The delicate relationship between knitted surfaces and filling materials experienced through human comfort/discomfort

Comfort is elastic

Maria Antonia Wolff Metternich
Comfort is subjective – it's strongly connected to our emotional state. When you feel happy you can feel comfortable even on a hard park bench.
The delicate relationship between knitted surfaces and filling materials expressed and experienced through human comfort/discomfort

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ABSTRACT

Keywords: knit, elasticity, comfort, filling, cover, experience, emotion, form, volume, tube, rolling, body, textile design

This paper describes a practice-based research project in which physical and emotional comfort and discomfort is experienced by the human body. A variety of different Comfort Zones are presented. All of them deal with the relationship between filling material and cover, in which knitted structures and materials play a central role in order to create comfort. The elasticity of the knit is challenged when creating volume and emphasizes the idea that comfort is elastic in material/physical way, as well as well in emotions.

The use of filling materials gives a new dimension, sensitivity and offers new opportunities.

This form exploration discusses the potential of knit to serve as a cover and decorative element, but most importantly the possibility of a textile to create its own filling.

By rolling up a knitted tube, volume is built up layer by layer; a torus appears and captures a void in the center of the form, required by the tube, the fundament. Hints of discomfort are given and emphasized by either surface/structure, volume or garments on the body.
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1. INTRODUCTION
Physical, as well as emotional comfort, is subjective.

In his book *Rethinking Sitting* Peter Opsvik (2009) states that “Circumstances that affect sitting include the nature of one’s work, climate, religion, hierarchy and perceptions of different social roles and functions” (pg.18).

Sitting on the ground is a common habit for the Ayoreo Indians, a nomadic tribe living in the Gran Chaco region (the border region between Paraguay and Bolivia), which often is supported by a string tightened around the body, whereby pressure is taken off and comfort is enabled. That is one of the local habits that has been handed over from one generation to the other for over hundreds of years (Aravena, 2010).

Inspired by the Ayoreo Indians, Alejandro Aravena (2010) introduces Chairless, created for Vitra. Designed as a reductive way of sitting, Chairless fits into our modern western society: to our daily and ‘restless’ life. A sturdy strap of fabric allows its user to sit down in a relaxed manner, it might be the easiest sitting construction.

“It is obvious that many things have evolved since the beginning of time and that progress has accumulated in our lives in the form of sophisticated needs and desires. But it is also true that there are many things and needs that haven’t changed much since our origins and they can still be satisfied in an extremely simple way: sitting comfortably on the ground is one of them” (Aravena, 2010).
In his book *Rethinking Sitting* the Norwegian designer Peter Opsvik (2009) liberates the human body from the tyranny of ‘correct posture’ and introduces the concept of dynamic sitting, independent of designed seating: “Every sitting posture is good, Opsvik sees it as a task to design chairs that allow as many different sitting postures as possible and make it easy to move and change frequently between position” (pg. 1).

In addition, Opsvik describes: “movement is a beautiful word- when we want to express our feelings, we move. When we try to change something in society, we form a movement. We move to show strength, to express sympathy, to protest or to celebrate” (pg. 35). Thus, the term movement is universal and describes a positive action in various ways.

The Couch in fig. 3 by John Chamberlain requires movement and activation of the human body. Foam serves the main base of the piece and presents a spacious comfort zone for several bodies to find its individual position. Chamberlain embraces the aesthetics of the foam and exposes it in his sculptures.
Droog Design, a Dutch design collective, founded in 1993, introduced a new view on the design field. As representatives of ‘the spirit of the nineties’, Droog Design introduces a wide range of products with experimental and functional approaches, wherein the concept and communication is central, rather than the functionality.

Renny Ramakers (1998), one of the founders, says “Droog has been based not only on the smart beauty and negligent elegance of its individual objects but also on the appropriateness of the collection as a whole” (Spirit of the Nineties- Droog Design, 1998, pg.12).

Some of the objects even stay in the prototype stage and thereby fill the gap between art and design. Prototypes document the raw state, give a hint of the final look, as well as leaving space for imagination (Paola Antonelli, Spirit of the Nineties- Droog Design, 1998, pg.12).

The Rag chair (1991), in fig. 4 designed by Tejo Remy for Droog Design offers a new perspective on design; Through this design Remy makes waste material functional, and states that textile is strong enough to be used as a self-standing medium. The piece also questions the abundance of the clothing industry. Moreover the industrial look of this chair remind us of stacked pallets, holding products compact and pressed together. The weight of the total construction nearly reaches 60 kilos.
Jessi Reaves pushes the border of functional and traditional furniture towards the artistic and aesthetic dimension. The Foam couch with straps in fig. 5 is handcrafted in a sculptural way: foam pieces are layered and squeezed together in order to create comfort. The ‘inner life’ of the couch upholstery is revealed. The whole construction is held together by straps and gives a raw and industrial impression.

Reaves furniture pieces are made to accommodate the body, as well as embodying simplicity and a modern reduction of covers and finishing- a reinvention of bare upholstery.

Upholstery in furniture is mostly categorized as one whole element; many steps of the first upholstery layers are unseen, although they influence form and comfort. The covering fabric holds the total construction together and serves as a decorative element.

Thomas Chippendale’s camelback sofas were some of the first furniture to be completely upholstered at the end of the 18th century: “His furniture was overstuffed, finished with brass nail heads, and covered in fine haircloths and silk”. Before comfort was appreciated as a progressive possibility to embed the human body, it was often neglected and secluded as effeminate (Feathr Oy, 2017).

Nowadays PU Foam is a common material to create comfort in seats, sofas and mattresses: it shows up diverse qualities and properties such as compressive characteristics and elasticity. But due to the issue of recycling, crumbling of the material after time and the difficulty of cleaning, knitted spacer fabric presents a possible alternative to PU foam. Consisting of two surface layers and one layer of yarns in the middle, or yarns inside, spacer fabric offers an interesting 3D structure, air permeability, elasticity and thermoregulation, due to its mesh structure (Ye Xiaohua, 2008, pg. 213).

In conclusion it represents one total upholstery structure and volume, so that in fact no filling material is used.
The Cabbage chair by Nendo (2008) represents one method of developing self-standing textile furniture. It is a collaborative project together with Issey Miyake, who initiated the idea of re-using the paper sheets, required for the pleating production of his fabrics.

This chair appears by peeling off layer by layer from a compact paper roll. Besides resin, which adds strength and the property to retain form, no other supporting materials are used to create shape. Due to the simple production process, the user could be challenged by developing his/her own product by the simple act of cutting and peeling off the layers from the main paper roll.

The ability to reuse materials innovatively, and combining art with design demonstrates the importance of the cabbage chair, which “fits active, optimistic and forward-moving to the people of the 21st century” (Nendo, 2008).
2. Knit&net

In her thesis *The Myth of the Silhouette*, the fashion designer Karin Landahl (2016) researches on form-thinking, and explores knit in relation to the body.

The silhouette in fig. 7 show the strong impact the openings have on the garment: the total shape, as they direct and control the whole construction. Landahl argues that “[a] hole is a property of a void, and is surrounded by material/ the textile, technique/ tangible matter”(2016, pg.112). It gives access to the material in order to ‘disappear’, ‘grow out’, ‘create depth’ and finally ‘finish’ the material/fabric. Furthermore, Landahl explains that “[t]he property ‘hole’ does not relate to or depend on size or shape for its being... whether it is small, big, round, or oblong does not change the fundamental nature of the hole. The hole guided the design process from the start, and defined the form of the garment” (pg.112).

The transparency of the knit enables the viewer to follow the emergence of the construction and its three-dimensionality. The body is visible inside the garments, it is the filling. Both body and garment merge. Due to the structure of the knit, the edges curl and appear a darker shade of grey and emphasize the outer lining of the silhouettes. Additionally, the openings of the garments become significant and guide the viewer.

Fig. 7

Garment knot 4, 2016, Karin Landahl
With her work the photographer Anna Reivilä explores the delicate relationship between man and beauty. She uses ropes to create connections around objects from nature. Images of interaction between the material and the nature object are presented. The lines, which are created through knotted ropes, become a dimensional drawing. They become one, both materials merges, especially in fig. 8, where the ice floe turns into an own abstract object.

Looking at Anna Reivilä’s work we perceive the clear contrast between the sensitive tied rope material and the rough but at the same time poetic ‘filling’ material from nature. Clear risks are found in terms of broken and overstretched ropes in fig. 9, as Anna Reivilä also claims in her statement that there is a delicate balance between being held together and being on the verge of breaking (Anna Reivilä, 2017). In fig. 8, a net structure is formed around an ice floe. The net captures the object and appreciates it (fine line between protecting and imprisoning) as long as its existence lasts (until melting).

The rope can only be stretched out to a certain point- but isn’t it also tempting to tighten it and being able to form the material that both materials can be affected by each other? What would happen to a filling material being even more voluminous- would it break out of the net, would the rope-net break?

In fig. 9 we see that the superficial and natural tension and elasticity are challenged and competitively interacting with each other. Those captured moments feed us with imagination and joy to find out how this shown installation could react and interact with wind, water in terms of movement, melt-process, etc.
Fig. 10 shows Ernesto Neto sitting on one of his Humanóides; a collection of sculptural sitting constructions. Every piece differs slightly in appearance but they all are constructed using the same method. Humanóides clearly offers interaction with the human body such as sitting, walking, hugging, hanging or leaning. Both ‘bodies’ merge and grow to one.

All movement and interaction of the human body challenges the material, and effects a smooth transformation of the total shape. In the book Ernesto Neto (2015), Hans- Peter Wipplinger emphasizes the qualities of elastic knitted materials: “the great variety of applications for textile materials, made possible by their alterability of form, surface and texture, is impressive. The fabric -not unlike the human skin- is distinguished by its softness and elasticity, but also by a certain vulnerability” (pg. 41). The human body functions as the heart/ the essence of these moving sculptures and brings them to life.

In his installation Variation on color seed space time love (2009) in fig. 11, Ernesto Neto deals with elasticity and challenges gravity: a tubular net material is strained at a very high level, filled with kidney beans. Space, body, gravity, mass and light create the essence of this piece in terms of materiality and atmosphere.

The outer net-structure interacts clearly with the inner material in compressing and holding the construction together; their existence depends on each other's elasticity and weight; the bending informs us about the weight of the inner filling material. Both outer and inner materials are truly interacting in the sense of merging. We are able to be part of the manipulation through movement and receive a feeling of the filling through touch.

