =

CONTRAST,  
WARM, ORANGE  
LIGHT, GLOW,

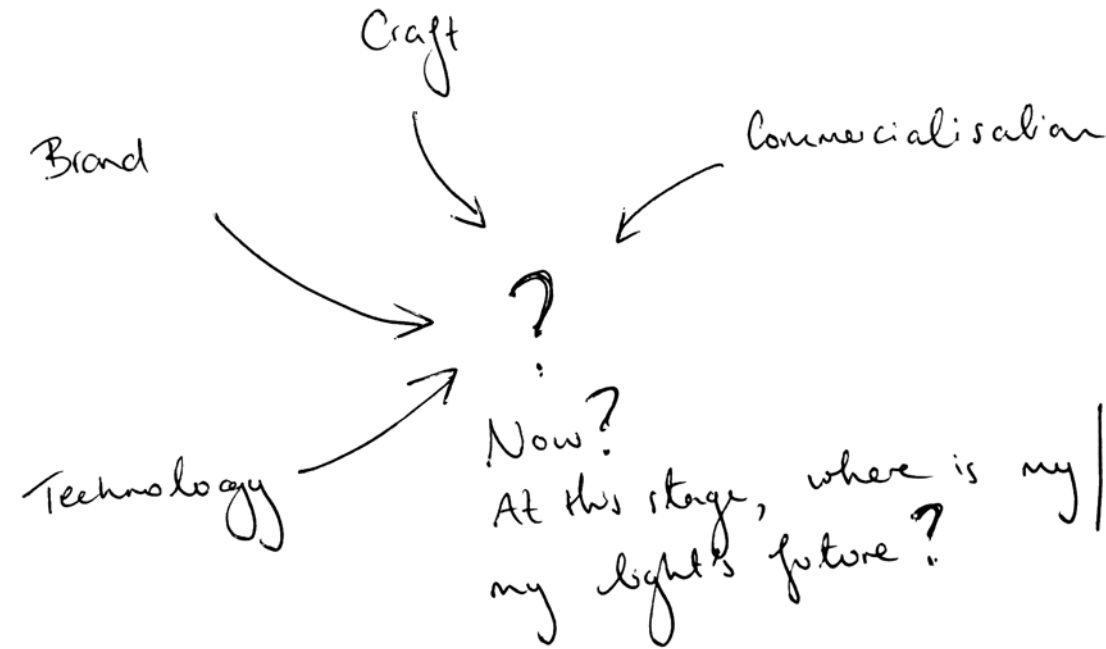


Also, having  
different IMAGE  
forms will  
create really  
new moments as  
they rotate:





# Final Discussion



I discussed how as a young designer in my final year of university, it is important that I discover where my design future lies. My aim was to discover what opportunities there were for designers like myself, who have both employed high-technologies and moved from a craft background.

### Is there a market for them?

At our university exhibition and Art in the Dark in November last year, I received positive feedback for my light fittings. This feedback came from the public, potential buyers, and academic experts. It was with regards to both the aesthetics and its potential as a commercial product. Without this positive feedback, I would have been unwise undertake this journey this year. I have found that it is possible to fall in love with something you have designed; it is important to step back and see whether it has potential commercially. In the initial stage of the design process you have to be close to your work but there must be a point where you step back, otherwise you are making art.

The CEO Summit was another opportunity for feedback this year. I received positive feedback from retail, industry, academic and commercialisation experts. This gives me the confidence to continue working on my product however, there are still many barriers.

### Given my costs, can I make a living from this?

My interview with the high-end retailer and commercialisation experts revealed that my costs are still too high. At this stage, earning a living from this piece alone is not an option.

