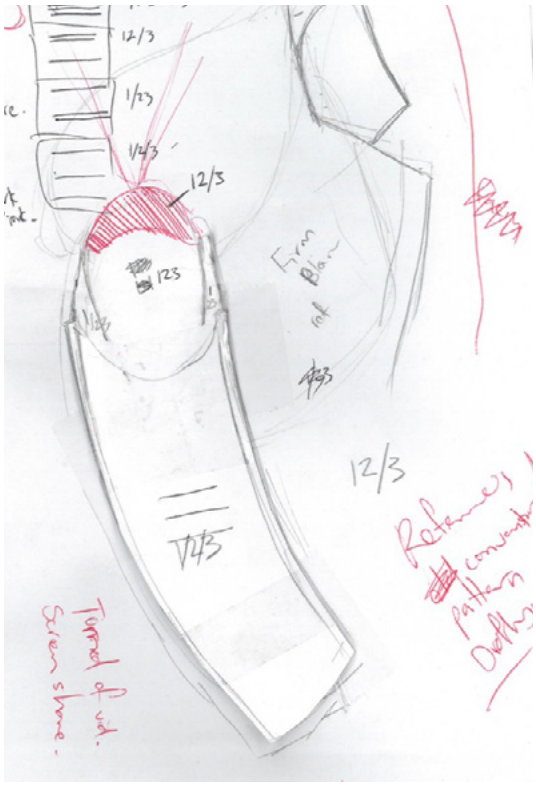
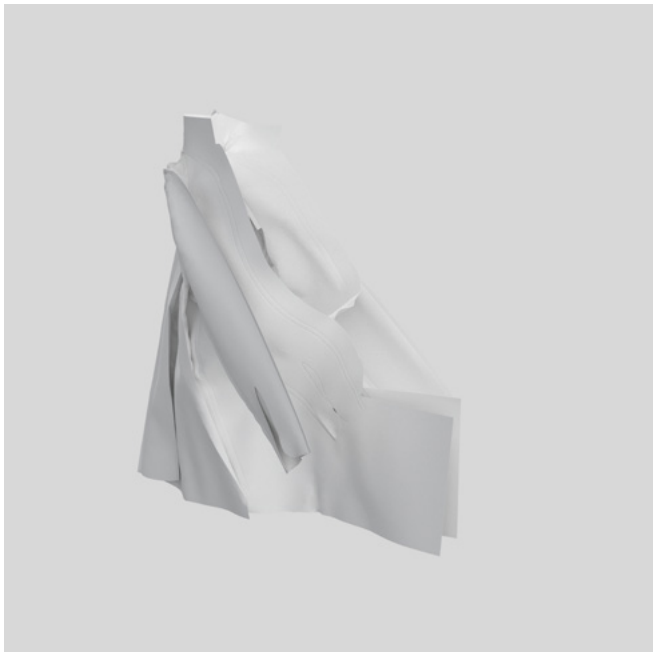
HOLLY MCQUILLAN



ZERO WASTE SYSTEMS THINKING

PhD: 2017 - present



Woven Textile-Forms:
Zero Waste Whole Garment Weaving

The development of garment forms that can be woven on the loom begins in digital 3D software CLO3D. Here the textile - form relationship is established.

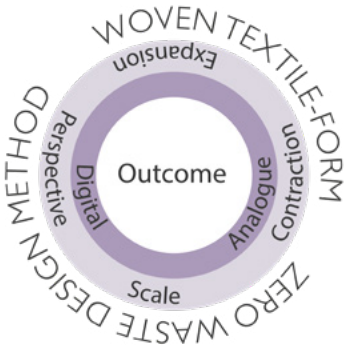
My PhD developed methods that facilitate the weaving of whole garments for the context of microfactories.