The elasticity of the knit is required in order to be able to bend/roll the fabric to create form.
3. Form

Within her work the textile artist Maria Blaisse explores the delicate and playful relationship between forms forming forms, and a diversity of materials.

Fig.12 shows a human body wearing a red circle shaped foam piece, which is both flexible and stable. The body and the foam become one moving sculpture.

The holes in fig.13 offer diverse possibilities of embodiment and interaction. It is as if the body is “embedded in the material, the form reveals itself”, and becomes alive through movement (Maria Blaisse, 2013, pg.146).

When looking at the circular stone formations in fig.14 we perceive a clear reference to the concave and convex lines in fig.13. Blaisse explores and researches circular shapes and their transformation and emergence. She also explores continuity in movement and visual aesthetics. The beauty captured in the natural language of forms in fig. 14 feeds us with imagination and joy to find ways of transformation, interaction and re-emergence: “when I see what has arisen out of a single form, this gives me a feeling of continuous emergence, to see what emerges from one form inciting the flow of continuous creation” (Blaisse, 2013, pg. 238).
All the artists discussed in the previous chapter deal with volume and form in diverse ways. Blaisse’s and Neto’s work demand high participation from the user or from those experiencing the piece, in terms of touch, form and movement. In both works the human body is an essential element to exhaust the art pieces potential to become a moving sculpture.

Karin Landahl’s silhouette requires the body to control and guide the constructed garment. The body in fig. 7 is rather static and holds the knitted construction in place, whereas the body in *Comfort Zones* actively transforms the shape and the construction to create variety.

Within this design project the body represents an essential medium communicating the physical and emotional comfort, forming an individual experience within each *Comfort Zone*. Through different positions, the body challenges the construction and shape through movement and provokes a transformation of the material of the pieces, resulting in a compressed, dense and elastic structure. Both body and pieces depend on each others relaxed or unrelaxed state in order to be activated.

The foam in Jessi Reave’s *Foam couch* is transformed when it is touched. Similarly, all the works in this thesis take on a new form, the moment they are touched by the human body. Both, Chamberlain and Reaves either totally reveal the under upholstery construction, as in fig. 5, or totally cover it as in fig. 3. Instead, this design project challenges different levels of dressed and undressed versions of covering in upholstery to create a vibrant balance.

When looking at the *Cabbage chair* by Oki Sato in fig. 6, the body is needed in the development process, to help the form emerge. By cutting and peeling fragile paper layers, the shape evolves and reveals a more abstract sitting object. Contrasting with the work of Oki Sato where the aesthetics and the transformation of the paper through interaction is central and become one object. This project focuses more on physical comfort as well as each piece expresses aesthetics.

Moreover, do both of the works of Anna Reivilä (fig. 8-9) and Ernesto Neto’s *Variation on color seed space time love* in fig. 11 express and deal with the net structure as a capturing element, wherein the tension and elasticity of the net is challenged by gravity. In *Comfort Zones*, the net structure builds up bit by bit, adapting to create physical comfort. Knitted straps build up one structure, serving as a decorative element, as well as the function of holding the foam together.
This research investigates the relationship between several chosen filling materials combined with knitted materials to create physical and emotional comfort/discomfort. The knit is involved and challenged in different ways: in order to create volume; as in filling and in cover. Some constructions are completely encapsulated, others totally exposed, as are the emotions.

All the examples mentioned in the introduction display the use of a variety of filling materials such as plastic, foam and seeds. These are used to create different expression, raising the question explored in this thesis of whether a flexible textile can be used as a filling. The Rag chair by Tejo Remy in fig. 4 shows a way of building up shape and volume by stacking garments/fabrics on top of each other. Anyhow the volume does not rise from one movement, one element, and neither are the stabilizing straps out of non textile material while the back lean is supported by a stronger unknown material.

But most importantly this project highlights the starting point of showing that volume and shape can be built up by its own element; by rolling up a knitted tube, which creates a vibrant expression. The textile does not only serve as a decorative element and upper surface as in upholstery; it can be its own filling and become functional and fundamental for the total construction. It functions as a strong and independant element and offers a new perspective on furniture design.

This way of using textiles in order to create volume for comfort should awake curiosity about the way the pieces are constructed and have impact on our way of thinking about textiles in general. Secondly, the creativity of the user is required, who is able to transform the product to diversify the resulting in a ‘new solution’ in the way that furniture can be produced and developed. Only one long piece of fabric is used to build up volume by rolling.

Designing a longer-lasting and sustainable product, challenges and widens the personal design horizon; it opens up to a dimension of exciting possibilities but as well presents challenges, restrictions and requirements.

When dealing with sustainability, there is not only production and material in focus but also other interpretations, as for example the observer’s perception, different ways of installing/constructing the pieces, shaping it in diverse ways, creating a simple change/diversity within the construction, or reusing the fabric for another use and to create something new.
This work explores the delicate and playful relationship between knitted structures/surfaces and filling material in order to create Comfort Zones. All Comfort Zones embed the human body and create a balance of an artistic and functional expression.
OBJECTIVES

5. Comfort Zones are introduced:

Zone 1: The Revealed Relationships
Zone 2: The Smooth Void
Zone 3: The Shared Solitude
Zone 4: The Captured Compression
Zone 5: The Burst
In Exemplary Design Research Thomas Binder and Johan Redström argue that: “with the notion of exemplary design research driven by programs, experiments and interventions, we refer to research based on the explicit formulation of programs that act as a frame and foundation for carrying out series of design experiments and interventions. It is ‘exemplary’ in the sense that it enables critical dissemination through examples of what could be done and how, i.e. examples that both express the possibilities of the design program as well as more general suggestions about a (change to) design practice” (2006, pg.3).

The purpose of this study is to investigate the delicate and playful relationship between knitted surfaces and filling materials, experienced by human comfort and discomfort.

Comfort Zones are created by different methods of form giving, wherein the knitted tube plays a fundamental role in guiding the design process and form exploration. It functions as a cover, interacts with filling materials but also builds up its own filling by the rolling technique for instance. Form is created, explored and manipulated by rolling, pleating, cutting, stuffing, layering and compressing.

5 Zones present different states/levels, from where the filling is being partly revealed, to totally covered and dressed.

All embed the human body and propose diverse ways to find one’s own comfort. The Comfort Zones can be activated through sitting, leaning and laying. An interaction is displayed and a relationship between the zone and the body is created.

Some are more conceptual than others, all are sculptural, but never divided from function: All pieces are scaled up to accommodate and offer comfort for the human body. Since comfort is subjective, the one or the other presented Comfort Zone might give a slight hint of discomfort to create vibrancy and contrasts within the collection.

Moreover, the Comfort Zones capture the human body: some more protective, others more exposed. The tactility of the material, both surfaces and filling, gain importance through the touch and interaction of the body.
Zone and body complement each other and create one whole, one vibrant expression. Organic and round shapes of body and object represent an aesthetic and atmosphere; displayed by color, balance and coherence.

Since comfort is subjective, zones present propositions based on the own research, wherein one's own comfort can be found.

In *Exemplary Design Research* Binder and Redström (2006, pg.4) both affirm the argument by Jones that “design is inherently about proposing in Jones words “a change in man-made things” (John C. Jones, 1980). This produces a double challenge for design research, as it must both be exemplary in the sense that it demonstrates that what is proposed by the program actually can be done, and additionally evidence that pursuing such a line of inquiry will, also for others, provide opportunities of unprecedented change and novelty.”
METHOD-LOGY

“Methods are necessarily part of every design process. In general, they can be defined as an action a designer performs during the design process. Either traditional methods are used or individual ones are adapted to the circumstances of the process. Either way, one should choose a method, which clarifies what one does not know, but needs to know to be able to continue the progress. Introduced by professional designers, who refuse to use proceedings they were taught, several new methods have been conceived to replace the traditional ones” (Jones, 1992, pg.3).

First, a concept was developed through needed to be formed by keywords, drawing/sketching, then start experimenting freely to dive into the creative zone. Creating form within the knitted tube was the first starting point of experimentation. Knitted tubes were used and rolled up to create shape and volume. Inspiring images by Vivian Sassen and Henri Manguin played an important role in forming a first starting point and concept. Color combinations of paintings and photographs were used and translated into this project during the process. A phase of fast production started; a collection of samples in a variety of scales, shapes, colors and materiality were developed. This was followed by a reflection phase, wherein images were taken of all samples and details to then be looked at in a gathered collection to gain a result a clear and practical overview of all first experiment.

“The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomena before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomena and the change in the situation”(Donald A. Schön, 1984, pg.68).

The outcome (the collection of samples), then were evaluated together with images, keywords, sketches and materials forming one whole concept. Then, groups of potential combinations of materials were formed and placed and composed together in groups and context, to crystallize interesting design elements- the rest was discarded.
When the previous experiment was accomplished, the new experimentation phase began, where samples/prototypes were developed in bigger scale, emphasizing the expression/function even stronger, as for example the prototype in fig. 24-25, setting the first of the 7 modules/tori of the Revealed Relationships in fig. 29. In case the goals and plans weren’t accomplished, another phase of experimentation in smaller scale began. This way of working and processing continued until all prototypes were set and prepared to be developed in bigger scale for the final collection of Comfort Zones.

“The purpose of the experiment is not to ‘test’ the program in the sense of proving or confirming it. Of course, there is much to be gained from reflection and analysis upon each experiment we make, but it is in the relation between program and experiments the perhaps most important knowledge is gained. In this way, the set of open ‘research questions’ are not necessarily to be found in the actual program, nor in the individual design experiment, but rather in the relations that surrounds them and bind them together” (Binder and Redström, 2006, pg. 4).

A clear contrast is found between the method of producing all materials industrially and the following main handcrafting/manipulation and embodiment: The raw material is produced and hereby offers to discover its essence.

“Looking back on my work, I realized that one form has emerged from another. I have become aware of this in retrospect: form forms forms. My work is a sort of Esperanto, a language of forms for a range of materials. ...The form that you ‘find’ has all the potential to go further” (The Emergence of Form, Maria Blaïsse, 2013, pg. 238).

“When I see what has arisen out of a single form, this gives me a feeling of continuous emergence” (Blaïsse, pg. 243).

The Emergence of form, as highlighted by Maria Blaïsse is a central method, emphasized by the torus shape, which emerges layer by layer through the rolling technique. The knitted tube presents a starting point and opens up to a dimension of possibilities of a variety of shapes.

