Dead Skin, Living Machines

Textile under surgery
Degree Project  
Master in Fine Arts in Fashion and Textile Design with specialisation in Textile Design  

Title  
Dead Skin Living Machine: textile under surgery  

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My interest for textiles is deeply related to the intrinsic duality of textile nature. It has this particular power of being an outcome as well as a “raw” material, which gives it a wide range of considerations. According to me, this duality makes textile one of the most generous medium in that sense that it is so much favorable to be considered as a “starting point” in its own field and many others.

Textile field includes at least two most basic practices, which are making fabrics and making clothes. This illustrates very well the double-personality of textile: a fabric freshly knitted or woven will be considered as an “outcome” for textile designer, but for fashion field, or any other activity closely related to making textiles, fabrics often are a starting point.

Nowadays, textile making practice is easily related to its heavy traditional background and hand-technics which tints textile technics with a “pejorative manner, and stereotypically something that is only of interest to the elderly” (F. Tellier - Loumagne, 2003).

Parallely, textile has lately been widely assimilated in ultra high technologic performances of new technical fabrics, have been associated with electronic, or printed in three dimensions.

“Almost all textiles are now becoming “technical” or “intelligent”. For example, they may be breathable, water-repellant, thermo-regulating, or moisture regulating, haemostatic, reflective, optical, thermochromic, acoustic, perfumed, anti-bacterial or anti-UV”. (F. Tellier – Loumagne, 2003)

Of course, making textile is not only about hand-craft. This is the thing. Textile field is very much known as “craft”, yet, making textile by hand is also a lot about machines and tools. In “the art of knitting”, F. Tellier – Loumagne explains a bit more about the inner contradiction of textile making.

“It is notable however, that the discrepancy has increased between, on the one hand, the increasing capabilities of the production equipment, and on the other, the very basic nature of many designs. In fact, production hardware is increasingly high-performance: the newest knitwear is now made in three dimensions, meaning without seams, and often includes complex details (such as edgings or pockets). Knitting is no longer created just lengthways but in all directions; structures are becoming more and more complex, using an impressive number of yarns in the same course to make textured relief patterns; fabrics can now be transparent, stretchy, comfortable or lightweight”. (F. Tellier – Loumagne, 2003)

Paradoxically, industrial machines are very expensive, super complex, hard to build and heavy, so not very easy to move. This makes the accessibility to textile making machinery a bit hard and seems to alter the idea that one has of textile design activity.

Dead Skin, Living Machine evokes the place of textile design practice in design fields, takes place in the relation hand-machine, focusing on the design practice of making textile.

To do so, I set up a design program for investigations of textiles within the idea of interaction. It is based on the exploration of knitting technique, including machines, techniques, materials and knitting aesthetic and takes its root in the matter of identity.
Textiles as dead skin; a design program anchored in processes of making/building textile dead skin as a symbol, a perceptive language, an aesthetic and structural model as inspirational source with respect to textile interaction. The program focuses on the notions of perception and identity, and interaction as witness of objects’ life in our environment. Fabrics should be developed using mainly a wild and very reactive knitting technique, and building textile settled in a making context that makes a point on two dimensions - three dimensions transitions as an ambiguous metaphor of life.

It is a program for the development of textile materials with no predefined context of use.

0.1 Background: How to investigate textile to materialize behavior?

- Notes: Bodies.

"phenomena offering the three dimensions" (Rational dictionary of the most used words in sciences, philosophy, politics, moral and religion, 1901)

Philosophers generally agree to define a body as any kind of substance having a shape (three dimensions) and a situation (a place), and occupying a space that no other body can occupy at the same time. The scope, the impenetrability, and the masse are its fundamental characteristics.

Etymology is always interesting to consult, it gives you a historical review of a word and its context of use, meanings in time. In the following, few definitions referring to the body are listed:

Material part of living beings
the human organism (opposition to the soul, the mind)
corpse, cadaver
person, individual
torso (as an important part of something)
The main part (of something)
Material object (thing)
atoms
Group (persons, things)
organized grouping of persons
(National Center of Lexical and Text Resources, www.cnrtl.fr)

According to these notes, a body can name persons as well as objects, but also an element composing an all, and finally, an all considered as unit, unity.

- Bodies interacting

Objects (bodies) are surrounding us in the environment. They interact with us, at first, physically: shape(s), weight, size, color(s), material(s). As three dimensions phenomena, they occupy space by “being” where no other body can be, appear into the outside thanks to their features, that the body natural antennas can sense.
The human body sensors (five senses) are the interface of the interaction with the external world, they are the media enabling humans to adapt, and are a core of research about perception. In “On the soul”, (Aristotle, - 384,-320) Aristotle states that sensations open the door to the external world, relates to its modification and allow adaptation to the modifications: interaction.

The senses are thus directly related to identification, being in contact with other bodies, analyzing non-stop outside’s datas.

- **Automatic interaction**

Despite the fact that the human body owns many natural antennas to sense the environment, the sight imposes itself and can override the others. When a person sees an object, the brain receives informations from this object, via the eyes. Then, the brain tries to identify the object by according the informations to those it has already got during the life: the memory. The memory helps us to identify objects and it is built by a lot of «basic - pictures», «referenced - pictures», rank in a specific order, which is different according to who you are, what you know about things. The person uses those referenced - pictures to identify something.

- **Identity**

Identity is based on qualifying unchanged features of things. If identifying relies on senses, identity relies on the appearance of the bodies. Senses interactions are also about chemicals, yet a body appears in its externality rarely. We identify things seeing and feeling the aspect of them, by relating the phenomena of seeing/feeling with the memory, which contains what has already been seen/felt, identified. Identity has a lot to do with perception.

- **The multiplicity of skin**

  *a support of identity in identification*

“Sameness”, “oneness”, “over and over”: the concept of identity expresses the permanence, what is continuously unchanged, and is based on qualifying unchanged features of things. A human reflex is to use the eyesight as the main sense to identify things: one basically gets the “outside” of an external body, filtering the memories within the unchanged features of it.