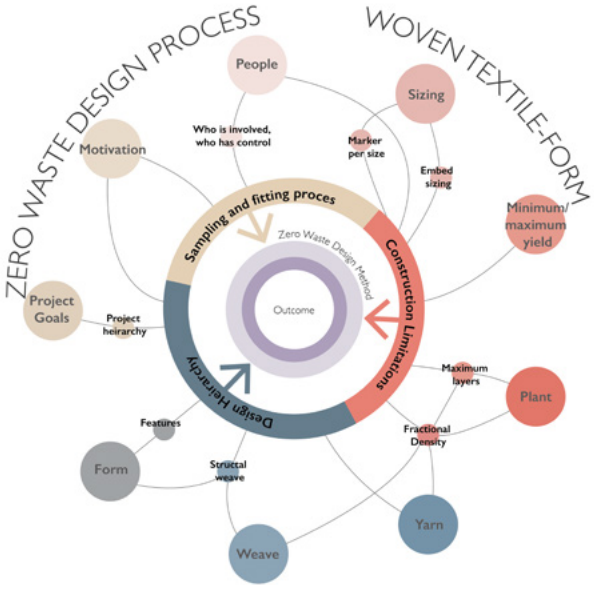
Click to open video in browser

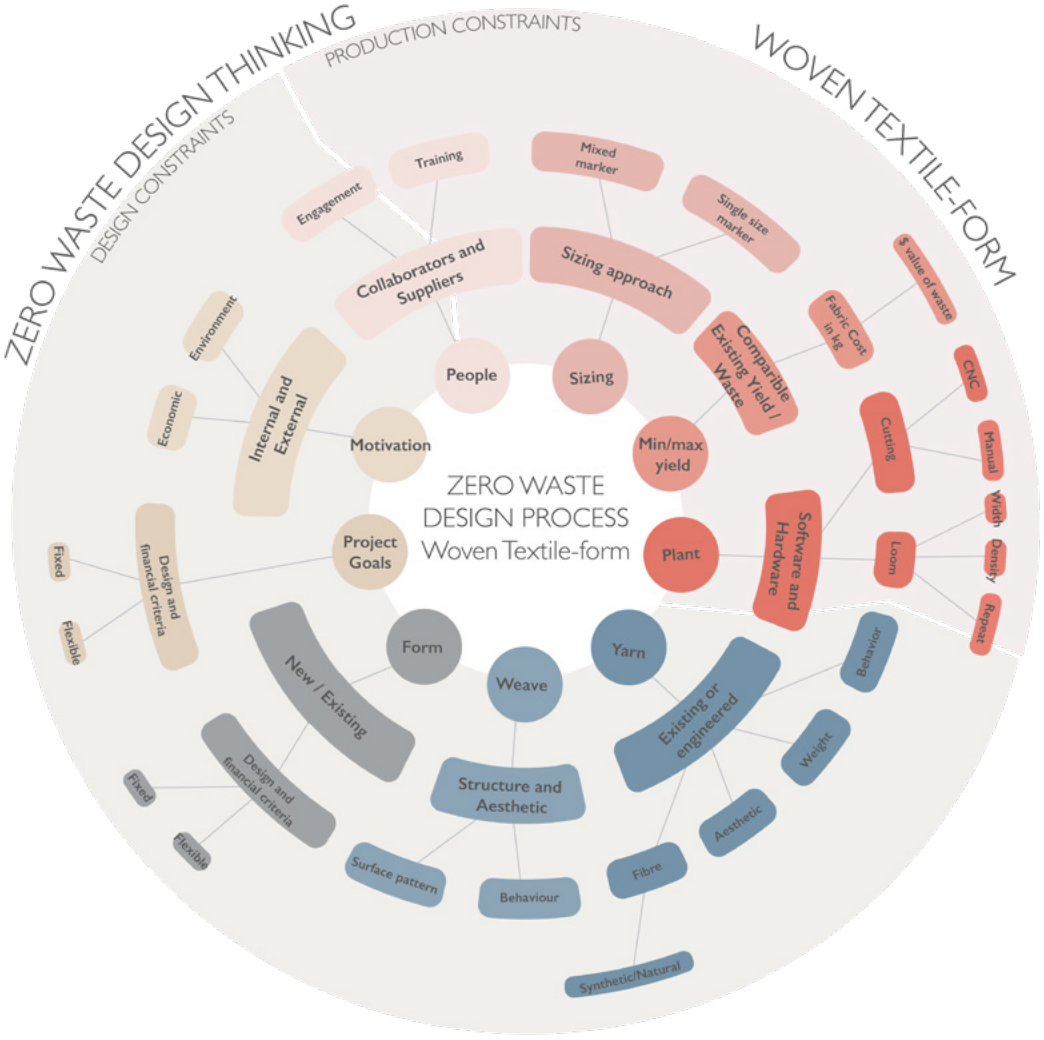
Click to open video in browser

Videos: Using a hybrid design process which designs both the textile structure and the form simultaneously, these examples embody the holistic transformation required for industries that design and produce textile-based form. Applicable to any field that utilises woven textiles, these methods provide tools for the production of woven textile-forms in a microfactory context.

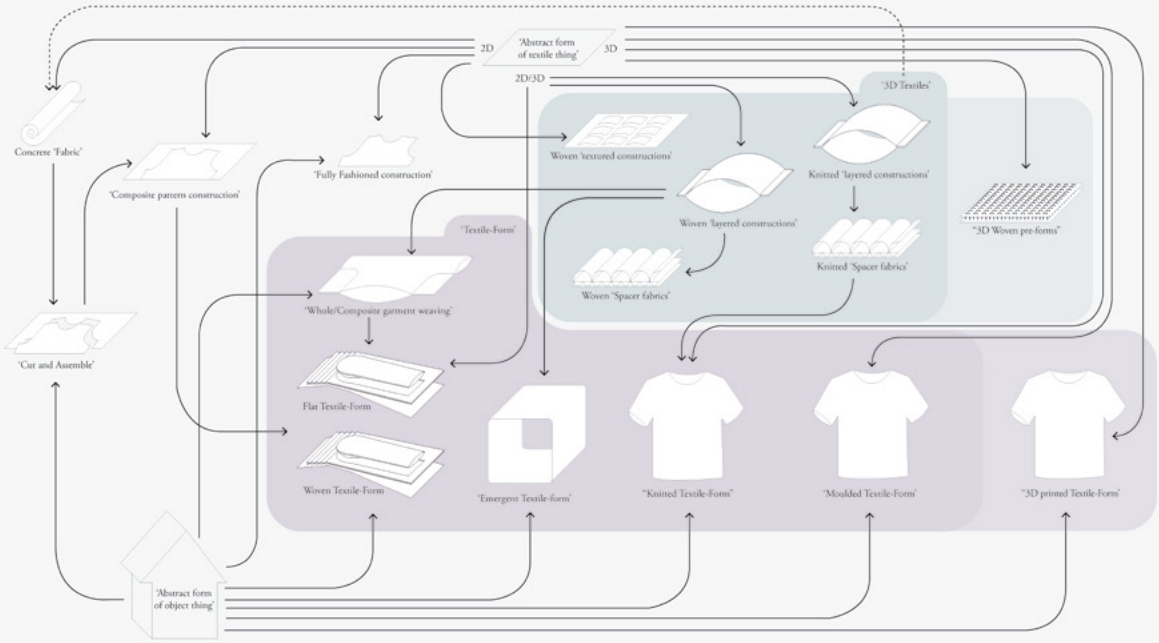
Utilising a reflective and experimental research approach, paired with thematic analysis as well as dynamic research sketching and giga-mapping, these models were developed to articulate the holistic relationship between design practice and thinking in the context of zero waste systems thinking.