Moreover, intuition plays an essential role within the design process which is used as one basic, and ever balanced and present method. Design decisions such as color compositions, etc. are taken by an automatic intuition: often the hands take the decisions and guide the design process.

“Understanding something from ‘within’; at that moment it is transparent and I see potential very quickly. A new terrain opens up and that’s where I go. What happens then is genuine ‘emergence’. It is not quite visible yet, but you sense it” (Blaïsse, pg. 240).

The users experience and perception is required to research on universal comfort in physical and emotional way, which supports the approach on this subjective matter. The stacked foam of the Captured Compression was constructed piece by piece on to the rubber tire, to be adapted to the own physical comfort, and the one of others.

“But the fact that subjectivity is not explicitly expressed does not imply that one can do without it. Subjectivity may remain hidden, or implicit, awaiting to be revealed by commentators” (Francois Jullien and Jean François Billeter, 2015, pg.2).
DEVELOPMENT & RESULT

Fig. 15
Lines build up relationships to each other. They provoke, emphasize concave and convex lines, they cross, run parallel or merge to one.

ZONE 1:
REVEALED RELATIONSHIPS

Fig. 16
DEVELOPMENT

A contrast between hollowness and compact material appears.

Fig. 17
The rolling of the tube

Following this experimenting phase, the focus changed to understanding the ‘net- construction’, Ernesto Neto uses in his installation Variation on color seed space time love (2009) in fig.11, translated in only textile material.

Elasticity and other properties of the knitting technique were explored and challenged. Achieving the same effect of gravity and weight, as Ernesto Neto, but without any filling material was the aim.

This process in turn led to the method of the simple act of rolling fabric inside to gain weight and to create form and volume with just textiles. Here the technique/method created the filling, presented as a contrast to the act of using extra filling.

The form is evolving naturally, as well as the knit’s behavior is to roll.

Challenging this movement even more extreme to create form, was the aim. Using this technique, a diversity of shapes was developed. Although the tube is limited in its own, the knit’s elasticity and flexibility support the movement of rolling. Choosing diverse knitted materials to work with, e.g. cotton/lycra in rib quality, helped to gain knowledge about how differently materials behave when rolled up.

Small knitted prototypes (10cm radius), represent a small collection of form-research, serving as a starting point for bigger scaled prototype (40cm radius).
Creating form within the knitted tube

Inspired by the natural behavior of the knit: the curling, a knitted fabric tunnel is rolled up neatly to build up volume layer by layer. It's like a dead body which rises from loose fabric and creates something 3-dimensional from its own essence. Then it has the ability to go back into the state of looseness after living, it's a circle.

This form development represents the most essential movement and practical method of this research and shows how a shape emerges. Moreover, the series of images in fig. 19 clearly documents the first embodiment forming the concept and context of the project, as well as expressing the complexity of the technique of rolling, which contains pulling, stretching and intense manipulation of the hands to result a neat shape.

When rolling, the resilience is constantly challenged, as it needs to be able to proceed the continuous act of rolling up the fabric, which contracts back into relaxed state due to its elasticity. A combination of cotton and lycra material was used, due to its strong elasticity and flexibility. The same material, developed as a bigger tube, served as a base material in the Smooth Void in Zone 2. All first prototypes were developed with this material, made on the circular knitting machine, with a diameter of 10cm, which should then define the scale of the outcome and scale of the torus.
The rolling process

Fig. 19
These images show a small collection of prototypes. All of them emerged from the basic torus shape; all are altered and pushed the limits further within its form as well as all shapes express harmony in themselves. Composed together they built up relationships to each other and displayed a certain ‘togetherness’ or an ‘intimacy’.

Using one 2m long piece of a knitted tube, seemed to be enough at that state to create a diversity in form and volume. Working on this form research helped to learn about different ways of rolling up fabric; in terms of reaching a certain tactility and density within the volume of the fabric. Rolling up fabric from two ends, opened up to a new dimension of shaping, several possibilities were enabled.

The decision was taken to continue with this technique, as it was first presented in a rather abstract and playful way, to then be applied and translated into a more functional sitting construction. The concept was to create volume through the technique itself: achieve filling through rolling. When looking at the first base form, a contrast was built up between the stable, dense and the loose fabric, growing out of the center of the shape. Some of them became active through the light translucent hole.

The hole is an invariant, a requirement of the construction; a result led by the circular tube. In her thesis, The Myth of the Silhouette, Landahl (2015) states that “An invariant is: a property that stays unaltered under non-destructive forms and making use (i.e. if not cut, torn apart, or manually destroyed in any way)” (pg.106).
A dead body rises -

it rises from loose fabric and creates something 3-dimensional.
Then it has the ability to go back into the state of looseness after living – it’s a circle.
Elasticity

Elasticity was used as a very basic but crucially important term in this design research. It served as a requirement for all designs in this collection, to achieve volume and form. This element is strongly emphasized by the knitting technique being used in all designs.

Flexibility is a natural behavior of the knitting technique, as it is capable of bending easily without breaking or destroying the structure. However, when using cotton/lycra as a material, as in fig. 20-22 the fabric gained the ability to resume its normal shape after being stretched.

When rolling, the elasticity was constantly challenged, and was needed to be able to proceed the continuous act of rolling up the fabric. The denseness and pressure were finally released when the fabric burst out of the hole after the final scale had been determined.

Rib was used as the main binding in the collection. The striped structure supported the elasticity in width and length and shaped nicely around the torus. Due to the combination of elasticity and the plating effect (a possibility in knitting to merge two colors on one surface), colors were partly stretched out and became visible and vibrant.

When rolling up the fabric on the steady cylinder forms, the level of elasticity was controlled by how dense and strong the fabric was pulled over, and was challenged by the various sizes of the cylinder forms, as the fabric is stretched out differently.

In conclusion, the elasticity was provoked in various ways, technically; but as well in the wide range of possibilities, the knit offers in creating shape.

"Oddly and mysteriously, a discarded elastic band will typically present itself in the shape of an infinity symbol (properly called a lemniscate). Perhaps that is because elasticity possesses that elusive quality of the infinite" (Hester Aardse and Astrid van Baalen, Findings on Elasticity, 2010)
Being able to develop this shape in bigger scale, required many tryouts and material research to find the best shape-supporting fabric. Additionally, a certain thickness was needed to be able to build up a certain volume quickly, but still should be elastic and flexible. This idea challenged boundaries and possibilities of the technique and secondly a potential for a functional object, a one-piece sitting construction was found. To gain a neatly rolled up shape in bigger scale, a steady wooden tube was used to stretch the fabric over. The action of rolling became at one point very exhausting physically, because of the fabric’s tension and its bigger growing ‘mass’, four hands were needed. During the process, more and more essential fabric properties, as for example the rib binding helped to guide the design process and support the shape nicely through its elasticity.

In fig. 24, a simple one-piece sitting construction is presented. It consists out of only one piece of fabric, which was achieved through rolling it up through the hole. The objects communicates the function and invites to sit and lean back to the fabric growing out of the hole and constructed on the wall/column. This 40cm wide shape presents a prototype to be developed further.

‘Function follows form’, expresses best the concept, which is communicated: the form has evolved naturally. Firstly inspired by the natural behavior of the rolling knit, the aim was to challenge this movement even more extreme; to test the shape’s, technique’s and the fabric’s limits. The back-lean consists of 2 layers of tubes (doubled 4 layers of fabric in total) and offers stability and comfort. The rib binding and the plating technique on the surface of the torus show up diversity in color: color becomes active when fabric is stretched out.

Embodiment was already present during this process, as well as the activating the shape by finding comfort after forming. The Function of sitting evolves naturally and follows the form: the backrest grows out of the inner center of the construction, the hole: it is an ongoing process, a circle.
Simplicity supports an important aesthetics of the concept, communicated most delicately by the photographs of Vivian Sassen. Organic and round shapes of body and object represent an atmosphere; expressed by color, balance and coherence. This image served as one of the first color inspiration.
Fig. 27 shows the rolling process in bigger scale, step by step
In order to create a neat torus shape, a steady wooden cylinder was used. By rolling the fabric up, volume and stability are built up inside; a continuous movement. At one point the rolling became very difficult and physically exhausting, since it required a lot of man power; the width of the torus/the ring got wider than the hands could grip, as well as the whole mass got very dense, big and relatively heavy.

So in fact four hands were used to create shape around the cylinder. Could any machine enable this technique to become easier and represent a solution to avoid the high use of energy being used?

While developing a diversity of shapes, different ways of rolling were found, in terms of reaching a certain tactility and density within the volume of the fabric. Instead of using a hollow tube/cylinder, where the fabric is stretched over, a triangle or squared form could be used in the future. Would this method help to influence the total shape; would it bend back to the original torus, due to its elasticity or would it be resting in another squared or triangle geometric?

Refining the rolling technique to be able to develop the sitting construction in bigger scale was the aim. During the process it turned out that the pressing/rolling the shape down the tube was the easiest way to work. Additionally, the fabric shouldn’t be rolled up too densely, since the comfort could become less strong.

In conclusion, gaining experience about the technique, as well as learning about the properties of the fabric were a crucial part of the design process and an important requirement for the further development.
The Module

A first sketch of showing how the torus shapes /modules can be transformed and positioned differently, as in creating one surface or gaining height by stacking multiple torus shapes on top of each other. The playfulness and creativity of the user was required.
RESULT:
Construction

7 equal sized torus shapes were used to create different compositions and constellations, they function as modules and offer the option of designing one’s own comfort in sitting, leaning and laying position.

As Wucius Wong (1993) demonstrates in *Principles of Form and Design*:
“multiple use of a shape is called proliferation. The size and shape of overlapped or superimposed, proliferated elements can vary” (pg. 177).

All Revealed Relationships can be stacked to reach a certain height, compressed or pinched in a loose fabric tube, so that shapes merge and become one.

3 pairs are connected to each other and are constructed out of one long fabric tunnel, as well one singular which served as the first prototype in fig. 25.

All 7 modules were constructed by the rolling technique. The volume was built up layer by layer and the torus appears, no extra filling material was used. This idea can be compared to a tree trunk counting its age by each layer. 8m of knitted tube was used to create one base shape.

The hole in the center of the shape gives access to the material in order to ‘disappear’, ‘grow out’, ‘create depth’ and finally ‘finish’ the material/fabric.