The word *skin* comes from the word *hide*, meaning *animal skin*; *hide* means to cover, conceal. *Peau* (french), comes from the latin word *pellis*, meaning *animal skin, tanned skin, leather, parchment, outer*. The skin covers the body, it hides the inside, what works you: skeleton, organs, mechanical motors, and the brain, pental and chimic motor. It owns a sacred status because it is not only a protection but also what is seen from outside. The skin of human body could be declared as its *outside*, because it is, theoretically, what we see first.

  *a support of life - behavior*

When J. Beuys stays in a close space with a fox freshly captured from wild environment, he has a hat, a felt blanket, a torch, a triangle, and a wood stick, which he uses to communicate and play with the fox. The felt blanket is a particular material for the artist, because it is related to the story of his own life - remaining. The fabric is deeply holding a symbolic life mark. In such a context as isolation in specific conditions, each characteristic, conceptual as well as physical, have the potential to be considered.
Behaviors

In French, comportement is admitted as the equivalent of behavior and literally means contains in itself, include. It is often assimilated to action, however, the definition itself evokes something a bit thicker. Indeed, the etymologic root indicates a link with the idea of having, in a continuous way (though not a habit) and has also something to do with restraining: it encases identity features that a body has to keep this body in a global position, which garanty the expression of the identity as well as its integrity, safety and abiding within the permanent interaction with the external environment. In other words, behaviors is the expression of the adaptation of the different qualified parameters of the identity of a thing within interactions at a given moment in time.

Skin, identity, textile

Identity and skin meet in custom area.

The word costume comes from the word “custom”, latin “consuetude”, which means “how to act, a way to act” (online etymologic dictionary the National Center of Texutal and Literary Resources / www.cntrl.fr).
A costume would be thus not a simple clothes, but a clothe which express a *way to act*, including group of symbols, precise features, details, which refer exactly to a kind of behavior, so an identity, a character.

A costume thus is a kind of textile version of a behavior, a *package* that cover a body and support qualified unchanged features that the fabric *owns* and thus, holds a behavior.

The expression *second skin* which often replaces the word clothes now makes any sense: clothes are not only a protection of this unique skin that is forming us, but also the “device” that is replacing the skin to show us. Fabric sprawls on the skin as words on a blank sheet, following the body’s shape, supporting the skin and expressing personal identity.

• The life of objects, interaction as a builder of behavior: preparation projects

Investigating the idea of object’s life, two projects were led in order to primarily materialize associations between the inputs introduced previously.

*Twisted Population, low – tech behaviors*

Twisted population is a project developed under the topic Soft & Hard proposed for the Stockholm Furniture Faire 2012. Twisted Population consists in a textile material research by applying a movement of torsion to stripes of knitted wool (single jersey), until it reaches a high point of hardness.

The concept relies on the idea of torture, which is nothing but an action of torsion [of the mind].

Thanks to the standing ability provided by twisting, I could think of hard textile knitted pieces to assemble and deploy in space.

Different technics, materials, sizes and twist combinations have been investigated to seek for a tension statement that makes the fabric piece “stands”. Pictures during the making process are very expressive regarding the behavior. Despite the new technologies, textile is still considered and produced as a surface, or at least, the idea of three dimensions in making textile is very new.

Seventy meters of fabrics has been knitted on a hand flat – knitting machine, with 4 yarns in one of cream color wool, to be twisted and create pieces. Each piece requires 1 meter of fabric to get a handy scale, which would allow me to consider an assemblage of several of this piece. The 3 feet / 1 head standing attitude provides 3 loops to insert or others’ legs, or a head, and allows a building up process in three dimensions. Around 70 pieces have been twisted, fixed by one stitch and colored, and finally assembled.

Fig. 1 & 2: *Twisted Population*, 2011, twist, sizes and material research, cotton and polyester
Fig. 3 to 8 Twisted Population, 2011, knitted wool on hand flat – knitting machine and bobine of fabric, standing behavior research, assemblage.

70 meters of fabrics has been knitted on a hand flat – knitting machine, with 4 yarns in one of cream color wool, to be twisted and create pieces. Each piece requires 1 meter of fabric to get a handy scale, which would allow me to consider an assemblage of several of this piece. The 3 feet / 1 head standing attitude provides 3 loops to insert or others’ legs, or a head, and allows a building up process in three dimensions. Around 70 pieces have been twisted, fixed by one stitch and colored, and finally assembled.

All the pieces have been produced in series, following the same process: production of one long stripe of knitted wool, cutting in pieces of 1 meter, twisting by hand, stitching by hand, coloration by hand. The repetitive of identical procedure makes them all very similar, in look and attitude.

However, despite all the care given, hand twisting actions are a bit more approximative and incorporate slight twist directions and tension differences that makes each piece unique. The standing attitude is very strong and enhanced by the body lookalike of the pieces, and create a series of textile standing behaviors.
Smart textiles are one of the latest high technologic textile aera and are used a lot for reactive fabric purposes, thanks to electronic, motors, and conductive textile materials, but also chemicals (inks) or sensors.

Among the different technic and solutions existing, one tickled my curiosity: the shape memory yarn. It is a very strong yarn made of polymer, which can be shaped by heat: you have to mold it and in-print the shape by increasing its temperature. Anytime the yarn will heat up again, the shape will retrieve. It is very strong and can easily constrain fabrics of different kind.

I embeded shaped yarns onto small triangles of fabric, and displayed them on a garment. The idea was to activate them on the body. To do so, I equiped the back of the garment with an electronic circuit together with a tiny computer (arduino Lilypad) and a sound sensor. The sound sensor receives external informations which are interpreted by the Lailypad and shape memory yarns are heated up and activate the textile triangles.

I made many test of circuits and shapes. The results were very impressive for two reasons: first, I used a very volatile, light, and stretchy fabric that could not constrain the movement of the yarn. Second, it appeared that as the shape memory yarn is super sensitive to the heating up, it also reacts (a bit less) to cooling down. Thus, the triangles were moving with a surprising spontaneity, very much like a living body. To illustrate, it is a bit like the reaction of a snail or a cluster when you touch it.
Also, the shape memory yarn is flexible enough to be molded by hand. I could establish a before / after heating up position of the fabric by turning the triangle into small balls before heating up the shape memory yarn, and thus, being the witness of a movement of opening / closing of the fabric : a behavior.