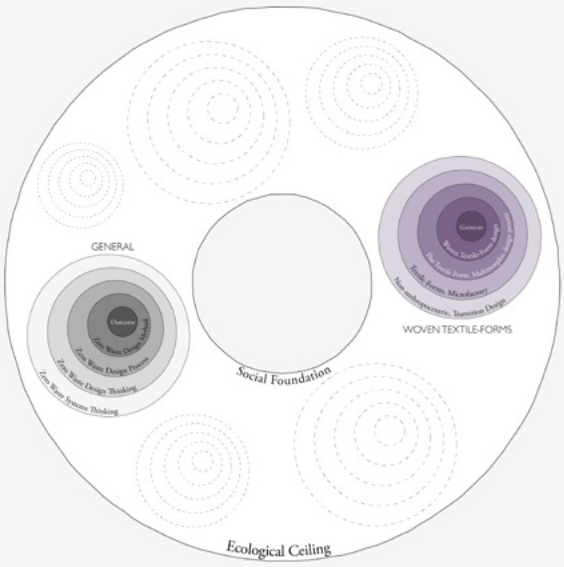




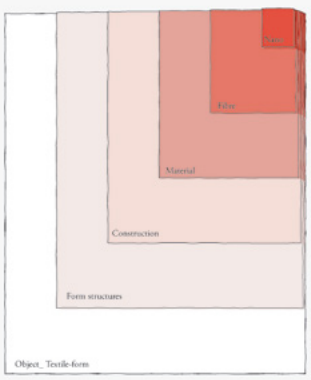
TEXTILE THINGS



ZERO WASTE SYSTEMS THINKING



TEXTILE-FORM NEST



TEXTILE-FORM

Flat Textile-Form

Method: Flattening

Woven Textile-Form
Weaving as construction
Matter: Yarn

Printing Textile-Form
Printing as construction
Matter: fabric

Lazerline Textile-Form
Lazer bonding and cutting
Matter: non-woven fabric

Other Textile-Form
Other flat-bed construction processes
Matter: other

Knitted Textile-Form

Method: 3D knit design

3D Knitwear
Knitting as Construction
Matter: Yarn

Whole Garment Knitwear
WholeGarment Construction
Matter: Yarn

3D Textile-Form

Method: Sculpting

Moulded Fibre Textile-Form
Moulding as construction
Matter: Fibre

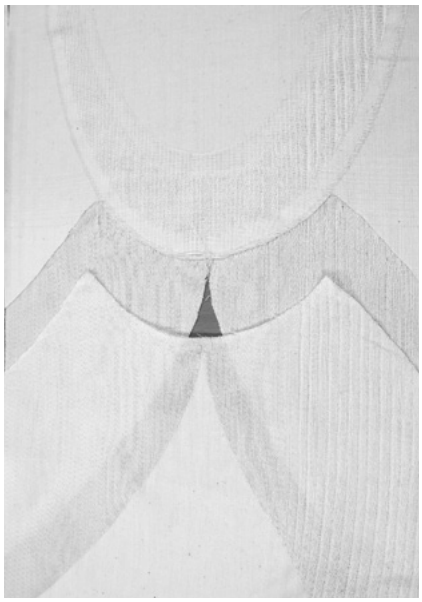
3D Printed Textile-Form
3D sintering/extruding
Matter: Various

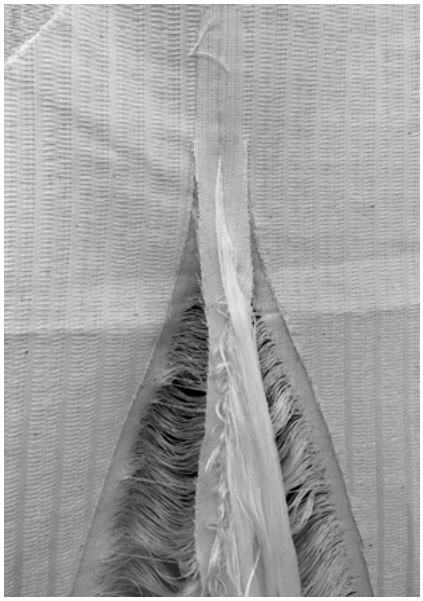
CRITICAL TEXTILE TOPOLOGIES

Collabroation for PhD: 2019 - 2020

Lead Researcher:

Reversed crafting and digital flattening of form for weaving.



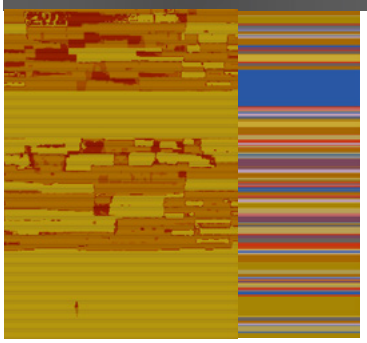


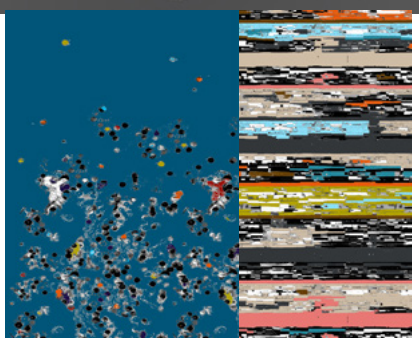
Separating layers in formable weave.

Digitally produced form in scale 1:1 in polystyrene.

Dress, three stages of heat forming.

The woven outcomes can be modified over their life through the application of heat - this example was woven the same as others exampees but was shrunk in a domestic dryer