The torus captures something somehow: the inner- the circle & the rolled up and hidden layers.

As Anish Kapoor (2015) philosophically hints at the Hirshhorn: Demetron Lecture: “the inside is bigger than the outside- that is what we are”. This quote refers to the ‘dimension of the inner’, the layers which are compressed, they stay invisible inside, we can only imagine them.

However, one torus shape was cut open to reveal the dimension of the layers.

The tube is like an empty flat mantle, like the dropped skin of a snake. It becomes alive when form is created with its material.
A diversity of surfaces, fabrics and shades of red form one collection of tori/ modules. The round shapes emphasized the continuity of the circle: a continuous fabric, a continuity of rolling, elastic possibilities.
Material, Color & Form - influencing elements

In total, 3 different sizes of rib were knitted to create a contrast in size, effecting a diversified expression. The thickest double rib fabric was knitted on the flat knitting machine, resulting in an elastic and comfortable material serving as a covers for two of the tori shapes. 3 shades of red, as well as 3 different materials are used to create one total vibrant expression. The more elastic the material, the smoother and most effective the rolling of the shape becomes. The bordeaux woolen fabric tube turned out to be the hardest to roll, since the material is significantly less elastic than the acrylic cotton, therefore harder to bend. Both of these tube fabrics were knitted on the circular knitting machine.

Moreover, the comfort can be influenced by the rolling: the denser the fabric is pulled over, the harder the shape gets, when touched. The signalling red of this Comfort Zone was set as the first base and starting point of the total collection, inspired by the coherent and modern image by Vivian Sassen in fig. 26.

A bursting out and disappearing into the inner of the torus. The left torus is covered by the double rib structure, whereas the right torus is bare and without a cover.
Physical & Emotional Comfort/Discomfort forming an Experience

The 7 modules/ tori can function as social elements. One or the other has to step out of their Comfort Zone to become comfortable to find one’s own comfort. Comfort Zones can be shared.

The aim is to reveal each other’s state of emotion. Interaction happens and relationships emerge: distance or approach, out of reach, entwined or encased- visually, physically and emotional.

When modules are arranged as one surface a spatial contrast appears and a void can be left in contrast with the filled and congested areas. The dense and compact base shapes contrast the loose fabric growing out of the void of the torus.

Voids offer the body different positions and challenge finding one’s own comfort.
Relationships are built up between the tori, as well between the human and the tori and the humans among themselves. The fabric in between the tori create a distance when stretched, and they can also be build closure when fabric is loose.

The knitted tube is like a flat mantle, a dead snake skin rising and creating something 3-dimensional, when rolled.
One longer connecting fabric encases all modules compact together- one whole piece is created and gives access to sit and lay on.
Laying position. The shape of the connected tori adapts to the body's gravity. The body activates the shape - both elements form each other.
The garment

The bodysuit, worn within this zone has a clear function of compressing the human body, which can affect comfort or discomfort, depending on the perception of the wearer. The rib structure contrasts white and off white lycra material, as well as it is steamed thoroughly to result a dense but elastic fabric. The crème white builds a clear contrast to the signalling red of the Revealed Relationships. The red line in the middle of the bodysuit gives a hint on the multiple red lines of the tori/ modules within this zone. The raw cut of the edges results in a wavy lining, adding to visual aesthetics. Finally, the black tights interact visually with the black color hidden in the rib structure of the covers of the 7 modules, which strongly merges with the red, which result in a dark shade of red. Also, the tights match with the strong black expression of the black rubber tire in the Captured Compression.

![Image](image_url)

The lines of the elastic body suit follow the lines of the back.
The red line in the middle of the body suit captures the body and ends on the backside. It connects to the red lines of the tori shapes as well as it hints at the sensuality of organic shapes/bodies.
You can never fully design the interaction of the body, but you can design possibilities of what can happen.

ZONE 2: SMOOTH VOID
I enjoy working with contrasts in materiality and shape. Researching on their properties and finding the best composition, is my passion.
A squared shape

In order to achieve a squared shape a wooden picture frame was taken, which forces the knitted tube into the squared geometric. The torus is altered. This shape follows the principle of the rolling technique, whereas the fabric is stretched over the frame several times in order to create volume. It presents a further development of the round torus.

The image shows a small prototype (20cm x10cm), serving as a sketch to be developed as a square/frame in human scale. Cotton/Lycra was used as a material, due to its strong elasticity and flexibility, to be able to stretch the tube over the frame.

There is a smooth void- emptiness in the middle.
Can you see the end?
I imagined voids dark and uncomfortable.
This series of images shows a form exploration of ‘the frame’. The body activates the shape- Interaction happens. Diverse possibilities of one shape are explored, wherein the end of the fabric is active in diverse ways. A continuous fabric offers continuous possibilities. It’s a circle. The void in the center of the shape directs the design process and functions as a crucial element of shaping.
Each material, undoes its own laws there to invert, and make use of what comes of it chances are weighed, coincidence being a state of mind (Maria Blaise, *The Emergence of Form*, 2013, pg.171)
When first planning the construction of the Smooth Void, taping was chosen as a sketching method to measure size and scale on the floor. After having set up the measurements, the simple wooden frame needed to be built. To measure the additional layers of the spacer fabric and lycra/cotton, presented a clear difficulty, since the behavior of the material was unpredictable. The measurements of the body helped to create a relationship to the piece for the first time, as the inner marked frame should be able to accommodate the body.
A ready-made mesh spacer fabric was used to be wrapped around the wooden frame. Several layers of the fabric sheathed and embedded the wood to finally build up a comfortable pad. The hard and uncomfortable wooden frame is hidden inside.

In this construction, knitted elastic straps made from cotton/lycra are used to stabilize the base construction by lashing them down strongly and then finally knot them. Moreover, the spacer fabric has elastic, thermoregulated and air permeable properties.
This experiment tested the scale of the wrapped frame, composed together with the human body. After all main edges were wrapped, the four corners needed to be wrapped, in order to create a smooth crossing. A first comfort was experienced inside the raw frame which defines a clear/ set area embedding the body in the inside of the shape.
A first contact between the wrapped frame and the thinner elastic fabric is perceived, when stretched over. Some of the images above show a glimpse of the inside and create an inner space, a shelter. When the frame is covered the look of the total piece refers clearly to a mattress, as well as the act of stretching/ bending of the fabric is reminiscent of stretching a fresh cover onto a mattress, corner by corner. After the first layer, 4 hands were required to pull the following fabric layers over the frame.
The body searches for shelter—at this stage the Smooth Void represents an introvert Comfort Zone.
The presented sketchy series served as a method to research on the relationship between body and object/ Comfort Zone and how both could interact with each other. Approaching several interpretations of a Comfort Zone was the aim with these photographs. Due to the relatively thin fabric the contours of the body become visible for the viewer. The body is captured in the inner of the construction. A shelter/cave displays a solitude and intimate space/escape, where personal feelings and emotions could possibly be expressed freely? A basic training suit and worn and loose tennis socks emphasize the physical comfort and create one smooth atmosphere.

Fig. 47-48
The horizontal angle has most chances to make us feel comfortable and relaxed—although comfort is subjective.
The void is displayed in several conditions as in loose and stretchy character. Regular and irregular wrinkles appear in the structure and shape the fabric surrounding the viewer. The void/ the hole is a required element of the tube guiding the design process from the beginning.
Approximately twenty fabric layers were stretched over the frame construction. Immense man power of two people was required. By stretching layer by layer over the frame, all irregularities of the spacer fabric were smoothed out to result in a clean, and neat surface. After every new layer of fabric, wrinkles had to be evened out step by step. The outline as well as the inner lining got rounder after every layer and resulted in an oval negative space in the inside of the shape. Besides, all layers compressed the inside, the surface became denser and harder. When grabbing into the corners of the piece, all layers can be felt- the fabric seems to be alive- organic- skin like.
RESULT:
Construction

The construction of the Smooth Void is built up on a basic wooden frame dressed in several layers of knitted spacer fabric, in order to create the base for comfort and volume. More or less 20 layers of fabric (a tube: 1m radius, cotton/lycra) created a desired soft and smooth surface. All layers are stretched over the frame by intense embodiment and strength. This sculptural way of constructing smoothens out the irregularities of the inner filling and base—it is a process. The very upper layer, a striped rib, knitted in wool creates a soft and smooth surface. The squared frame forces the round tube to follow its form. Furthermore, the elasticity of the knit is strongly challenged when stretched. The void (required by the tube) in the middle of the construction naturally evolves, as it is surrounded by all knitted layers. Fig. 54 shows the inner perspective of the fabric roll of the cotton/lycra knit, which was used to create the Smooth Void.

Layer by layer volume is build up; it’s like a tree counting its age per each new layer.
Material, Color & Form - influencing elements

The knitted lycra/cotton material supports the elasticity and enables the act of stretching. When looking at the inner base construction, the knitted spacer fabric is the decisive factor for the comfort. It consists of two surface layers and one layer of yarns in the inside, offering an interesting 3D structure, air permeability, elasticity and thermoregulation, due to its mesh structure (Ye Xiaohua, 2008, pg. 213).

The Smooth Void highlights the similarity of a bath tub: a void which embeds and accommodates the body, encircled by a 3-dimensional frame. The neutral crème color of the piece supports the simplicity which was aimed for and supports the natural organic expression of the piece and guides the viewer to focus on the most essential - the shape.

Led by curiosity, we look closer, attracted by the black depth, and realize we don’t know ‘the inner life’ of the shape: is it just a void, another space, or an endless space maybe?
looseness vs. tension
relaxed vs. unrelaxed
= vibrancy
In this image, the Smooth Void is held up against the light which shines through, due to the transparency of the two layers of woolen rib. The outline of the void becomes clearly visible.
The lining of the woolen upper surface follows the shape and disappears into the void.
The finishing edge of the fabric appears as a detail. The wavy edge suggests a scallop.

The backside of the Smooth Void shows the finishing of the fabric, which is first stretched out and then fixed and sewn onto the base.
Physical & Emotional Comfort/Discomfort forming an Experience

Due to the fact that the shape is placed on the floor it offers different ways to access the zone, in laying and sitting position. A strong relationship between shape and body appears: the body is captured, enveloped, encased, enclosed. Led by curiosity, we look closer, attracted by the black depth, and realize we don’t know ‘the inner life’ of the shape: is it just a void, another space, or an endless space maybe? Where does it end? A void usually gives an impression of darkness and emptiness: it is closed and open at the same time. A slight hint of transparency is given and light shines through the center.