Electronics and textile have been often associated for reactive textile purposes. It is still new, yet many projects has been developed and, at the same time, an expressive language mixing and combining electronic and textile technic, via materials and electronic components development. In Armor, the fabric is literally activated by the shape memory yarn. A tiny program in the Lilypad defines the intensity of electrical current to send, and interpretes the datas received by the sound sensor. The shape memory yarn will move more or less according to the amount of electrical current diffused. The speed of electricity produces a reaction of the triangle to the absence of current (no heating) as instantaneous as to heat. The behavior of the triangle is thus settled in an inter – action of the shape memory yarn under different conditions.

In both projects, behavior appears from a lasting (twisting) or punctual (sensing at a given moment) tension state of the pieces. However, in Armor, the tension is rather concerning the shape memory yarn than the actual fabric.

Dead Skin Living Machine design program seeks for textile interactions within the construction of textile skin. My interest for electronic devices and computation (machines) is big, however, using electronic with textile is a bit like drawing with a computer : if you don’t have that kind of drawing expertise, you might have a lot of difficulties pursuing this. Thus, I chose knitting as the exploration land.
Dead Skin, Living Machine aims at designing textile interactions / behaviors within an exploration of knitting technics, machines, materials and patterns. The exploration is guided by the idea of skin, which acts as a vehicle, a model of living / interacting, and a source of expression regarding textile interaction / behaviors.

Three steps rhythm the development, always articulated around interactions and behaviors interpretations:

1. parameters of expressions of interactions are listed out of investigations of the materialization of skin in different interactions’ contexts.
2. the idea of skin is explored and translated into textile interactions and a textile aesthetic and language is defined.
3. the aesthetic and languages are mechanized to illustrate textile building processes.

The design process is rhythm by successive experimental methods of translations between different element’s nature, and settled into a fictional atmosphere. Six videos has been made out of about 130 knitted samples of many kind to tell about making textiles.

1 Investigating the skin regarding behaviors
   the Skin interacting

**Materializing the skin**

The first step has been to use fabric to materialize examples of skin in different context. Several scenarios has been transferred into textile version:

- Skin as a surface, on an active body

Two objects have been selected for their shape: one “square” (cubic), one “circle” (circular). I covered them with paper and tape inside and outside, and “peeled” the paper / skin with scissors. It ended up as a half surface half container, with marks of the skin – building (covering action) and the cut – it – down (peeling).

*Fig. 15 & 16, Paper Skin, 2010, white paper, plastic glass and carton tea box*

The paper is shaped by the past presence of an object. It remains marks from objects features.
The aim was to try to build, cut down and recover a skin of object, to materialize the idea of a skin supporting marks, signs, specific to a body and that would remain the appearance of the object.

- Skin as a volume

Fig. 17, 18, 19 & 20. Pockets, 2010, white cotton fabric, plastic glass and carton tea box

The paper is shaped by the past presence of an object. It remains marks from objects features. They act like small bag and stand according to the cuts position.

Pocket is the textile version of Paper Skin. The same objects have been covered with white fabric and glue, inside and outside. The same cutting - peeling process was applied, with a specific focus on it: I tried different cut line along the object to retrieve a series of objects – skin which I expected to “behave” or at least look like different form each others. A small family of different reactions, silhouettes and mechanism of the same bodies under different cutting roads.

Also, they had this double layers structure that I saw as an obvious opportunity to give back to these materialization of skins a functional assets which is found in the skin idea and in the identity of the chosen objects at the same time: containing. Filling up the in between was affecting the textile – print (skin) of the objects, and I tried to use this as an expression of life of the objects in a photography work.
Fig. 21 & 22, *Pockets*, 2010, 29.7 cm x 42 cm, 3 photographies, white cotton fabric, plastic glass and carton tea box.

- Skin as an active body

Giving a function to the skins I retrieve in Pockets gave another opportunity to explore life of objects within textile. Pockets can be a bit considered as moving skins, alive thing that react.

Fig. 23 & 24, *Chair*, 2010, 120 x 45 x 45 cms, foam and metallic cable
I made a scale 1 chair out of foam and metallic cable to be able to apply a movement to the idea of the chair that we know. It has the real look of a chair but is unusable / useless as a chair due to the materials used. They call it back to the representation of a chair.

I used an entire room to record the passage between to dimension state of the foamy chair. The idea was to produce images of a skin / objects moving by itself. To do so, a puppet string system was displayed between the floor and the roof via the chair to pretend its movement. I taped the elevation, and photographed it from side and top.

Fig. 25, Chair, 2010, foam chair and transparent thread 20 x 45 x 45 cms, video, 2’06"

• Skin as an interface and a support of informations

Fig. 26 & 27, Objects and functions , 2011, white cotton fabric, plastic glass, carton tea box, fork and knife, scale one.

The aim was to materialize the context and elements of the interaction which includes an object, its features, and the hand of human (external body form the skin materialization) , with the box, the glass, and fork and a knife. The objects – actors are covered in way that gives indications about how to use them. It is adjusted according to the actions of the hand necessary to be used by a person, but also to mark the space where the interaction between the person and the object takes place.
Skin as an object in space

The last examples are a serie of outcomes that set the interaction between the skin materialization and a person in three spatial contexts.

The skin appears and is manipulated on the person’s body in the environment. The shape is inspired by the plastic glass Paper Skin, like an object that affixes itself on a person body. The back is inexistant.

In a second scenario, the skin appear alone in the environment and is manipulated by the person / 's body. The shape wants an independant body in space, can be worn but mostly aims at intriguing the person curiosity.

Finally, (fig. 32 & 33) the skin appears “on” the space and is manipulated on the person’s body linked to the “environment” (wall).

The shape is thought to be settled on a wall and wear by a person.
Results

The wish of covering and cutting down from objects was to see the exploded pattern surface coming out of the cutting down of a 3D shape into a two dimensional version, like a pattern. I thought that the difference of “integrity” between the two dimensions could have something to do with the life, and could be explored within the skin idea.

The results materialize a moment between the two and three dimension, between the empty state and the filled state, harsh and flexible. It blurs the origin of the final paper shapes. I also noticed a potential in cutting down the paper – skin as a gesture to mark the “skin” and end up with expressive paper shapes in three dimensions. The same experience in fabric makes a point in cutting with expectations regarding behaviors. The cuts alter the standing ability of the fabric and result in different attitude of each Pockets.