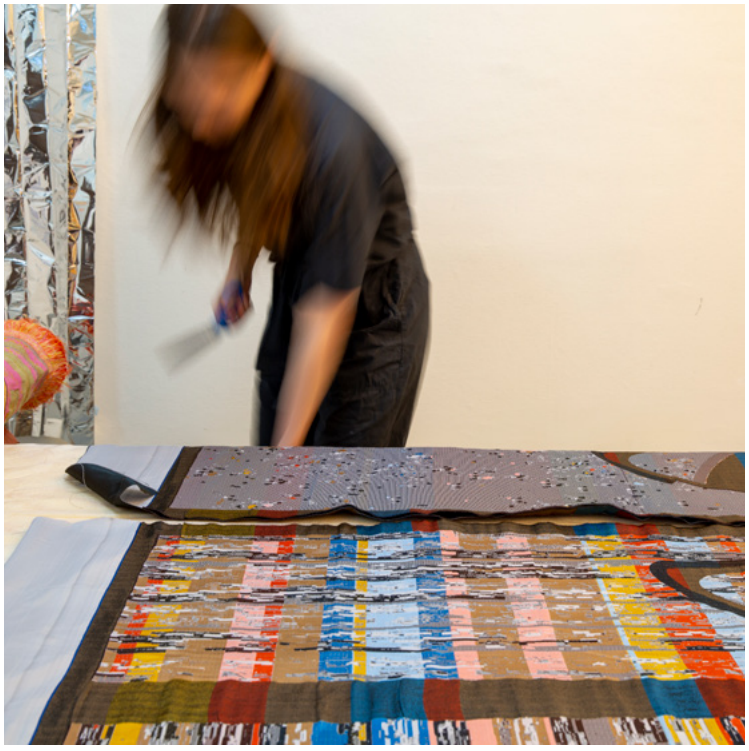




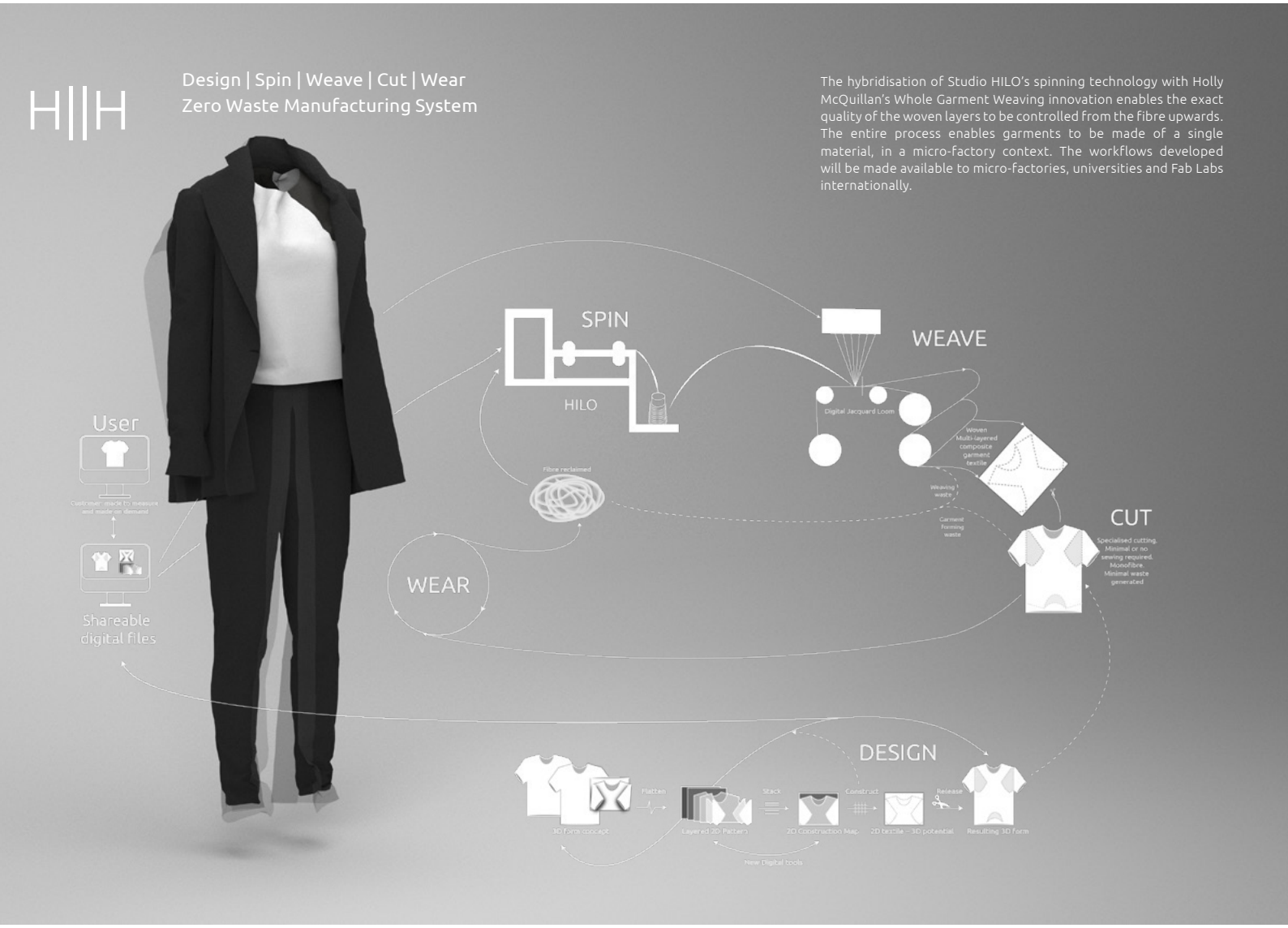
PLANET CITY COMMISSION

PhD and Melbourne Trienial: 2020

Lead Researcher



Three costumes were commissioned by Bafta nominated, LA based Liam Young for his speculative futures film *Planet City* which will show at the Melbbourne Triennial in December 2020. Ane Crabtree, who was costume designer for Westworld and Handmaids Tale was costume director. The design and production process developed in Critical Textile Topologies was used to design and make each piece, which is woven almost entirely complete on the loom. Collaborations with Dutch weaving mill EE Exclusives, and HDK in Gothenburg enabled the project to complete, even though it was undertaken during the height of the european Coronavirus lockdowns.



H||H COLLABORATION

2019-ongoing
WORTH 3rd Call winner 2020

H||H Design | Spin | Weave | Cut | Wear
Zero Waste Manufacturing System

Design | Spin

Established in 2018, Studio HILO have since developed diverse open-source prototypes for digital spinning systems. Their soft- and hardware allow professionals to adapt industrial yarn productions to their needs, making production more local and flexible.

The HILO hardware is a compact spinning machine which can be installed in any textile workshop. The machine is controlled by the user-friendly HILO software. It allows users to translate digital patterns (such as an image) into different yarn properties and design customized yarn with unique tactile and aesthetic qualities.

The innovative spinning technology will provide a broad experience in sustainable fibres and a customized yarn system that defines the final appearance of the textile collection.

Weave | Cut | Wear

Holly McQuillan developed methods for designing garments which can be constructed in 2D and when cut become 3D forms that the body can wear.

In digital 3D software McQuillan stacks in layers the garment patterns that make the forms, positioning each so that no waste in made in the process. The layers are able to be then woven on a standard digital jacquard loom, emerging as a flat textile with the 3D form embedded inside – a kind of Whole Garment Weaving. Once woven the textile needs only be cut – and in the case of the top shown, a small amount of stitching – and the garment is complete.

This process is a radical departure from conventional garment design and construction, which usually requires many different steps and hands to make each piece.

Design | Spin | Weave | Cut | Wear

Hybridising these two process means the designer has complete control over the material expressions of both the garment and textile. Additionally no yarn of fabric waste is created as each component only produces what is needed

H||H Design | Spin | Weave | Cut | Wear
Zero Waste Manufacturing System

The H||H collection (top, trousers, jacket) presents the proof-of-concept for a new sustainable design and manufacturing method: The H|H Zero Waste Manufacturing System.

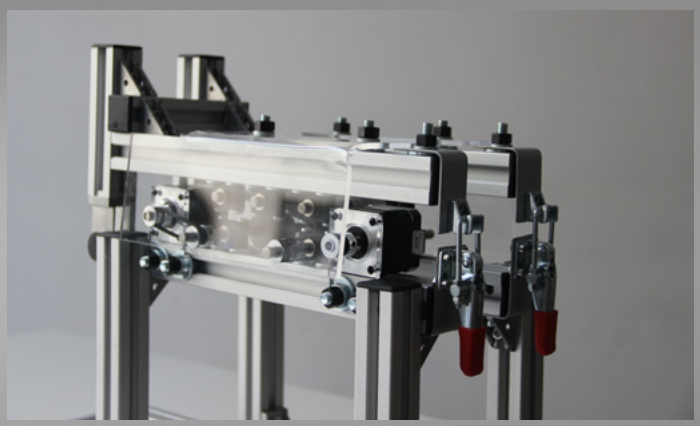
The innovation in the H|H Zero Waste Manufacturing System lies in the integration of two different textile technologies (spinning and weaving) in one zero waste whole garment production process. This projects aims at changing existing textile production infrastructures through a completely new design workflow.

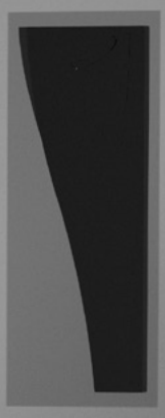
This new workflow includes the digital design of the garments with different software tools, yarn that is engineered to the designer's specification with open hardware machines and a 3-D woven garment that is made with almost no sewing or waste.

We call this workflow: Design | Spin | Weave | Cut | Wear.