The neat surface/cover allows us to follow the shape easily. The lines of the rib structure follow the form. Tactility is valued highly within this piece- the upper woolen surface should promote the physical comfort as it as well has important impact on our emotional comfort. The body nestles and clings into the shape.

A tension between the closed and tense shape and the looseness of the body appears.

“As designers, we must not focus one-sidedly on what these tools can do for us and forget to find out what they can do to us. Tools should serve the individual, the community and the environment- in both the short and the long run” (Peter Opsvik, 2009, pg.17).
Different positions can be taken and found within the shape. The base frame especially offers comfort for the head, due to the several layers resulting in a soft but stable pad.
A relaxed laying posture, emphasized by the loose fabric of the pants, displays a contrast to the dense and steady Smooth Void. In this image the body is exposed.
Fig. 66

Sitting position
The body nests into the inner circle of the shape; it is captured smoothly by the piece. Two curvy bodies appear. The slight appearance of the slight ridges on the frame refer to the loose and fluid pleated pants.
Due to the rib lining of the surface, the visual expression reminds of the Birth of Venus by Sandro Boticelli, as the shell exposes but captures the body. The shell structure is highlighted by the rib lining following the shape, which finally disappears into the void.
In this image the shape captures the body and serves as a retreat.
The garment

An extra-long pleated silk pants, combined with a pleated bandeau top create one whole, one casual atmosphere and perception. Together they present smoothness and comfort. The knitted pleats make us feel comfortable, as they are playful in touch and visually beautiful. Possible emotional discomfort can be transformed into comfort.

The crème color of the silk radiates a comfortable homey atmosphere, emphasized by the woolen surface of the frame, which is carefully brushed up to become soft in touch. Additionally, the long pants present a provocative element in their fluid character, contrasting the finished, neat and smooth shape of the Smooth Void.

The lines of pleats of the pants refer to the lines of the woolen surface of the Smooth Void – however they are loose and manipulatable, whereas the lines and the structure of the zone are nearly fixed and strongly stretched.

One half of the bandeau top is knitted from hard woolen material and effects a certain stiffness. The selvedge refers to the finishing of the backside of the frame in fig. 60-61. The rough wool contrasts the soft touch of the raw silk material and gives a slight feeling of discomfort.
Calves are partly exposed and show a glimpse of the skin. A sensual relationship between fabric and body appears.
Silk leisure pants combined with a silk/wool bandeau top.
“The encounter of positive and negative forms (resulting in a subtraction) is a way of producing spatial contrast. Space can be pushed and squeezed by unit forms which are thrust against each other. It can also be left as a void, in contrast with congested areas” (Wucius Wong, 1993, pg.109)
Some like to share their Comfort Zone, what about you?
Detailing-/Hintgiving

Hintgiving and Detailing is another method, being developed during the process. Lines are emphasizing and provoke convex and concave expressions, they trigger the eye of the interactor. Within one experiment a red stripe was knitted into the structure, running parallel to the general rib. Overall, lines appear and disappear in the structure- they provoke, give a hint and seem to run endlessly. Some of them run with the rib structure and some beyond that.

In the book *On Line: Drawing Through The Twentieth Century*, Connie Butler (2010) exemplifies her view on “a line may be broken or continuous, may comprise an extend sequence of single marks or an uninterrupted stripe. It is the relation of one mark to another, in their shaping and shading, their tonal gradations, that a drawing acquires form, depth, volume”(pg.23).

Minimal details are set, as they support simplicity. The property of the hole is an indispensable aspect and element and offers the ‘disappearing’of the material and the line, as well as the ability to shape.

The line disappears in the hole. A scan is used as a medium to capture the shape/structure.
Embodiment

Inspired by a garment (pullover), which normally consists of various sizes of tubes, different circles appear inside each other when rolled up. Since the act of rolling started already with the natural act of embodiment, the whole concept is closely connected to the interaction of the human body.

As a freely experiment a body/a model was dressed into a very long knitted garment, made out of a cotton rib. Some of the tubes were rolled up, some rested in their basic condition: loose and long. Contrasts in shape appeared, as the rolled-up parts framed and captured different body parts. The body and the fabric interacted with each other and became equally strong: two elements in movement, as they are individually elastic.

Within this experiment the act of rolling was limited because of the body proportions, and was no longer presenting a continuous movement. Finally, this experiment presented a starting point and opened up to new possibilities for choosing the body as a medium, in order to create shape.

Starting from a thinking method the body became a fundamental medium interacting with the different Comfort Zones. The body activated the pieces, in order to support and form one total expression, as well as it communicated best the comfort or discomfort, translated through emotion, attitude, position and mimic.

The human body functioned as the heart/ the essence of these moving sculptures and brought them to life: “They assimilate the bodies, as it were, wrapping themselves around them and touching them, with the result that the object is shaped through this contact with the body as well... participants gain a feeling of emotional security in the soft material and become one with the sculpture” (Ernesto Neto, Ernesto Neto, 2015, pg.49).

In some Comfort Zones the body represents the filling. In addition to that certain elements, such as skin, sensuality, elasticity can be found back in the materiality and tactility of the collection and created one balance.
This series displays the body as a filling. Several body parts were framed as details. A clear contrast between loose and densely rolled up fabric appeared. The white and off white fabrics smoothly merged together with the skin.
An interaction of the body and a sketchy shaped spacer fabric is displayed. The visual expression of the piece can be referred to the one of a sleeping bag. When the fabric was gathered in movement, the surface changed and presented a triggering structure. A vibrancy appeared when both body and fabric transformed. The body functioned as a filling, captured and compressed gently by a second skin, the fabric tube.
RESULT:
Construction

The Shared Solitude explores the phenomena of sharing a Comfort Zone but still being in solitude. A 6m long fabric was knitted on the flatknitting machine, and then sewn together to a tube. Comparable to the construction of a sleeping bag, the piece additionally offers the property of a mattress, since the volume appears within the structure when knitted: thick and shock-absorbing.

The tunnel offers two individual entrances on each end, which two bodies can access separately. One meter of fabric is flat and can be rolled up to create comfort for the neck. Within this zone, the body functions as the filling. Both body and fabric display external and internal forces/elements forming each other.

The selvedges on each side- horizontally, give an insight of the construction of the spacer fabric, as the structure is divided into smaller individual tubes. Additionally the side edges are connected by an upper seam, creating a delicate lining which emphasizes the total bulging shape, as well as it gives a slight hint on discomfort, due to the black inner monofilament, which partly bursts out of the structure.

The complexity of the material/ the knit forms a balanced composition together with the ‘simple tube’ of the total piece.

Steamed rolled up fabric. The wavy lines of the selvedges contrast the straight lines within the structure of the fabric.
The upper selvedge is wavy, due to the material combination of bamboo, lycra and monofilament. Different materials challenged each others elasticities.
The lines of the tubes in the structure connect visually with the fine lines in the knit, effected by the plating technique: One yarn feeder was feeding two different colors - they merged and became visible on the back and the front of the fabric. A crossing structure of black monofilament was used as the inner yarn to build up stability and to push the two fabric layers apart from each other; hereby volume is created.

In addition, the wavy selvedges of the fabric present an interesting contrast to the straight and exact tube structure. The wavy expression is underlined by the elasticity, a result of the combination of materials: black lycra, black monofilament and white bamboo.

10 meters of fabric were knitted and developed for 24 hours on the flat knitting machine. After knitting, the fabric was steamed to fixate and strengthen the structure: it shrank down to approximately 6 meters.

The plating technique combined the black and white color and created a delicate color play. Fine black and white lines on the surface appeared, resembling fine brush strokes.
The ends of the fabric give an insight of the knitted structure. The crossing of the black monofilament becomes clearly visible.
Material, Color & Form - influencing elements

The Knitted spacer fabric: Consisting out of two surface layers and one layer of monofilament in the inside, offers an interesting 3D structure, highlighted by the parallel running tubes, creating a bulgy expression. Additionally, the spacer offers an air permeability, elasticity and thermoregulation. Since the fabric is partly knitted from bamboo, it adds a hygienic property. In her thesis *The Myth of the Silhouette*, the [fashion] designer Karin Landahl (2016) researches on form-thinking, and explores knit in relation to the body. Additionally, Landahl reflects upon openings in garments: how they support the total shape, create different effects of fastenings, and finally make the garment stays on the body. Within Landahl’s work, the tubes dress the body, whereas in this research the tube evolves from its own essence, its own ‘body’. The natural behavior of the knit is to roll, which appears inherently, due to the knit’s flexible structure-it strives to be formed.

The painting in fig. 85 is by Manguin, it shows comfort in solitude. A *Comfort Zone* is like a circle/a border we draw around us, we define it by our emotions. We feel protected and captured. This image served as the first base for color inspiration: the green and red color are complementary colors as well as the signalling color builds a vibrant contrast to the white of the boy’s pants.
The Shared Solitude offers two ways of entering the tunnel. Both ends of the fabric can be rolled up to support the neck. The fabric adapts to the body and the body shapes the structure.
Distance between both bodies can be overcome, if wanted.
Physical & Emotional Comfort/Discomfort forming an Experience

The Shared Solitude functions as a second skin/cover, which compresses the body smoothly. Firstly, inspired by the basic empty tube which naturally coils up, due to the knit’s elasticity. Since the tube encases two bodies, they are able to touch each other - a certain approach can be taken, and the distance overcome, dependent of the emotional state of both bodies - Intimacy can be shared.

By encapsulation and decapsulation of the body, the piece is activated. However, the tube offers protection but also the possibility to break free, to breath, due to the fabric’s porous property.

A highly closed roll-neck pullover as a garment can emphasize the expression of encapsulation and protection. Nevertheless, it also expresses tightness/narrowness, resulting in discomfort and oppression. Consequently, the pullover and body suit have an important impact on this introverted Comfort Zone.