It also put under the light the inter space liberated by the absence of the original objects inside. The materialization of skin gets back its container function and can be filled up. The photography work out of the Pockets attempt to introduce the idea of movement to the skin which is express by the Chair.

The Chair video (fig. 3, “the skin as an active body”) compiles a bit of each previous examples. It aims to enhance the transition between two and three dimensions, with its transitive positions, to activate the skin and to give to it independence in the movement and the best opportunity for materials to interact. Indeed, the metallic cable inside the chair is not a easy material to shape, and it gives to the chair a dislocated attitude that I could observed on both the video and the pictures.Thus, the chair gets a behavior very much alive.

Choosing a chair has a lot to do with the living character of the chair’s movement, because the object is still recognizable even if it is a materialization of a skin. In the flat version of it, one can relate to its structure as one can relate to the body : a back which becomes a head, legs which become arms.
**Process**

Pockets, the Chair, Infos / Interface and Living Machines / Bags are small studies also satisfying the need for me to fast materialize an intuition before a process of reflection actually starts, or before I see anything that could influence the intuition. It is a kind of copy – pasting process that helps me to project my intuitions outside of head by keeping close to the intuition.

I mainly used simple materials like white cotton, toile, glue, or metallic cable to build the materializations of the skin. Thus, I was able to work fast and catch my intention as quick as possible.

Recording and photographing are also serving the wish to stay close to the rawness of the experiments. It is about catching statements and creating a library of “references” for a further development.

Previous experiences allowed to define different filters to investigate the skin within textile. The filters aims at evoking behaviors by expressing actions or states of bodies in different contexts:

- the idea of marking the space by being and holding traces;
- the idea of volume, yet textile is most like a surface;
- the standing ability and attitude of textile;
- the movement of textile;
- transitions, together with movement, between different states, evoking time;
- and finally, the idea of piece, of building fabric in pieces.

2 Knitting: introduction to behaviors

This project starts a session of knitting. The focus is only on knitting as medium and material, land and context of exploration. Obviously, the ultimate aim is to make textile. Four periods of knitting divided in three collections allowed me to associate the idea of skin and textile until the definition of behaviors.

**Defining the expression of the skin**

1 Dead Skin

I set up the first knitting experiments in a simple cyclic process to be able to focus on the expression of something that I did not know (consequently I could not anticipate that much.)

- material choice: usually which kind of yarn, or association of yarns
- machine: a hand flat – knitting machine gauge 6
- an skin expression topic: layers
- tests: refers to the activation of the yarns, within the production of samples, playing with stitches size, pattern and sample size, eventually textures due to the type of yarn
- a time of observation: how does it behave and what is interesting regarding layers
- samples selection: a new material choice within the knitted state, in order to refine the material choice, maybe mix different samples, and re – knit.
The selection of yarns comes from the idea of layer. I focused on thin, transparent, black or white thread, which were my first feelings about the topic, seeking for transparency. The selection overflowed to other kind of thread, by curiosity.

Regarding the samples, I began with simple settings: single jersey, fullrib or tubular, normal stitches sizes (in the norm of the machine), to try out all the different selected threads.

In parallel I was keeping a small notebook in which I could write down tiny recipe and expectations, and where I was gathering few pictures about transparency (layers). I was trying to orientate the sample making by looking at anything related to skin, layers and transparency, and I randomly kept a picture of the molt of an insect, a perfect, beautiful print of a body, standing on the ground as a mark of a past living. The very detailed print was standing there as a living, oscillating between illusion and paradox, pretending to be alive, but actually empty shape. It was like a stopped-time small element, fragile and intriguing mark coming from a microscopic and teeming world.
This totally imposed itself in my mind the day after while I was knitting a sample which was mixing a plastic transparent tape and a bouclé beige yarn. When I took it off the machine, the contrast between what I felt – saw and what I could then feel – touch was so big: it was dry and loud, maybe light, making you manipulate it very carefully while it was not fragile at all. I got surprised by this difference and it reminded me of the molt paradox.

What I liked in the molt is the standing position and the way it was possible. I researched a bit about the reason why insect where molting and, it is definitely a matter of shape evolution in relation with the nature of the skin of insects. By nature, I mean how it is made, why it is made like this, and its “look” as a body in the external world.

This made me replacing the layer topic by the “dead” state of skin. It also led me to an observation regarding knitting aesthetic.

Knitting consists in looping a thread into successive stitches in order to build a surface. Different kind of stitch-exist and the general structure of the fabric is settled by arranging one or several stitches in a looping process.
The flat hand – knitting machine is different only in speed: 1 to hundreds of stitches (depending on the size of the machine) are made within a few seconds.

The repartition of stitches is also what can create knitted patterns. What I observed from the few samples I’ve had seen is that patterns were created thanks to some needles tricks and mechanic and the alternation of different yarns, and appear on the fabric in “2 dimensions”.

It is a bit like drawing or painting with yarns and loops: the yarns are usually chosen and combined in a way that produces a flat pattern out of an stitch arrangement within the knitted structure.

There are special stitches, called tuck stitches, which are very used to make holes in the knit, and can also results in a 2 different side knit (pattern) due to different yarns in loops. When the needle is on tuck position, no stitch will be done, the needle simply catch the yarn until the needle gets back to normal setting. The thing with the knitting machines (hand and industrial) is that you have to think in superposition of a number of stitches raw. Thus you can see a real choreography happening out of the binding setting and the machine action.

My attention got caught by the “shape” of the yarn in the needles with the tuck stitches: it is like a small cavity mold among the loop, but it is harder to see it on the surface then: it is only a structuring element. The yarn selection was very suitable for the observation of the structure within the samples, because they were all thin enough to create an open structure. Fig. 42, the pattern is a bit in volume but the pattern works as a surface. With thin yarn, it is barely the same. Fig. 43, stitches shapes appear between the 2 beds of needle, and are recognizable at on the surface.
Dead Skin, samples
The idea behind the production of samples was to produce a big piece of a dead skin fabric on the industrial knitting machine to experience an interaction in a big scale with the fabric. I could get in touch with the machines and the software to “draw” or elaborate knitted structures. I selected four samples made of a tuck stitches binding and a multi filament plus plastic tape yarn and monofilaments and compared their behavior under stretching or folding, to observe the influence of the tuck stitches.