Key customers are fashion designers, makers and technical researchers from industry that will benefit from a customizable digital design process that is highly flexible and offers a shortened lead-time through local manufacturing and reduction of waste and budget.

By integrating the H|H System with local Fab Labs, maker-spaces and in the growing market of micro-factories we will support skills continuation and encourage community engagement in the making of more





sustainable garments. The integration within research organizations, in particular those exploring notions of Sustainable Cities in response to the UN Sustainable development goals, will help us to implement the H|H System on a political level for Europe's industry.

The European textile industry is looking for sustainable new production systems, particularly those which add value in a high wage economy. Automation enables more garment production to remain in Europe in times of industries moving away. 52% of garments are woven, but we have few solutions for woven garments in small production contexts, such as microfactories. Digital samples can be used instead of manufactured sample garments at POS – reducing overproduction through made-to-order yarn and textile-garments. Reshoring production enables better transparency: the local industry and society are better placed to be able to address the production issues which may arise.

A key marketing strategy will be over a period of time, to extend by entering into strategic collaborations with specific market players and also the suppliers. Suppliers are local manufacturers for fibers, weaving labs, CLO3D and the Do Tank at Science Park Boras. Future collaborations will be with Jacquard weaving machine suppliers to develop new machine integrations.

This is primarily a B2B exchange. As such attending technology and design fairs to promote our Zero Waste Manufacturing System will be crucial to building awareness. Additionally we will utilize social media to promote our work, enabling us to connect with innovative thinkers in the field of sustainable textiles and fashion innovation.

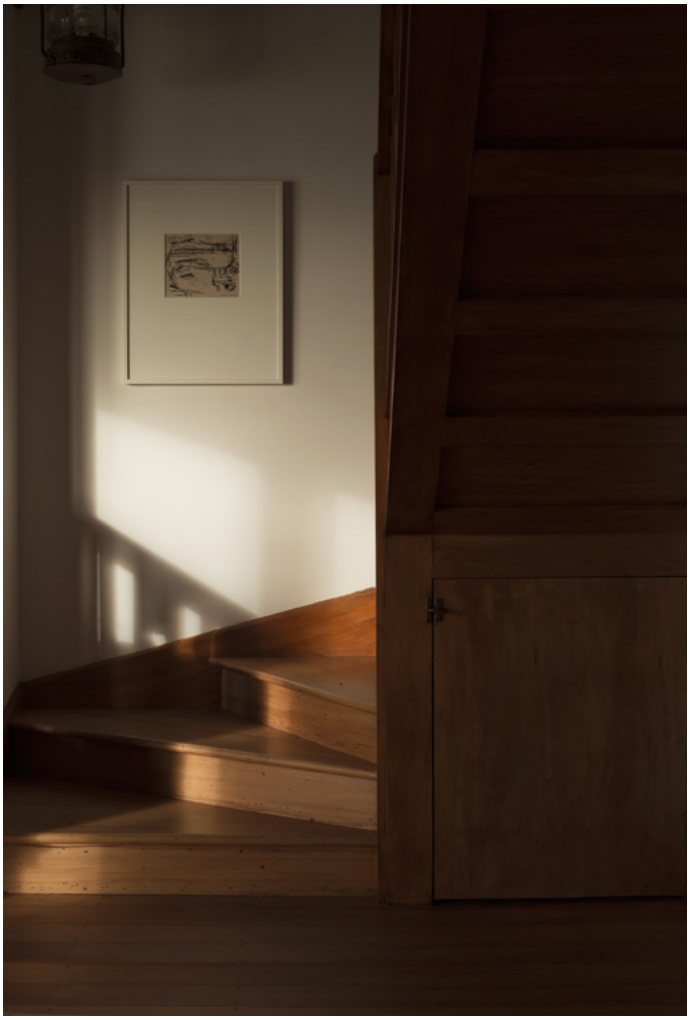
Revenue will be generated by selling workshops and consultations for workflow, technologies and machines of the H|H Zero Waste Manufacturing System and supervise its integration in the existing manufacturing environments. The developed garment prototypes will act as sales tool for the H|H System.

MAKEUSE

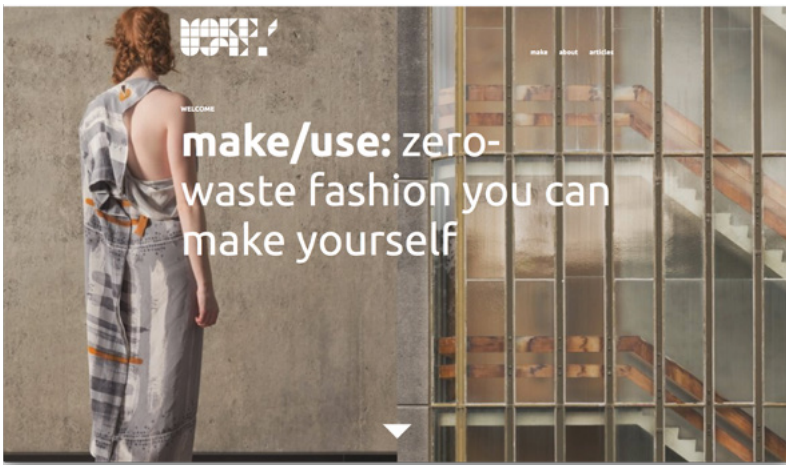
Lead Researcher: 2014-2016

Make/Use explored what might occur if we consider not only the aesthetic of the garments we wear, but also the way we use them and the waste they create when we make them. This interdisciplinary research-through-design project questions conventions of the clothing industry in relation to knowledge-keeping, production practices and material use, through a proposed multilevel system of engagement dependant on participant skill ~~level, time~~ and available resources. Through developing open source, user modifiable, zero waste fashion designs, Make/Use aims to empower everyday users of clothing, and challenges them to question the relationships they have with their present and future garments.