In the book Findings on Elasticity the structure of the human skin is described as: “this envelope, combining properties of suppleness and strength, not only protects the organism from external attack but also represents a site for exchange between the inside of the body and the exterior” (p.54).
The open back of the body suit created a contact surface, thus the softness and comfort of the spacer fabric could be experienced and felt. The extrovert body enhances a slight provocation to the more introvert Comfort Zone.
Through playing with sensuality of material and form you become aware of your own body. Sensuality is also synonymous with vulnerability.
The fine lines of the selvedges refer to the outer lines of the body and skin.
The garment

An oversized roll-neck pullover encapsulates the upper part of the body. It is constructed of an extra thick, double rib fabric in woolen/acrylic quality. The fabric was developed on the flat knitting machine and returned as a cover fabric in the Revealed Relationships. Due to its stiffness the high neck collar presents a protective element and emphasizes the intimate atmosphere experienced within the Shared Solitude. Next to the safe and comfortable feeling, oppression could be affected by the heavy and dense properties of the fabric, worn so closely to the body. The raw edges sharpen the contour and display a sculptural object, rather than a garment. All openings were cut raw and strive to be rolled up: Both sleeves and turtle neck and the spacer fabric of the Shared Solitude is adjustable.

As an additional outfit, a body suit is presented. It was knitted from the same dense double rib fabric and reveals the body much more in the way it is shaped.

The dense and heavy turlle neck pullover offers protection, thus it captures the body. The heaviness can also be perceived as an oppressive element.
The long sleeves emphasize the long fabric tunnel, as they can also be rolled up. Next to the access of laying, the piece functions as a mattress. The rib of the tennis socks of the model interacts with the rib of the pullover and the main Shared Solitude.
The neck support of the body suit, compliments the turtle neck of the pullover and emphasizes comfort and coziness.
The main outfit complementing the Shared Solitude.
Foam is an extrovert material, due to its pure and naked expression. It is porous, therefore comparable to human skin.
Raw materials composed together: PU foam, rubber tire and knitted straps

Fig. 98
A rubber tire with a diameter of approximately 1m was used as a base to build up a chair. Besides, the tire was shaped as a torus, which connects to the overall concept - it is pumped up and adapted to a comfortable seating level. The elasticity and bounce of the PU foam, played together with the bounce and elasticity of the tire. Foam is a common material used in upholstery creating comfort and volume.

Every foam piece was built up onto the tire individually, to slowly result in physical comfort. In the very upper images equally sized foam pieces were taped onto the tire, which had to be removed, since the regularity of the placement of the foam caused discomfort.

The hollow tire tube builds up a vibrant contrast to the dense foam, encapsulating the tire, without hiding it completely.

Transparent tape was used as a stabilization tool/method which should connect and hold both elements compact together. The 2 lowest images shows how the back lean was built up by stacking foam onto each other.
Most foam layers were cut from a 10cm high mattress; all layers combined displayed a diversified expression in total. In fig. 100 the stripy cotton cover of the foam mattress was re-used to cover up the lower base construction to even out all irregularities and reliefs caused by the rubber straps, cutting into the foam. The rubber straps connect to the rubber tire in materiality, as well as the total construction was made more elastic and bouncier. Besides those, diverse colored knitted straps were tightened around the construction, resulting in a total stripy image, effected by printed, knitted and rubber stripes. The hole in the center of the tire eases this way of tightening, since both hands can meet to create a knot.

All straps are sculpting the foam and slowly build up a Comfort Zone.

The left image shows a side view of the back-lean construction. Gaps between the foam layers become visible and highlight the porous texture of the PU foam. The expression of the total piece becomes light.

The raw cut edges of the foam highlight the more rough and sculptural working method within this piece.

Side view of the back-lean construction, which is held by elastic rubber straps.
This series shows an interaction, a first experiment wherein the body gets comfortable in diverse ways. The constructed shape offers accommodation for the body in several positions, especially the hole in the center of the piece has an important impact on giving access to the piece, as it invites to sit, for instance.

The body is in ‘action’, as it goes into rather unconventional positions and postures. The embodiment is already strongly present in the making, the process of this piece; as in stretching, taping, stacking and pumping up the tire.

“Even the most comfortable position becomes uncomfortable after a while. Have you ever woken up with your arms around your partner?” (Peter Opsvik, Rethinking Sitting, 2009, pg.37).

Different positions are taken to explore the shape’s possibilities

Fig. 102
Fig. 103 displays a completely dressed construction. When starting to develop this piece, the inner construction was not supposed to be seen. But then the bare foam construction turned out to be more triggering than the dressed piece.

The entire inner tire/foam base construction was hidden under a thick fabric cover creating a smooth surface. The total shape gave an organic and curvy expression, where only a few hints of the inner foam becomes visible. In order to create quick volume, two different fabrics were developed on both the circular and the flat knitting machine. The volume within the stripy grey fabric was built up with a supporting filling yarn, being stuffed into the structure when the fabric is knitted. Furthermore, the red fabric which was produced on the flat knitting machine is knitted in a double rib structure, resulting in a thick quality, heavy in weight and soft in touch. Elasticity in both of the fabrics were an important requirement.

Both fabrics were connected to one tunnel and then stretched several times over the foam construction. This method of layering smoothened out all irregularities of the upper foam surface- the total shape changed and shrank. It became very dense and totally compressed.

The upper fabric layer held the construction together, it also functions as an outer visual cover. Two zippers on each side connect both fabrics and eases the bending over, due to its ability of opening. The stripes of both fabrics cling around the shape, emphasizing the organic and round character of the piece.
After having discarded the cover fabric to show the inner base construction, the tape became clearly visible, as it was used as a stabilization method in connecting foam and tire. When using tape to connect both materials, the construction was fixed and inelastic, meaning that the foam pieces couldn’t be shifted anymore to be adapted to create comfort. For aesthetic reasons and a lack of elasticity, the tape was cut and ripped off the foam and tire and finally replaced by knitted straps in fig.105.

The upper image shows an interesting contrast between the taped foam and the revealed parts in between; Some parts of the foam were in close contact with the tape, therefore kept away from oxygen and light. Slight differences in color become visible and create an irregular pattern. The transparency of the tape triggered the eye and added shine to the total rather matte materiality. The base of the construction was lifted up by two additional foam layers to ease the access for the user. Consequently, the tape straps were removed and replaced by elastic knitted tubes, allowing the foam to breathe.

The upper image demonstrates how plastic tape was used as a construction tool and stabilizer, whereas it has been replaced with knitted straps in the lower image.
This experiment followed as a continuation of the first series ‘body in action’- Here the body positions on the bare and simple foam construction (wrapped in plastic for protection). The off-white straps, knitted from cotton/lycra merged with the yellow shades of the foam and the bare skin, which was partly exposed.

An elastic construction combined with an elastic body. Freedom was experienced through resting, exposing, hiding, leaning, sitting, laying, disappearing, diving and sinking into the center of the piece.
RESULT:
**Construction**

The Captured Compression was constructed of a circular black rubber tire and additional yellow/white PU mattress foam. The rubber tire served as the base shape and set up the overall torus shape. The foam was stacked in sliced layers upon the tire and followed the torus in order to create comfort mainly for the sitting position. Overall the construction created a contrast between a hollow space (the tire) and the dense and compact areas (the stacked foam).

“It is common for individual forms or units forms to contain contrasting elements which may help to make them look more interesting. Sometimes contrasts exists without being noticed, but a designer should be sensitive of its presence. Effective use of contrast is of paramount importance in designing” (Wucius Wong, 1993, pg.107).

Both the compressed air and the compressed foam were captured within the construction. Knitted elastic tube strings (cotton/lycra) were knotted onto foam and tire, holding both materials compact together and functioning as a second compressive skin. Additionally, the tubes interact with the foam, as they compress and shape it due to the elasticity of both materials. This construction method created one net-like surface, one ‘knitted cover’and shows up different parts of concentration, which is “a way of distribution shapes of forms with increasing densities in desired areas” (Wucius Wong, 1993, pg. 345).

The net-like surface captures but at the same time reveals as in giving access to reach and touch the inner through openings, as well as it offers visual access.
"A great contrast between hollow space and compact snow is created. Negative form: A hollowed shape surrounded by solidly filled areas. Negative space: Space that is not filled or occupied. Positive space: Space that is occupied by a filled shape or positive form." (Wucius Wong, 1993, pg.347).
Color inspiration, Paris, Summer 2018
Physical & Emotional Comfort/Discomfort forming an Experience

Due to the elasticity within the materials, the comfort becomes elastic/flexible: accessible in diverse ways. Both foam and rubber tire create ‘a bounce’, which enables swinging back and forth, when leaning back into the highly stacked foam lean, an ongoing vibrancy: there is tension of life, a certain movement and eager of transformation. Meaning that the individual comfort can be found by taking in different positions.

The hole in the center of the torus has the ability to swallow the body, or let it appear, arise-it embeds the body smoothly. The air inside the rubber tire (an empty tube) can be regulated, changed and influenced by the tension and comfort. The high back-lean offers stability in construction- in physical, but as well in emotional way, offering protection and safety.

The Captured Compression exposes the body and expresses physical and emotional comfort. When feeling comfortable we become relaxed, we enter our own individual zone: feeling free, independent and positively hold. We no longer adapt to the outer world- we expose and reveal ourselves. Comfort provokes and affects a relaxed body and affects looseness: contrasting the compact, compressed construction of the piece. Breaking away from set convention, rules and behaviors is the aim. Disclosure becomes a central aspect.

The person experiencing the Captured Compression wears a body suit with exposed back. Due to the exposed skin the contact surface and meeting point of both (pure) elements becomes available. Foam and skin touch each other and merge. The exposed skin emphasizes the importance of the tactility, the pure, the raw; the focus lays on the surface. If foam so close to the skin is perceived as comfortable it is a matter of subjectivity.

Both ‘skins’ change and evoke each other. Tactility influences our comfort or discomfort – it creates an atmosphere around us.

At last, the Captured Compression is variable in its positions and possibilities- it is elastic as well in the way it could be adapted and adjusted to the own individual comfort: more straps and foam could be added or taken away.