I finally knitted one 4 meters wide fabric with 2 multifilament polyester and plastic tape yarn (last picture), because the fabric was so light, but able to produce thickness, extendable and strong at the same time. I also like the squeaky sound it has and its tendency of sticking every where.

The expression of dead skin definitely guided the process, but the outcome is not a “skin”. It is a fabric, whose elaboration and production has been developed within the idea of dead skin, the skin being the vehicle of projection of a fabric in an interaction between bodies. It induces an interactive contexte, and gives to the fabric a freedom and independence in expression.
Recall: insects moult.

The insect moult did not only give me the frame of the skin topic. I also saw in it something about mark, in space, by being but most all by localizing a “was”. Noting that insects’ “skin”, or rather full body armor, works a bit like some kind of flexible and super thin shell, in which the insect grows until it fills up the hard skin. Then, it needs to metamorphose to breach the hard skin and continue to grow. Regarding my knits, that sounded like something about shaping.

**Fig. 46, Dead Skin, 2010, 4 knitted pieces, aluminium tape. Four aluminium tape knits holded objects and hang during three months on a wall.**

**Living Machine / Bones**

The last part of Dead Skin knit session made a brief focus on the production of a small serie of knits made of a yarn knitted itself with monofilament.

The monofilament tube turned into the super stiff knit and very hard to stretch. I could also be introduced in between the two needle beds, like a weave.

**Fig. 47, Dead Skin, 2011, knitted monofilament tube, multifilament**
The process of successive knitted sample production defines the expression of the skin. The production of one piece leads to the next one, through associations of materials for structural purposes, deconstruction and misplacement of tuck stitches, creating a family of samples form the same concerns and actions.

The sound of associations of fibers in a sample and the idea of dead skin appeared and identify the skin as dead. By defining the expression of skin, a frame of observation is delimited and allows the introduction of the real skin as a perceptive language, and aesthetic and structural model regarding textile interactions.

**Creating Behavior**

2 Knitting Session 1: questioning the technic

I started knitting again where I left it: in Dead Skin. I set up an updated version of choices regarding technic, materials, machines and aims and expectations, which loads a new round of “copy – pasting process” with knitting.

However, I do have intentions about knitting programs: the idea of two - faces fabric (interacting) and the idea of “pieced – body” fabric. Pieced – body refers to my wish of having something about “objects”, I mean, what we call objects today, the things, marking our spaces, our lives. The scale of objects interested me.

The choices regarding bindings are supposed to guide a knitting investigation on pattern in 3D. The tuck stitches aims at seeking volume in the knit structure itself, some thickness, some “verticality” inside a “surface”. I selected yarns with the intention of playing with their differences to exaggerate and underline interactions between them.

Recall: Dead Skin, Aluminium tape pieces

The shaped samples are selected as a start inspiration, due to their three dimensional aspects. It could guide the research regarding object scale.

Recall 2: Dead Skin, Bones

Knitting with very stiff and thick yarn and very thin and flexible one, like in Bones, is also taken as an example of start.
The focus is put on bindings and yarns interactions / tension, to try to get out of the piece more 3D effects and textures, and also by associated yarns together to make one (very different ones).

Little by little, I modify the bindings, choose yarns too big or too small, use racking in bindings that “normally” don’t have, and start to force the machine to knit yarns combination sand bindings that it does not like. Mistakes and disorder get “into” and create a bit the expression. I mainly use monofilament combined with other fibers. (Fig. 59)

Then, I tried to use the computer assisted machines, to have more flexibility with the needles, sizes and scale. Computer machines will allow you to dispose whatever stitches you want wherever you want, in contrary to the traditional knitting machines where the tuck stitches position depends on the high or low but of the needles. I could get few samples with wild tuck stitches, or over tuck stitches, very beautiful and so irregular that they had a very alive look, still. The tuck stitch have this circular 3D structure which was kind of “marking” the traditional Rib or Single Jersey. (fig.60)

Fig. 48, Knit Session #1: binding selection: 3 bindings are selected for their three dimensions structure potential: one similar of the Dead Skin one, (left), one with tuck and racking (middle), and one with a tube structure (right).
Fig. 49, *Knit Session#1*: Different samples
Singularities composing an all : this is what I get. The pieces are very similar and mirror each other a lot. I took a while to observe them, to write about them, to read about skin, seeking for a clue which could help me to understand them. Also, I had to take a moment to write down about what actually happened when I was “knitting”.

As I said previously, I started to break down the regularity of knitting by playing with the heart of its balance, which asked me a lot of physical energy and different relation to time. One thing to realize for me was that I started to define my intentions in words of interaction while doing, and interactions aesthetic while observing :

"It consists in two faces which complete each other in a positive / negative shape way. Where there is a bump, there is a hole behind. I remember I thought about veins, grooves, regular, typical of a mechanical construction. One side holds bumps, large compared to the grooves. It is like half a bump. There are wholes, small empty spaces. The volume is interesting. On one hand, it seems soft, shapes are delicately spread, rond and pointing up, like if it was blown a bit everywhere. It kind of make the piece smooth whereas its aired structured could repel. It looks like regular bleb on a burned skin. The volume reminds an volatile thing kept to the ground. (...) "

(Knit Sessions #1, 2011, workbook personal notes)
Regarding strategy, I decided to keep using the traditional hand flat – knitting machine, because they are stronger. However, I lost a bit of freedom regarding bindings. This made me reconsider the limits of the machine itself: if I wanted to continue to focus on scale, or be more free to place my “structure element”, what could I do with this more limitative machine?

I observed again the original piece and tried to “air” it, try to get more bubbles than black part. I also chose colors. I was digging into the real skin and dead skin, and tried to get strange colors together, like these light bruises can have.

**3 Artefacts : dead skins**

To “air” the piece, I started to suppress stitches, little by little. I could get more bubble than belt. And I played with the transfer thing, making stitches meet then splitting again, stopping and starting somewhere else. It was like a promenade on the knitting machine.