Lead Researcher: Holly McQuillan

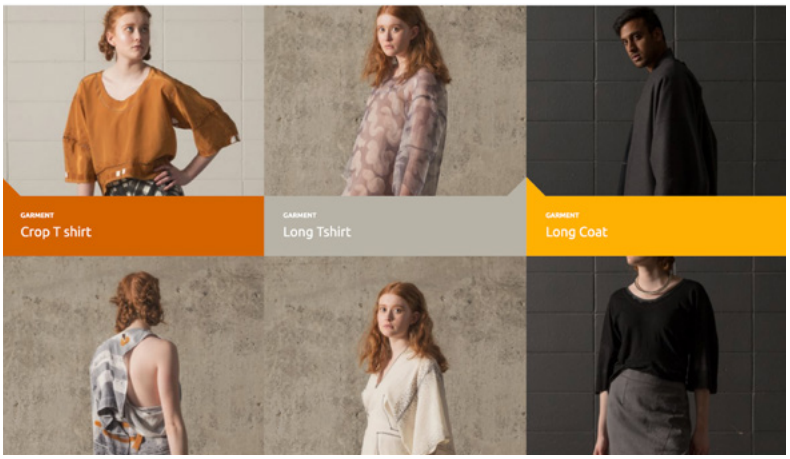


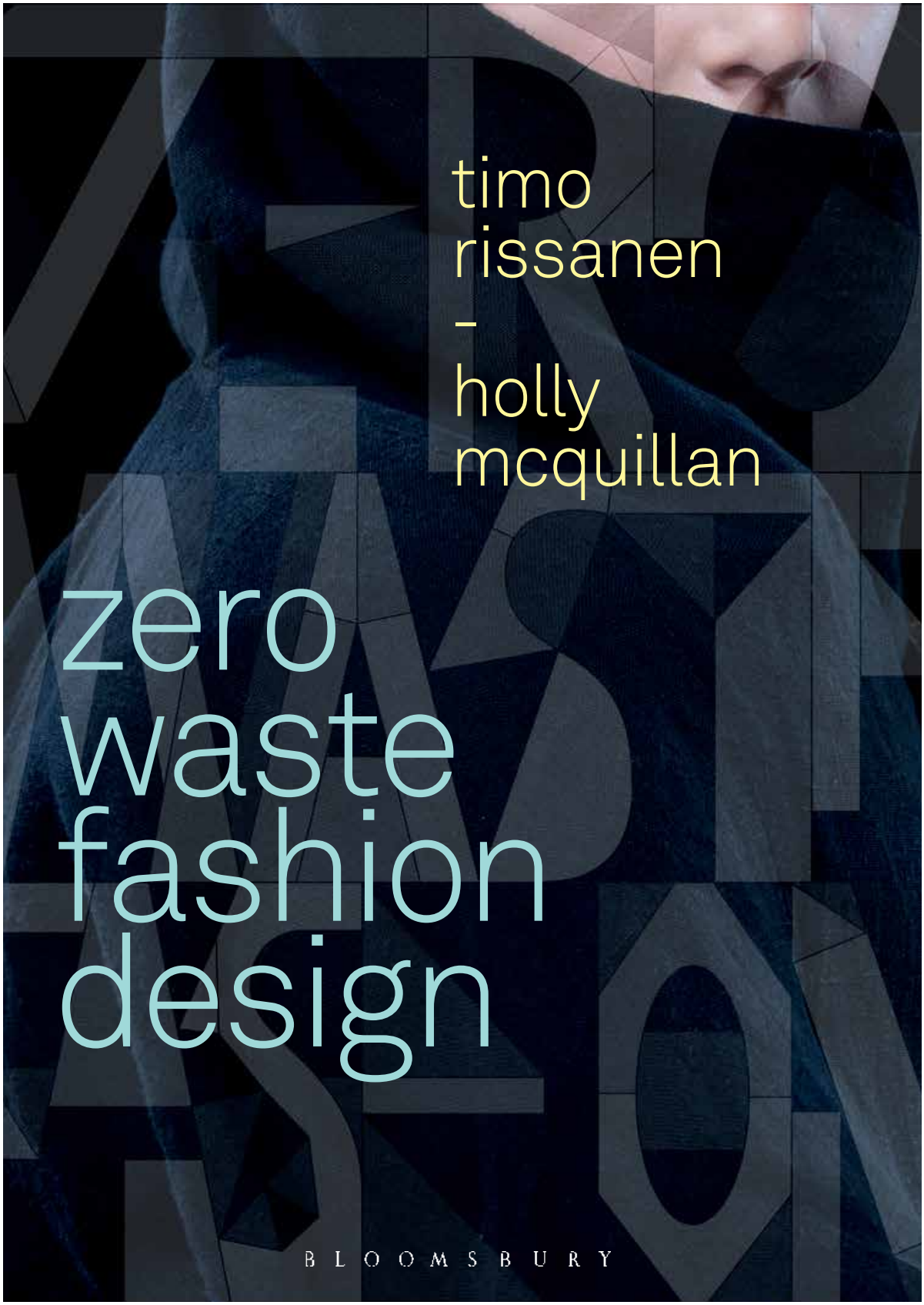

GENTLEMEN



Winner of Open Source: Use in the Arts award at the New Zealand Open Source Awards 2016, this project is ongoing in the digital space instructions are regularly downloaded from the website, and the content is used in workshops online and in person regularly.

Workshops have been delivered internationally, including in San Fransisco, Auckland, Brisbane, New York, London and Stockholm.





ZERO WASTE FASHION DESIGN

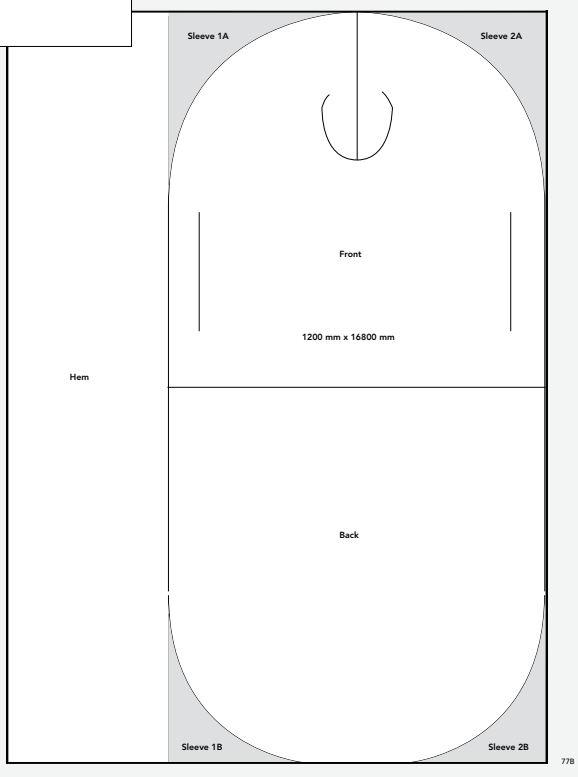
Co Author 2013-2016

Second edition due: 2021

Zero Waste Fashion Design (2016)
This book is co-authored by Dr Timo Rissanen (Parsons School of Design/UTS) and myself, published by Bloomsbury and is the result of 25 years research between us. Of the content; the text is predominantly written together with some chapters primarily written by one or the other author while approximately 80% of design work (experiments in form, zero waste solutions for desired outcomes) is my own research practice.

Summary: Fashion is seductive, glamorous, even magical. Yet the industry and the garments it produces are full of inefficiencies. These inefficiencies are often masked, whether inadvertently or deliberately, as manufacturing is invisible to almost everyone except adesign addresses inefficiency in fabric use by reframing fabric waste as an opportunity to explore the magic of fashion; just like all fashion, zero waste fashion celebrates experimentation and the discovery of new forms.