“When sitting suspended, rhythm and frequency harmonize with the urges of the human body, both physical and mental” (Peter Opsvik, 2009, pg.105).
Different shades of PU foam build one backlean. The elasticity of both foam and knitted straps are challenged and form a steady but at the same time elastic construction.
The construction method becomes clearly visible within this series; the foam and the knit merge and build up a strong contrast to the deep black rubber tire. Besides, the lining of the straps runs parallel, diagonal and lead into the inner void. All knots are tightened differently and embody a rough and volatile way of working (at least within this piece). The elasticity in all three materials play together and form one whole.
This series shows the backlean of the total Captured Compression. Foam is stacked onto each other to create a stable back support. Irregular knots become important elements, functionally, as well as visually.
Body sits in relaxed posture on the Captured Compression-an extrovert Comfort Zone. Both Construction and body are revealed.
Possibilities of postures are elastic.
The exposed back of the body suit offers a contact surface, where both ‘skins’ meet and merge. Moreover, the crossed straps of the body suit clearly refer to the knitted straps of the Captured Compression.
Material, Color & Form - influencing elements

The raw expression is emphasized by the purity of the PU foam, which is often used for the inner construction in upholstery. Within this zone the foam serves as a central visual expression, as well as creating comfort. Additionally, it shows up diverse qualities and properties such as compressive characteristics and elasticity. The properties of the foam can be compared with the ones of the human skin: “the passing of time and the environment not only affect the appearance of the skin but also its function. The skin is not a simple envelope: it is subjected to mechanical strains which it withstands due to its flexibility. With time, its properties of elasticity and tension are lost; its protective, metabolic and sensory functions (as well as its capacity to adapt) diminish” (Findings on Elasticity, 2010, pg.177).

Foam is an extrovert material; it is porous, it emphasizes openness and exposure. The knitted off-white cotton/lycra tubes are mainly used as a construction and stabilization tool. The rib binding supports the elasticity. The off-white merges with the color nuances of the foam. Right under the concentrated areas, the foam fades, since the tube offers protection from sunlight. A certain sensitivity appears through the detailing: the knots, contrasting the overall roughness.

The elastic cotton/lycra material tubes, knitted in a rib binding, embody and support the elasticity. Right under the concentration spots, the foam fades, since it is protected from light. A palette of yellow tones appears and creates slight differences. A smooth crossing between the foam and the knit appears: a contrast of sensitivity and rawness. Next to the ability of uniting all elements, the knit has the ability to smoothen out all irregularities in the structure by compressing and stretching: “a shape can be metamorphosing- be affected by internal growth in one or more specific areas. It can be deformed as if it is being acted upon by some external force that is squeezing, pulling, or pushing it” (Wucius Wong, 1993, pg.177).

The Captured Compression shows a new perspective on how ‘filling material’ can be interpreted in a more extreme and exposed way. It bares the aesthetics of the mostly hidden ‘inner-life’ of upholstery and the beauty of the ‘unfinished’, a ‘prototype’, supports the idea that: “a product has quality when it makes me think”, and “it is a misunderstanding that design is only successful when it can be sold” (Renny Ramakers, Rethinking Design, 1999, pg. 20-21).
When using foam as the main and coherent construction element to create both comfort and surface, the skin touches the exposed foam: both ‘skins’ change and evoke each other. Tactility influences our comfort or discomfort – it creates an atmosphere.
The garment:

The model wears an extra-long pants knitted out of the same cotton/lycra material as the straps, used as a stabilization tool to construct the Captured Compression - it is comfortable, elastic and soft. Additionally, the off white pants and foam merge and become one. The long pants act as a slight provocation insinuating to the loose hanging/ fluttering tube parts of the knots, as they visually interact with each other. As well as the waistband of the pants refers to the straps, as in elasticity and compression/ holding. Combined with the off-white pants, the model wears a bordeaux colored body, exposing the back. A contact area between both surfaces of skin and foam is formed. Both elements complement each other’s bare, naked and raw expression. The dark red color of the body adds contrast to the overall dominant pale look. Also, the crossed straps of the body hint at the knitted strap construction of the Captured Compression.

The oversized pants merge with the foam and hint at the loose hanging ends of the knotted straps.
Oversized pants combined with a bordeaux colored body suit.
ZONE 5.
THE BURST

Structure of the yellow rib fabric

Fig. 124
Cotton/lycra straps are compressing the base construction.

DEVELOPMENT
The cut

Cutting was chosen as another technique to influence and abstract the torus shape. When cutting into the shape from different angles, a clear reaction of the knit’s behavior could be observed: it expanded and bursted; which tells us about the inner, the way it was made, how layers were built up and at last: how color was explored. Contrasts appeared and the characteristics of the shapes suddenly changed: hard became soft, dense became loose, etc. The incised torus shows best the dimension of layers, which are normally hidden inside the shape. Due to the high density of the rolled-up fabric, the shape seemed to nearly explode. Instead of the expected softness, the burst felt very hard and compact, since it was rolled up very tightly. The stripes of the rib structure reacted to the “form-creating act”, the cut, and followed the form. Cotton was used as a material to knit approximately 3 meters for each torus shape. Cotton exemplifies a very flexible material, easy to bend, but not elastic, thus no contraction of the material happened, which affected a much more loose and soft structure, whereas in fig. 20-22, the shape became quickly very hard due to its significant elastic cotton/lycra material.

Scan of transformations of a torus shape, approached by the cut.

The first image shows 2 yellow colored tori, made by the rolling technique, knitted on a 10cm-diameter circular knitting machine.
The Banana Split in fig.128-129 embodies a bigger scaled example of the cutting technique. The cut into both sides of the shape resulted a new geometric. Layers became visible and the total expression vibrant.

As in fig.126-127, cotton in two yellow shades was used to knit one 8-meter long tube on the circular knitting machine. A burst is not only found on the sides, where the material is cut, but also in the center of the shape, where the fabric grows, ‘bursts’ out of the void.
This prototype for the last zone: The Burst is a material collector of all raw materials used within the collection. First a knitted mesh spacer fabric in the inner base, followed by PU foam, and at last the encasing knitted rib as the last layer. Originally, the Banana Split was intended to be translated into bigger scale. The shape is build up by the rolling technique and manipulated by the cut on both sides of the torus.

Due to scale, the rolling technique could not be translated into bigger, since the bending would have required even more man power, a much bigger wooden tube where the material could be bend over. Only the outer encasing layer was elastic enough to roll.

Finally, the decision was taken to construct 2x1m long rolls individually, in order to create one total sitting construction. This way of ‘rolling’ can be compared to the rolling/adjust of the backlean of the Shared Solitude in fig. 86. As the prototype in fig.130 demonstrates, all layers of materials are visible and burst out.
The line is searching for the outline of the shape
The knitted mesh spacer fabric served as the inner base of the 2 rolls. Step by step the mesh was rolled to build up volume. The same cotton/lycra tubes were wrapped around the shape to create a stable construction. In order to create a neatly rolled up shape, small cuts had to be made into the structure, where the straps could be put through to hold the fabric tightly together. In addition to that this way of rolling can be compared to the backrest of the Shared Solitude.
Two base shapes, consisting of spacer fabric and PU foam were built up. Compressed and hold by crème colored straps. Irregularities in the surface were smoothed out by the cotton/lycra material. In order to do so, some tube straps were cut open to be able to cover a larger surface.
After the inner base was built up, the knitted rib was stretched step by step over the shape. To reach a compact shape, the fabric had to be sewn in the whole width on to the base shape. With each more layer, the surface became more even.
RESULT:
Construction

The Burst unites all materials, such as PU foam, knitted spacer fabric and a double rib fabric being used in the collection. Together they build up volume and comfort.

Inspired by the Banana Split in fig.128-129, the Burst was developed in bigger scale. Rolling both rolls individually, seemed easier, instead of letting the shape appear out of one element as in fig. 126-127, as well as the use of spacer fabric decreased the weight of the total piece.

The Burst offers a clear function of sitting and can become accessible for 2 persons. 2x 1m wide and 50cm high rolls are used to create one total expression, as they are connected by a knitted fabric, which builds up the last layers of the construction. All 3 filling materials are exposed/revealed on each end of the 2 rolls. Each layer becomes visible and evokes a vibrant expression, as well as the crossings of the different materials.

Moreover, the outer knit cover mantles around the shapes and finally meets in the center, where negative and positive space is created. “The encounter of positive and negative forms (resulting a subtraction) is a way of producing spatial contrast. Space can be pushed and squeezed by unit forms which are thrust against each other. It can also be left a void, in contrast with congested areas”(Wucius Wong, Principles of Form and Design, 1993, pg.107).

Then the fabric rises to the ceiling and forms a back lean. A contrast between the 2 densely rolled up pieces and the loose fabric is visible, similarly to the construction of the Revealed Relationships.

In his book Principles of Form and Design, Wucius Wong analyzes the ‘contrasts of gravity’, which refer to the two main contrasts found back in the construction: “there are two types of gravitational contrasts: stable/unstable and light/heavy. Stability or instability may be due to the shape itself, or due to or deviation from either verticality or horizontality. A stable form is static, whereas an unstable form suggests movement. Lightness or heaviness of a form may be due to the use of color, but is also affected by shape and size”(Wucius Wong, pg.107).

The naturally arising form (mainly reached through the rolling technique), is best emphasized by the concept of ‘the function following the form’.

The second roll functions as an additional back support next to the rising fabric, since it is slightly higher constructed than the one in the front.

The two base shapes are constructed with approximately 11 layers of ready-made knitted spacer fabric, followed by 2 layers of PU foam and finally 4 layers of double rib knitted cotton/wool/lycra.

Comparatively, the same thick rib quality as the covers in the Revealed Relationships was developed in order to build up volume quicker, compose comfort, as well as it holds and stabilizes the total construction. The last layers of fabric had to be sewn onto the layer underneath to crate stability and hold all layers together.

The lines of the upper yellow cover leads the viewers eye around the shape and supports to understand the way the piece is constructed. All layers build up a continuous rhythm, emphasized by the outer and inner and concave and convex circular lines.

During the process, elastic knitted tubes were used as a stabilizer, tightened step by step around the bigger and bigger growing roll. This tightening method supports the total shape, as well as it affects a neat rolled up structure: holes had to be cut into the structure of the spacer fabric to connect both elements. Similarly, this method has been used in the construction of the Smooth Void.

When rolling, the resilience was constantly challenged, as it needed to be able to proceed the continuous act of rolling up the fabric. The denseness and pressure were finally released when the fabric burst out freely up to the air.

This way of rolling can be technically compared to the Shared Solitude, wherein both ends of the tube are simply rolled up to create a neck support for laying position.

As a matter of fact, the piece can be slightly composed differently, due to the two flexible main modules, the rolls.
Negative and positive space appears.
Close-up of all material layers. Seams become visible in connecting them.
Material, Color & Form- influencing elements

Due to the combination of the elasticity of the material and the plating effect in the structure of the knit (a possibility to merge two colors on one surface), the slight color contrast of the bright yellow and the white becomes visible and vibrant when the body interacts and the fabric is stretched out. Moreover, the acid yellow tone adds freshness to the matte and muted foam and the white/transparent spacer fabric. Since the foam changes its color over time, so will the total expression also change its appearance.