After this piece, I used the transfer thing in more regular way, more to sculpt a Rib structure into a Single Jersey, in some places. I added yarns, I introduced lycra, because I thought its elasticity would underline in another way the bubble effect.

**Fig. 51, Artefacts, Bubble.** 2011, green monofilament, pink, blue, yellow bouclé
Then, I had two leads : first, the lycra thing and the binding gave a very strange skin structure, like if it was partially cut in a regular way. I tried to do it fully for the next piece. Second, the reduction of the number of needle in one piece of knit.

During the elaboration of Artefact outcomes, my attention has been fully captured by inter – bed views and stitches transfers travels. The chosen bindings have been unfolded, manipulated, dislocated until the establishment of a stitching and transferring adaptative technic. That way, I “unlocked” the stifness of the machine and suppressed the lack of independence regarding stitch placing. It appears in two ways :

When setting – up the machine, as certain amount of needles is pushed up along the bed to be reached by the yarn feeders, thanks to a small arm athe back of each beds. Pushed, the up active position of the needle is safe and avoid irregularities in the knit.
Knitting Skeleton made me realize that the needles don’t need to be pushed up and locked to be reachable, they just need to be positioned upper on the bed to be reached. It gives back a comfortable flexibility to the act of knitting which allows to use wild knitting tricks:
Artefacts outcomes materialize the establishment of a process of designing textile behaviors which relies on pushing the possibilities of the hand flat - knitting machine over its limits. It appears within transfers - interferences and random racking during the process of knitting. The act of knitting is dis-located and violent, beating on an un - planned and mistakes - ignoring rhythm, yet framed by clear choices regarding materials. Interferences become participative action in the simpliest act of knitting (single jersey), and induces radical metamorphose of aspects such as numbers (of courses, of yarns, of patterns) or time (related to length, sizes, intentions) : choices are made only by the permanent observations of interactions and behaviors of textile materials. It is an on - going surgery not to fix but to built. Two extra pieces were made to sale – up the size of the Skeleton, being the most interesting regarding the act of knitting (chaotic transfers)
Man – Made Nature is a replique of Skeleton. Its particular pattern is the result of the surgeon attitude and a wild knitting technic previously developped use. A part of it has been cut off and transformed into a repeat to knit on an industrial knitting machine.
The challenge of Computer Nature was to extend the pushing machine attitude to an industrial knitting machine. Indeed, “wild knitting” such as crossed transfers or five needles transfers are almost impossible to constantly do. I dugged into the software to draw a simple stitch interactions, based on cable knit and stitches knitting directions.

Artefacts finishes to declare the general program framing the exploration of textile dead skin behavior. Fabrics should be developed using mainly a wild and very reactive-to-objects knitting technique, and building textile settled in a making context that makes a point on 2D - 3D as an ambiguous metaphor of life in the research of behaviors.
5 Knitting Session # 2 : textile dead skin under surgery

This last series of fabric made on hand-knitting machine is a time where I use the very-rule-less and open technic I started to develop with Dead Skin, which doesn’t really consider the usual rules of knitting I learned. Instead, it will let the technic inspire the decision time, considering the effect wanted, and so the “personality” of the outcome. All the aspects of my knitting practice are considered as a technical and conceptual muscle for the development of textile dead skin.

The uncertainty of the making will be guided by clear choices in materials and supported by the cooperation between hand craft technics, industrial machines, and my body. Also, I aim to search for and underline some kind of “mechanisms” of the materials and the outcome, an activity. The decisions during the making process should also be oriented by actual tests, activations, to catch the “machine – outcome”. The wish of double-faced fabric was realized with Artefacts, the other intention was to build pieced body textiles, mechanized.

A specific behavior is first define, as it was done with Black and White: a description of tensions and interactions precised by words of behaviors. The idea is to find a way of seeing, feeling, and shaping the predefined intention in the act of knitting. It anticipates a personality and aims at inducing it in the maki process to underline a specific of the fabric once set free from the machine.

**Claws**
A claw lookalike knit is shaped thanks to transfer technic

**Double - face**
Three pieces have been knitted on two bed but separately, linked by 3 or 4 stiches in between.

**Lycra**
Thick monofilament and very elastic and multiple lycra thread are combine in a binding including large rackin and diverse irregular tuck stitches.

**Fingerknitt**
Two tiny finger knits have been made out of a very stiff, and so resisting, monofilament.

**Beige SK**
Brown S is derived form the Black and White tuck binding

**Red series**
A rectangle is knitted in a flat fold position thanks to transfers and racking. It remain rectangle once out the machine.

**Pink serieses**
A pink stripe of fabric is re installed on the machine and a second layer of fabric is knit ted above a fold, in order to recreate and freeze a surface.

**Fluo**
Set an micro interaction between monofilament and lycra.

**Purple Loops**
Associates a group of cotton yarn inside a multipla lycra yarn, which created huge loops.

**Claw study**
Development of the claw

**Tiny skeleton**
Fig. 58. From top to left top to right bottom: 1 Claws, 2 Double-face, 3 Lycra, 4 Fingerknitt, 5 Beige SK, 6 Red series, 7 Pink series, 8 Fluo, 9 Purple Loops, 10 Claw study, 11 Tiny skeleton
A new family of objects is born. Within the breaking apart method - again, I considered knitting a sample from three point of view:

- assemblage of material, bindings and machine, which is more about continue to explore the interactions between those three / the result comes from a point on the making

- actual “dead skin”, knitted volumes that comes form the wish of seeing objects coming out of the machine / bodies / the making comes form a point on the result (wanted)

- solutions, which gather samples made by thinking in both previous way, and is very representative of the association between living – machines and textile interactions (design program).

As in Dead Skin, one piece leads to the next one. Thus, some shapes, system, or patterns are repeated in different scales, or materials. The family is divided in under family or unique sample. The time of production is distributed according to the different “session” of knitting: one session usually comes from one predefined intention. The family relies on many kind of pieces containing many kind of interactions, from the smallest stitch to groups of samples, which have been cut off and experimented within a new intention for each new piece.

They all come from the same intentions regarding material choices, root that can be observed from different behavioral point of view and inspire the definition of behavior I would like to have. Indeed, they all provide different kind of interaction in themselves, embedding already a combination. They are bodies that I can get inspired from.