FIGURES 77A AND 77B.
Triangles as sleeves: arc T-shirt pattern detail, Void (2012). By twisting the triangle pattern piece into a tapered tube form, a sleeve is able to be constructed.
Photograph by Thomas McQuillan.



DESIGNING WITH THE FABRIC WIDTH

In her research into historical cloth and dress, Burnham (1973) pointed out the connection between the loom type used by a particular culture at a particular time, the width of fabric that would result from weaving on that loom, and the kinds of garments that were made from those particular widths. When fashion designers design garments at present day, the width of the fabric is usually not a consideration in the process. Perhaps it should be. It need not be a constraining one; the width is merely the space within which the fashion designer and pattern cutter have the conversation about the design being developed. The fabric width is an intrinsic quality of the fabric, which in turn is the primary material that fashion designers work with. The width can be the source of design ideas, and conversations about it and within it can bridge gaps between fashion design and fashion manufacturing.

Fabrics come in many different widths and various strategies exist within zero waste fashion design to respond to new widths dynamically and quickly. Fabric width, while perhaps a new consideration for many fashion designers, can be an opportunity in design, when approached creatively.

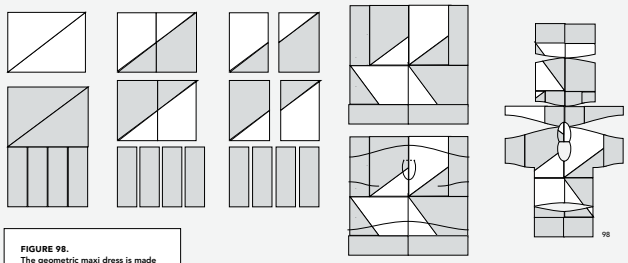
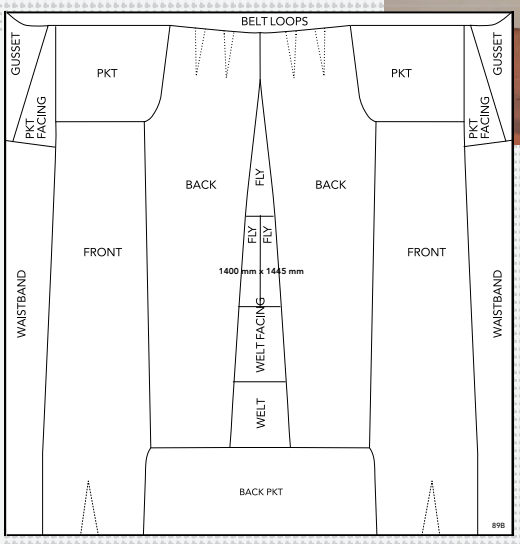
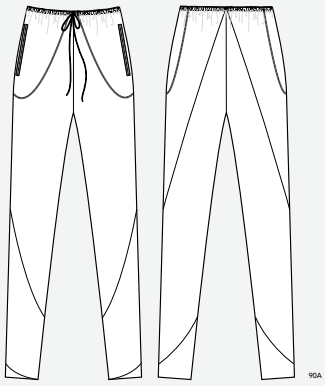


FIGURE 98.
The geometric maxi dress is made by piecing two shades of gray fabric together to create new fabric widths and colorways.
Courtesy of Holly McQuillan.

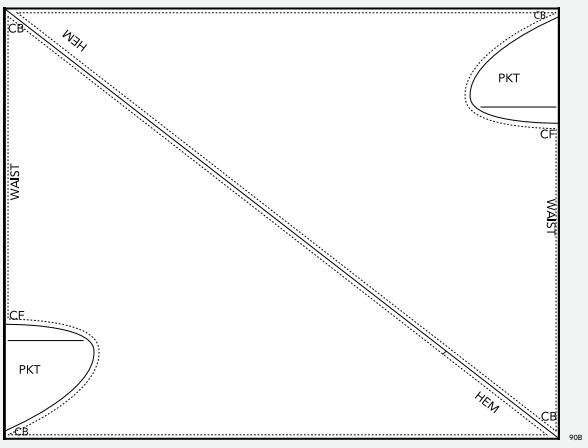
FIGURES 99A, 99B, AND 99C.
The geometric maxi dress is made by piecing two shades of gray fabric together to create new fabric widths and colorways. Photograph by Thomas McQuillan.

FIGURES 89A AND 89B.
Simple trouser setup: straight leg trouser, Void (2014). The straighter cut of these trousers is achieved through a reduced overlap in the nesting of the front and back leg.
Photograph by Thomas McQuillan.

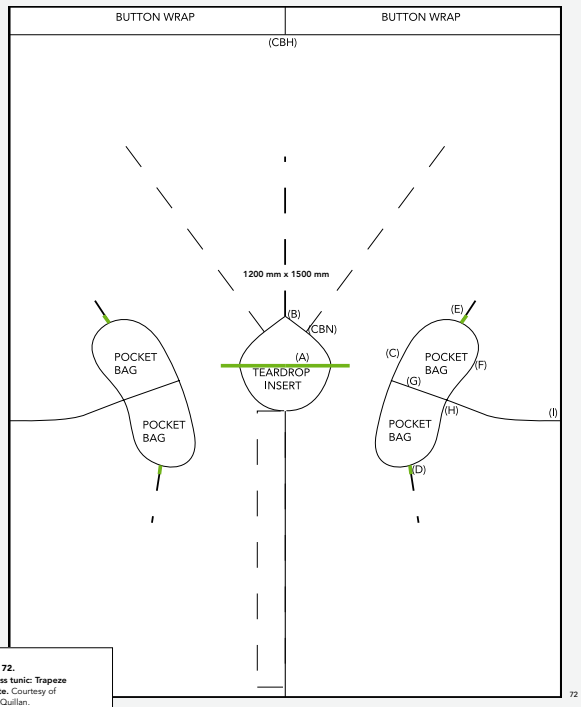




FIGURES 90A AND 90B.
Basic spiral trouser setup: hem width is determined by the difference between fabric width and diagonal line. Leg width is determined by fabric length. Waist and hip width are determined by placement and shape of crotch seam relative to fabric length. This results in a conventional trouser silhouette without side or inseam.
Courtesy of Holly McQuillan.



TRAPEZE SLEEVELESS TUNIC
by Holly McQuillan



72

FIGURE 72.
Sleeveless tunic: Trapeze silhouette. Courtesy of Holly McQuillan.