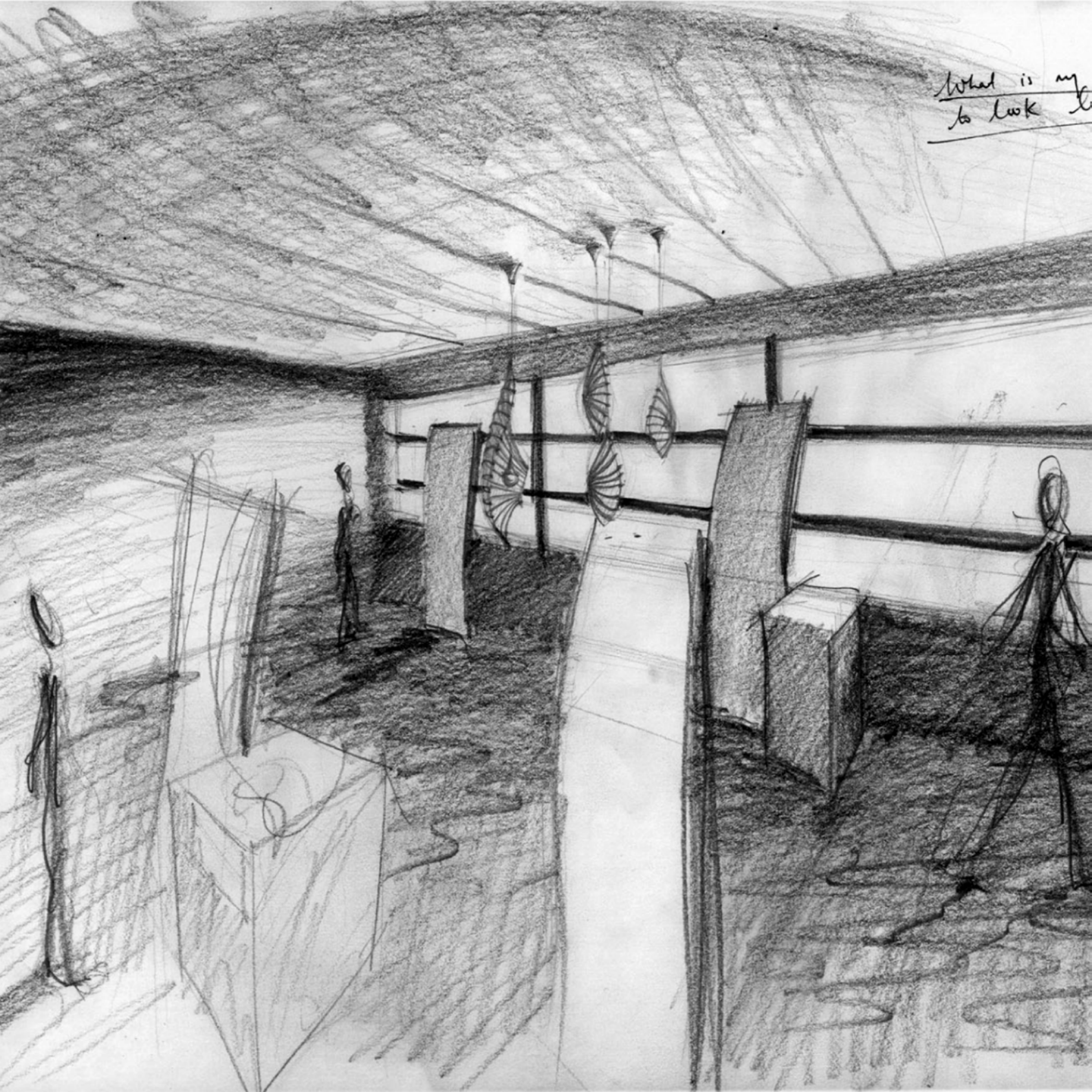
It would be very unlikely for a designer like me to make a living from one successful product. From researching my case studies and observing other designers, I have learned that it takes years to become established. My work this year has shown me how long it takes to get a product into the market. There are a number of barriers that I did not expect. I talked about my visits to lighting and manufacture experts. No one had the solutions to my problem. Instead, I had to find solutions myself and compromise. At the beginning of the year, I expected to simply hand my light to a manufacturer who would have all the answers.

One of the major barriers for me, and I assume other crafts-people, is idealism. As the designer-maker, I have a vision of what my product will look like. It is not unbearable to spend hours, days or months trying materialise it. This artistic side of my work is extremely important to me. However, I have not chosen the field of fine art. I am making a production piece and so I have had to compromise and balance this side with pragmatism.

On reflection, it was critical this year that I was surrounded by people who are more pragmatic than me. Without this, I do not believe that I could strike the balance between idealism and pragmatism that is required for the niche I am trying to enter. There were many disagreements to do with the small details of my light. Often I would keep pushing for my idea, working on it for far too long, only to compromise later. When I finally did compromise, the

- ① Is there a market for them?
- ② Given my costs, can I make a living from this? Is there enough demand?
- ③ Do I have the support I need?
- ④ Am I driven enough?





thing that I was fighting for, that seemed to me of huge importance, did not seem so significant. Through these experiences, I am learning to be critical of my thoughts and pick my battles. I have to be very wary of my tendency to spend too long on a detail that no one else will notice. In saying this, I am very conscious that it is the artistic, idealistic side that drives me and many other crafts-people. I want to work on improving the things I am weaker at (commercial, business knowledge, pragmatism) without compromising my strengths (artistic, idealism).