They are suppose to contain infos about mechanism related to dead skin, interactions, behavior.

This last knitting session is characterized the piece format, which aims at relating to the scale of objects, and introduce the idea of combinations with other piece, as a mechanism at a handy scale.

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To complete the scheme, I came back to the real skin in its alteration as an inspirations source of mechanism. (fig. 60)

The diversity of the samples is also diversity regarding mechanics. With the pieces, I finished to unfold the package regarding textile dead skin: shapes, material, technical and machines has been broke down and rebuilt until artefacts. The pieces are the last step, utilizing again materials conclusions to break artefact into pieces, and materialize a new set of combination totally issued from dead skin (idea of spine) which introduces the dimension of scale.

Indeed, each sample can be observed closer to discover many tiny mechanics specific to it that can be used to define behaviors.

The idea is to define some behavior from the observation of the sample. The question is then about what look to use to find clues regarding behavior definition.

1 Observation preparation: defining behaviors purposes

- definition of six filters

Six topics are chosen to act like filters of the pieces. To do so, I had went through all the development again until I start knitting, making a focus on the idea of mechanism, both in the making process and in the wanted mechanisms or expressions of mechanism. I could come up with six topics:

On / in
Superposition
Interlayer
Infiltration
Suspension

I very fast draw tiny scheme to see in a raw way to understand what are the different mechanic and environment cleared by each topic.

To complete the scheme, I came back to the real skin in its alteration as an inspirations source of mechanism. (fig. 60)

Regarding structure, the skin is usually decomposed in 2 parts: the epidermis and the dermis.

Basically, the epidermis and the dermis are like a female and a male pieces that you can encase in each others. If we consider a cut of the skin in its thickness, the skin main mechanism that defines it as a “material” could be compared with a “shade”. Indeed, from the in - side to the out - side, the cells composing the skin are participating to many biological transformation to provide what the body need. The specificity of the skin cells is that once they’ve done their work and thus, changed in shapes and function, they are used for another purpose. This concerns all “containing tissues” in the body (internal organs).

The cells are like full small bags which interact with each others and participate in each of the 4 skin functions described below; their “content” is used little by little, so their shapes and function evolve and they “stratify” themselves according to their “life - time”. At the out - side layer, they are like flat empty bags on the top of each other and don’t have any other function than being hard and avoid or filter any intrusion or exit of any kind. Funny point, the last layer of skin structure are actually a kind of heap of dry and flat skin cells, which are biologically stated as dead. Human - being are covered by dead skin.
One may have often heard about “keratin” or “collagen”. Those are terms used to name the protein material which stabilized the layered organization of the skin. They are made in the subcutaneous layer of the skin, under the dermis. To make it simple, it is a kind of fibrous and elastic material which keep together the whole cells. It could be compared as a very flexible and elastic skeleton of the skin, which allows it to “stand” by balancing the tension between the cells.

As an example, when you get a line on your skin, cosmetic will suggest you to use some lotion to re-activate or boost the production of this material to re-stretch the skin.

We can say that the skin is an association of different life - state of the same cell which is, thus, able to manage itself. In somehow, I like to believe that the skin is some kind of very independent part of the body which support and provide to the other, react and express any internal malfunction; but also communicate with the outside world.

(http://archimede.bibl.ulaval.ca/archimede/fichiers/19935/ch02.html)
Each behavior/topics has been cleared and supported by references to the alteration of real skin. “On/In” relates to interns interactions affecting the surface of the skin. “Superposition” refers to the journey of skin cells form inside until outside. “Interlayers” refers to the skin under folding. “Infiltration” refers to hairs, nails, etc. “Inside/Outside” refers to the broken skin which let the inside coming out. Finally, “Suspension” refers to dislocated or unstretched skin.

Thus I could define my six topics more precisely, and with a clearer view regarding mechanism and behavior.

On/In: different pieces related to each other by a surface
fabric recipe depth/surface
the intern interactions express themselves in the surface: earthquake

Superposition: putting pieces on the top of each other [from under]
depth/surface
the intern interactions express themselves in the surface: 2D -> 3D

Interlayers: rebuild a surface by folding and keeping the folds
surface/volume

Infiltration: recreate a surface by assembling by introducing a piece inside another one going inside

Inside/Outside: expand the surface in all dimensions and directions by pulling out a fabric form another one

Suspensions: jump

1. Living – Machine: family pictures

To narrow the selection of fabric, I came back to dead skin blood line and how I ended up with the artefact. I used the same system: description of what I see in an interaction way: what does what on what?

I realized a photography work which consists in a serie of pictures of each samples arising from the aluminium samples: the Dead Skin line. It aims at underlining shapes, aesthetics and interact – or which appears and evolve within different intentions, creating behavior diversity in format unity.

Recall: tuck stitch

Fig. 61, Tuck stitches between needle beds, within a knitted structure, and pushed by the act of knitting.
Dead Skin’s ascendent comes from the evolution of the tuck stitch structure and profile view. It will be scaled up, forced, multiplied, deconstructed, stretches, build – up (in three dimension), expanded, etc. The three previous pictures are showing the small “tuck personas” I stucked to in order to go on, and which guided aesthetical choices.

This is the mechanic of living machine. The photographies aim at pointing the aesthetical elements coming from its evolution as the witnesses of behavior.

Fig. 62, Tuck stitches evolution, general view and close-up
Fig. 62, Tuck stitches evolution, general view and close-up
- Selection of samples

The close – ups were a very good support for a very close observation of the samples and allowed me to identify and choose samples to illustrate the topics which totally share the same origin : the tuck stitch.

I made a selection of samples out of the topics and their scenari. They were chosen as they are, materials examples, knitted volumes or part – solutions and can induces a way of looking at them.

Together, they consitute textile dead skin’s example of the six behavior previously defined.

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**Fig. 63, Sample selection illustrating the six topics / behaviors**

*Superposition, tuck stitches, Claws / Infiltration, Double – Face On/In, Tiny Skeleton / Suspension, Purple / Inside Outside and Pink stripes / Interlayer*

Six samples were chosen as representative of the mechanic studied to interpret. After being an outcome, they become an inspiration in shapes, textile materil expression, voume, structure... to use in bigger scale. They also constitute a link between the knitting part and the video editing, as landmark among the samples.