This design is developed through the Planned Chaos approach and revolves around the simple placement of neckline and armholes. It can be modified in many ways to generate a range of outcomes and silhouettes. It combines flat pattern cutting with drape to develop the design to its final realization. The block used is usually a darted bodice block, but it can also be a shirt or blouse block, even a jacket block. The block will be determined by the final goals of the project. If you aim to resolve the design into a shirt, then begin with a block with sleeves. The key fixed areas will be the relationship between neckline and armholes and the armhole/sleeve crown relationship. Fabric length is twice the length of the garment, and the width the volume of cloth available to the designer to achieve the trapeze silhouette. For example, using a 200-centimeter-long (78¾ inches) length of cloth will result in a top that is 100 centimeters (39⅜ inches) from shoulder to hem. A narrow cloth results in a less voluminous trapeze design. There is also a potential direct relationship between the width of the fabric, which determines the button placket (button wrap) length, and the length of the center-front opening where the button placket is sewn.

This is a setup for a sleeveless tunic design with a center-front opening with button placket and inseam pockets. It uses a piece of cloth 120 centimeters wide and 150 centimeters long (47¼ × 59 inches). As it is symmetrical, it is folded along the grain line, to measure 60 centimeters by 150 centimeters (23⅝ × 59 inches).

Detailed instructions:

1 Begin with a darted bodice block and pivot the darts out of the shoulders and into the waist. This is the starting point of the trapeze silhouette and allows for the shoulder seams to be eliminated. There can be a direct relationship between the half width of the fabric (which determines the button wrap length) and the length of the center-front opening, where the button wrap is sewn.

2 Mark out a rectangle half the width (60 centimeters/23⅝ inches) by the full length of the cloth (150 centimeters/59 inches). Label selvage (sl), fold line (fl), and top and bottom cut edges (tc and bc). Six centimeters (2⅜ inches) down from (tc), draw a straight line parallel to this. Label as button wrap (2 centimeters [¾ inch] button wrap with 1 centimeter [⅜ inch] seam allowance). Mark center-back hem (cbh). Mark (a) approximately halfway from button wrap to bottom cut edge (72 centimeters/28⅜ inches). Place the center front of front bodice block one centimeter from (fl), aligning shoulder/neck point with (a). Place darted bodice on the back, aligning shoulder seams so as to eliminate them; mark in position of center-back neck (cbn) point.

3 Widen neckline 5 millimeters (⅜₁₆ inch) all the way around, and extend the back neckline to the (fl) (b). This teardrop shape becomes an insert, which supports the back drape form.

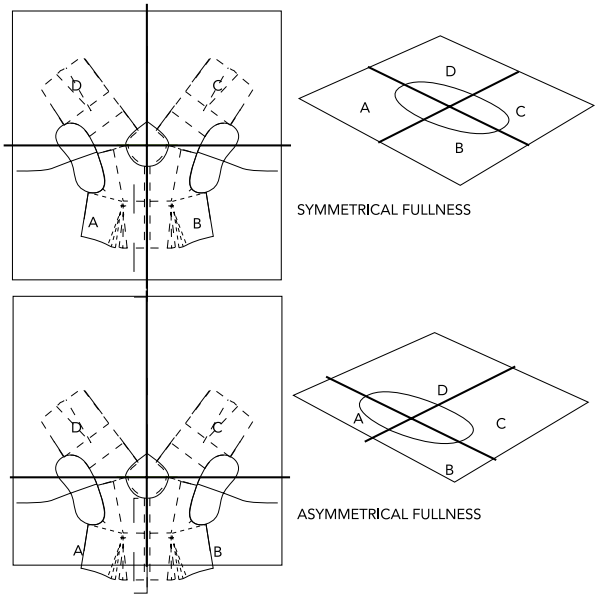
4 Mark around front and back armhole (c), marking the side seams ([d] and [e]). Continue the back armhole around in a smooth rounded line to join the front armhole (f); this forms the pocket bags when divided in two (g), so ensure a hand will fit comfortably inside.

5 Measure from shoulder around (f), and mark at halfway point (h). Extend a line at a right angle, and then curve toward selvage (i).

6 Cut garment, sew cut line (f), attaching (e)–(h) to (d)–(h). Sew back pleat (b) + (cbn). Insert teardrop insert at (cbh), then resolve final design on mannequin, considering button wrap and pocket placement.

The length of front and back is determined by the placement of the armhole and neckline; moving these toward the front hem will generate a shorter front and longer back. The same mechanism can be used to orient the fullness toward a particular axis of the design.

FIGURE 73.
Alternative layout of Trapeze tunic setup; by moving the neckline and armholes, fullness can be redistributed to any axis of the body. Courtesy of Holly McQuillan.



73

74A

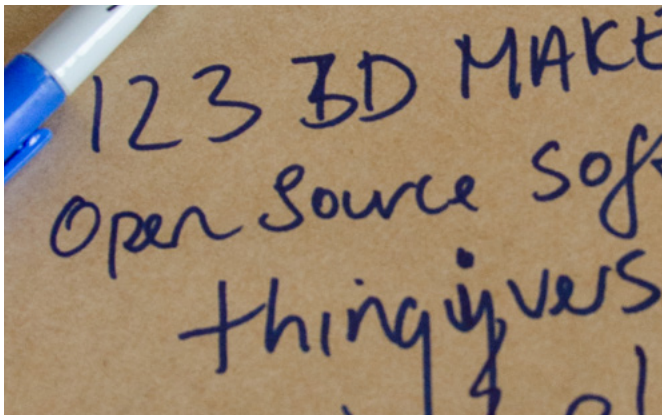
FIGURE 74A.
Trapeze tunic setup: fullness distributed to backs (2014). Photograph by Thomas McQuillan.

74B

FIGURE 74B.
Trapeze tunic setup: centrally oriented fullness (2014). Photograph by Thomas McQuillan.

YIELD: Making fashion without making waste exhibtion and catalogue
The New Dowse, Wellington and Textile Arts Center, NYC, 2011

SpaceBetween 2012
Upcycled corporate uniform commission



Local Wisdom: WGTN 2013
Project associated with Craft Practice by Dr Kate Fletcher

About me

Holly McQuillan's work in the field of zero waste fashion design, articulates sustainable fashion systems and practice. She focuses on issues such as transition design, the impact of technology and how these can challenge established design, production and use practices. Holly co-authored Zero Waste Fashion Design with Timo Rissanen and together they are currently writing the second edition. She also co-curated Yield: Making fashion without making waste, the first contemporary exhibition focussing on zero waste fashion, and developed the award winning open-source zero waste resource Make/Use. Her work always seeks to broaden the impact of zero waste and sustainable fashion design through research, publication, workshops and lectures. Currently she is a PhD candidate in Artistic Research at the Swedish School of Textiles exploring zero waste systems thinking through the innovative design and production of textile-forms.
www.hollymcquillan.com