### **Do I have the support I need?**

Currently I have the support I need. I am still at University. I will have to be strategic if I want this to be the case in the future. This year has taught me about my current strengths and weaknesses. I feel confident in my skills aesthetically. I am confident that with a pencil, paper and material I could design any number of beautiful and innovative light fittings. I am not so confident with more pragmatic things such as business and technology (in particular, electronics). I have talked about how I do not want to compromise my artistic side. Taking this into consideration, I think that in the future I would ideally like to find a business partner/investor to help me commercialise this lighting range and future ones. The first advantage of this route is that I would have more control over my design than if I sold it to a retailer or manufacturer. A wisely chosen partner would provide me with the constraints that I need (e.g. time frames) while having empathy and appreciation for the artistic side.

### **Do I have enough drive?**

I will not know how challenging it is to make a living from my designs until I experience it. I will assume that it requires a lot of drive. Receiving positive feedback for something that was initially just an idea in your head is very exciting and satisfying. There are a lot of frustrating moments in the design process but they make these moments more enjoyable. I enjoy making and designing and really want to do this as a career, so with the information I have now, I know I am driven enough to commercialise this light and more after that.

### **What will be at the exhibition in November?**

Over the next four weeks I will finalise the details of the original form. Packaging will display the final brand. The light fitting will be fully costed. The original light will be accompanied by a cluster of 3 smaller fittings. They will be merino and the structure will be made with transparent cell-cast acrylic. All the connections and details will be fully resolved. I have yet to decide whether I will display the two different colours. I think it would be more effective to choose one, either the natural or the white.

For each craftsperson, taking their product from craft to design and employing high-technology will be a unique and personal journey. I have learned to appreciate the constraints as they can drive creativity. I have found the experience challenging but also enjoyable.



### Postscript

The solution for the structure was transparent, laser cut acrylic.

Following AUT's Art and Design exhibition, I showed Kotuku in Shear Brilliance and Wool House, both Campaign for Wool initiatives. I also hung the lights in Essenze in Parnell for feedback.

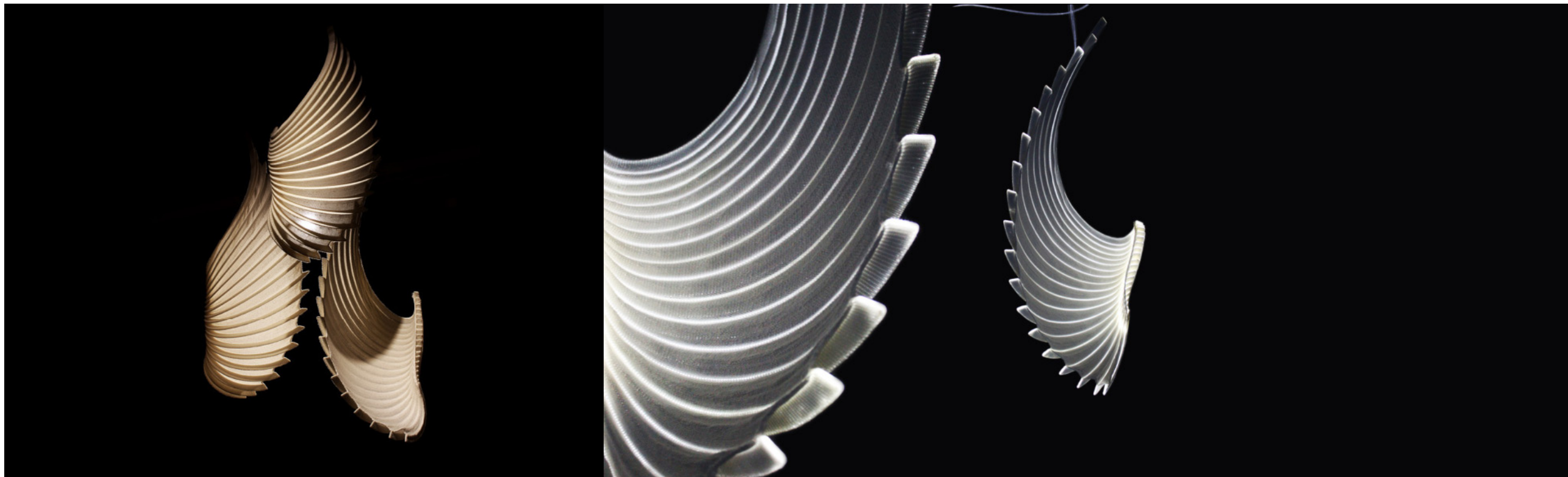


AD12 Art and Design exhibition  
November, 2012









Hanging in the Wool House  
exhibition at Somerset house,  
London. March 2013



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