The material combination of 50% Lycra, 50% wool/cotton offers flexibility and elasticity within the structure and enables movement and interaction of the body. Additionally, the rib was used as the main binding, due to its flexibility and its property to follow and support the shape nicely when rolled, as well as the lines, which also support the shape visually.

One long fabric connecting both rolls forming one total expression.
Physical & Emotional Comfort/Discomfort forming an Experience

The rising back lean encases and protects the body, the piece becomes alive and active, clearly noticeable in the stretched-out fabric. When the body lays back in different angles into the lean, the body relaxes, contrary to the fabric which is strongly stretched.

When composing both shapes with the human body, an on-going elasticity can be found back on the surface. The elasticity is provoked in various ways, technically; but also in the wide range of possibilities the knit offers in creating shape. Both bodies have influence on each other when interaction happens. Additionally, the shape of the rolls is clearly transformed by the gravity of the body, whereby the material gets squeezed but contracts back into the original shape when the pressure is released.

This image shows an experimental search for color shades creating an atmosphere. Introvert and extrovert at the same time.
This image displays a relaxed body leaning into the backrest, which then stretches out and transforms from ‘loose’ into an ‘unrelaxed’ state.
The influence of the body on the shape
The Burst offers comfort for two. Both bodies are able to lean back into the back rest. The roll in the back functions as a back support, since it is automatically higher than the front one due to the gravity of the bodies.
Partner seat accessed in different variations
The garment:

The main outfit, combined with the Burst, consists out of one light yellow rib shorts out of cotton and a transparent olive-green turtle neck pullover, knitted from polyester. Both colors combined create a fresh, summer appearance emphasized by the model being barefoot. Complimentary to the green color stands the red, which is strongly represented by the flexible modules in the Revealed Relationships in fig. 29.

As a matter of fact, the transparency of the thin and delicate pullover builds up a strong contrast to the thick and dense materials being used in the collection, as well as clearly hints at the contours of the body, due the thin quality of the knit. The raw edges of all openings curl up, and give a hint to the elasticity and the overall starting point of this research. Connected to the summer thought and atmosphere, all openings/tubes can be rolled up to expose the skin but also serve and function as a protection when rolled down.

At last the more transparent lines in the back hint at the vertical movement within this group, since the backlean also rises up in the air. The additional outfit consists out of a yellow top, knitted out of the same knit as the yellow and white shorts.

The transparent stripe at the back of the pullover functions as a slight detail and refers to the overall lines of the collection.
Two outfits composed together add a fresh expression to the Burst.
CONNECTING ELEMENTS OF THE COLLECTION

All pieces within the collection can be composed and lined up differently. To demonstrate and emphasize differences, or common components and contrasts pieces can be grouped by shape, size, color, texture, direction, and/or position - they create a dialogue and counterparts.

All 5 groups embrace the terms: ‘capturing ‘and ‘elasticity ’, individually, combined with each other, in materialization/tactility, visual aesthetics and emotions.

In addition, all pieces are connected by the knitted tube, the crucial element which functions as a cover or filling. The hole/the inner/the center is a central element, often provoked and effected by the tube.

Lines build a red thread in the collection and connect every individual piece, through rib structure, geometrics and volume.

The Captured Compression and the Smooth Void are most contrasting in shape and visual expression as well as they express/communicate comfort. The Captured Compression appears very raw, due to its total exposure of the filling material, contrary to the Smooth Void, where its shape entirely closed, smooth and finished neatly.

The Burst presents a good communicator between the raw Captured Compression and the other pieces. Both deal with foam as a material in different ways: the Captured Compression more exposed, the Burst in combination of all other materials of the collection. All other pieces deal with filling and cover in a more balanced way, less extreme.

The spacer fabric functions as a filling and base of comfort within the Smooth Void and the Burst, whereas it covers the body in the Shared Solitude.

The rolling method used for the construction of the Burst is comparable to the rolling used in the Shared Solitude, where volume can be adapted optionally in order to create a neck support. This is contrary to the method of rolling in the Smooth Void or the Revealed Relationships, where the volume is created by the rolling of the tube.
The following arguments will be discussed:

1. The role of the garment in the collection: How does the garment strengthen the role of the body?
2. The term capturing; translated and expressed by the net structure
3. Comfort in public spaces nowadays, and how it cannot be accessed
4. Comfort seen as too effeminate in history- seen as decorative element

The garment:

Since garments have a great influence on our comfort and discomfort, it seemed challenging and appropriate to design textiles for the body emphasizing and interacting with the collection- the Comfort Zones. Clothing strongly supports our physical and emotional state and affects a coherent balance of ‘being’, when comfortable. As an added element, the collection of garments should complement instead of compete with the pieces, they should merge and become one whole. Besides experiencing the piece, the garment should be experienced. Controlling the bodies’ comfort by garments could strengthen the concept as they emphasize the overall importance of the embodiment in the collection.

A back-free body, for example creates a bigger contact surface, where skin and material meet- a more intense experience can be provoked.

By discreet details in structure, material and form, hints of discomfort are given to create a vibrant expression as it also shows how vulnerable and fragile comfort is- it can just be for one moment, for one thought, for instance.

All garments are made out of knitted material, being used in the Comfort Zones. Knit expresses a clear comfort in its flexibility and touch and offers additional stabilization and fit. Elements of color and materiality return within the collection when translated on the body.

A clear interaction happens when the body touches and activates the Comfort Zones. The material and the body evoke each other when composed together; the skin/ the upper surface of both elements change.

Would a casual jeans and t-shirt, our daily comfort express the same sensitivity? This choice would definitely stimulate a clear focus on the central objects and lead to a more direct and practical use and interpretation. All of the Comfort Zones capture and accommodate the body. Some more exposed, others rather protective and enveloped. Some even become abstract garments, as in the Shared Solitude, wherein the body nestles closely to the body like a second skin.

Could this expression be sufficient, instead of adding extra garments?

The net:

The term capturing has been serving as the ‘red thread’ from the beginning as it clearly influenced the process. The properties of the net have been translated in a fascinating way: the net has the ability to hold, capture and cover something, and contrary; to completely reveal the inside. Due to its openings we get access to touch the inner; the filling. During the process, a rubber net was discussed to be used within the Captured Compression. The aim was to function as a stabilizer, a cover to hold the foam and the rubber tire compact together. Since the elastic knitted tubes/ straps already added sufficient function for the construction, the net became unnecessary and presented a rather decorative element, as well as it created quite an extreme contrast to the raw and pure foam construction.

Since the nets’ characteristic express a certain sensitivity, it could be used as an interesting element in further explorations, either in relation to the body or material. During experimentation, a see-through metal tube was knitted to be layered on several different filling materials. A surprising phenomenon appeared: the existing comfort of the inner could be perceived by the look but not by the touch/feeling/experience. It became inaccessible, due to the outer metal layer.
Comfort in public spaces

Notwithstanding that we share many ‘comfort zones’ nowadays in public spaces, such as libraries, restaurants, etc., the definition of comfort is strongly connected to our personal taste and emotion, therefore, perceived differently. When looking at the placement of seating in a Parisian metro, we realize that the focus lays on individual anonymity and isolation, rather than challenging an interactive communication with the ‘opposite’, in fact to dare the step out of our Comfort Zones. Although this design of set-up allows a certain human approach, we mostly prefer to stay in solitude and comfortable on our own.

Most often the emotional comfort is more highly regarded than the physical, although both depend on each other and influence the others triumph.

Certain corners or spaces at stations for instance, are provided with different tools to control and keep away the homeless, or other: people unwanted setting up ‘a residence’. Concrete pyramids ostracize these people from others and clearly state that they are not wanted. This example could be compared to preventing pigeons getting comfortable by putting up metal needle surfaces.

This manner of stealing and delimiting others comforts in order to gain own safety and comfort is currently highly discussed in the media. This so called ‘defense architecture’ started a social and political discussion about the access of public spaces in general- apparently a phenomena of an anonymous big city life.

The German online newspaper article Defensive Architektur, written by Julius Heinrichs (2018) deals with fundamental questions like; who actually is allowed to access public spaces and who are they owned by?

An explosive discussion which reflects an expression of ‘social coldness’ of the upper classes being captured comfortably in their individual zones/spaces. They boost themselves by arguing that these spaces could symbolize a social descent, and eventually affect a feeling of oppression and uncertainty (Heinrichs, 2018).

But overall, what is the use of these zones, if we cannot access them? Wouldn’t this represent the minimum of comfort, all of us deserve? When granting access, these zones are kept alive and vibrant- they unite.

Comfort = effeminate, textile= effeminate?

The last point of discussion is looking at the history of upholstery, where comfort was perceived as too effeminate (Feathr Oy, 2017), therefore slowly developed. Nowadays we all admit appreciating the physical comfort, although it is more and more commonly reduced to designs for individual solitude.

Upholstery is often related to the upper decorative fabric layer, which is indeed very functional in holding and uniting all layers together in order to become one. Textiles in general suffer under the prejudice of being exclusively embellishing: emerging from traditional handcraft techniques, developed by women. The fashion designer Tracy Mulligan creates refined, contemporary clothing. She works with textile designers who create fabrics featuring prints and embroidery: “the streamlines silhouettes Mulligan favors, draw attention to the textile which is often embellished. Stating that “surface decoration is the future of fashion”.

Mulligan expresses her interest in handcraft and texture which are employed for both visual and tactile effect (Fabric for Fashion, Tracy Mulligan, 2001).

In fact, textiles serve as the ‘finishing touch’; both in tactility, as well as in finishing up and representing the total construction.

In this research the textile plays a central and fundamental role in embodying the comfort. The comfort emerges out of the textile.
While working on this project much discomfort was felt and was set as a requirement to be able to create the Comfort Zones in bigger scale, whereby many unknown métiers were entered.

“To create or invent something new, you have to enter new territory and not everyone is prepared to do that. You have to leave your familiar ground and the comfort you know. That is why improvisation is of such importance: not knowing what's going to happen and discovering that you are so much more than you imagined”
(Maria Blaisse, *The Emergence of Form*, 2013, pg. 242).
REFERENCE LIST


IMAGE REFERENCES


Photographs of author: Fig. 1, 15-25, 27, 28, 37-56, 61, 70, 73-84, 91, 97-109, 111, 112, 121, 124-127, 130-142, 146-148, 150

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