In this case, my judgement domine, however the samples selection was made by associations with the six topics defined previously, thus, it is more about a emergent choice than a limitative controlling one. The samples choices are relevant inside the limits of the samples

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- Activation : the expression of the behavior

Previously, behaviors were created by pre – declaring tiny scenarios staging materials within interactions, and the act of knitting a “matching’ piece. Behaviors express an adaptation of identity within interaction at a given moment (0.1 behaviors). Stitching a thread is like applying to it an arrangement of tensions. The materials react to the stiching process and adjust their own behavior to eachother under different tensions applied within a stitch. A stitch actually already is a behavior materialization. The entire production of knits constitutes a series of static behavior.
By being in the environment, a body is reacting with all others occupying the space. Thus, it is constantly interacting. In other words, the identity is constantly the subject to interactions. Consequently, a behavior is actually more about a succession of expression of identity facing different bodies expressions of their identity, and interacting. This is also where the behavior acts as a garantor of the integrity of the identity, by moderating and limiting the interaction to make sure that an adaptation fits with the conservation of the identity remaining in time. It frames the interaction and represents the range of possible expressions of the identity.

In this step, knitted samples will be explored under motion to collect example of textile dead skin behaving and emit pists to explore, in or to design behaving textile dead skin behaviors.

Two scales are defined : microscopique and macroscopique, wich set the eye position regarding the samples.


Knitting structure plays very well the game of motion, due to its basic principal : a thread looped in itself over and over. Thus, the alteration of one loop can affect the whole, in a super reactive and spreading attitude. Also, elasticity is one main specification of knitted surfaces, because of the single thread stitching.

Fig. 64, *micro - mechanics of knitted samples*, 2011, photographs

Fig. 65, *micro - mechanics of knitted samples*, 2011, videos
3. macro mechanics: the fabric covers the eye

Due to the use of thin yarns, practically all the samples are made of an aerated loops structure which endues them of transparency and see-through effects, and also tiny mechanisms at the stitch scale, reminiscent of a chain’s links reaction with others.

These photographic and video researches leads to a real film shooting within the six topics defined previously.

- Designing behavioral – textiles

4. Living – Machines:

Six videos have been realized from the topics and their illustrative samples, using the entire knits production. The aesthetic and languages defined and designed are mechanized to activate the textile dead skin and illustrate textile building processes.
4 Discussion I outcomes

0 Introduction

Dead Skin – Living Machine aims at exploring textile making, making a point on textile identity, textile interaction and textile behaviors. Identity, interactions, behaviors and skin are constantly used as filter to make sure that the practice answers, support or even disagree with the design program. Machines, tools, materials, technics, appearance, structure, scale and nature of textiles have been investigated within the idea of skin, which act like a global envelop and structure of the development.

The monofilament is omni-present, often combined with others fibers. As a yarn, a stitch, a section of samples, a piece or a movie, it is always associated as “dead skin” because it is hard, and the hard part of the skin are a lot not living and assure a structural and standing integrity.

The wide range of interests touched by the development is materialized in the many knitted samples of all kind unified around one knitted stitch, and express diversity in unity by their look, their behavior, their sizes and their “nature”. The interest extends until the inclusion of knitting field tools in movies and the construction of stages or machines to make the videos.

Questioning everything regarding knitting practice has been materialized by a process of pushing, deconstruct and reconstruct a flexible adaptative wild knitting technic from challenging a very stiff machine, and by the transposition of this process into the knitting act and the production of pieced samples: textile dead skins.

Finally, a point is made on fiction as a strategic tool to build limits, and appears to have a role to play in each part of the process.
Method

1 Self - projection

Recall : 1 Skin as an active body, Skin as an object in space, 4 Videos

Photographing and recording activation of textiles are a way of freeing my mind of the mental image of an interaction or a behavior. Instead of sketching or writing, I more comfortably use videos or photography, because it allows me to create a distance between me and the intuition : I can fast look at it. Also, I use it as a way of projecting myself into the intuition materialization, so that I belong to the stage of interaction and freely play the role of human version of three dimensions phenomena.

2 The act of knitting

The knitting practice of Dead Skin Living Machines is characterized by a progressive break down of knitting rules, throughout a continuous pressure carried on the limitative hand flat knitting machine.

The knitting skin expression is defined by going against knitting traditions, regularity, good balance, stability and smoothness in the act of knitting. It starts with an observation of effects, and ends up in a pieced - body knitting session, witnesses of the last stage of evolution of textile dead skin.

The tuck stitch caught my yes and kept it between the two beds of the machine during the entire knitting practice.

My eyes were always following the yarn position between the two beds of needles, and choices regarding materials relied a lot on the look of the yarn inter bed journey.

Fig. 69, Chair, 2011, video
A fake chair is settled as a puppet in a room, that I activate until standing position. I am the energy input.

Fig. 68, Inter -bed view, the act of knitting, personal document
The more the technic, machine, and material are challenged and pushed over their limits, the more I need to pay attention to the inter bed space, to make sure that the knitting process does not get stuck due to a non stitches loop or a yarn mixing. Forcing the machines, the thread, the needles and the stitches also require a new projection of myself as a part of the process, as a physical support and an intermediate tool helping the yarn tension to remain safe and stitches to appear even in the more extreme situation. This is a situation that I remember as a real fusion with the machine, which can not knit without an extra support regarding yarn tension, stitching, and weight, together with a each course needle setting that I position myself after transfer – interfering or racking.

This experience has been wrote down afterward, because it felt necessary to be put in word in order to have a look at it from an external point of view and understand it better.

"I selected from what I know or have done all the yarns, bindings, machines and settings to follow it. I used them, I combined them, I forced them, I mixed the whole thing, I tried to get a group of “assemblage” to observe further on.

During that time, I could get even more in touch with the machine: the high and low butt, tucks, transfers, etc. that I massively used made feel as if I was operating an open heart textile surgery.

The practice breaks the rules, it seems that the repetitive rhythm of knitting by hand receives bullets from all sides: one time ignored, another time overused, sometimes bandy, the machine and the body have to adapt to each other each time a slightest detail is change: textile is very delicate temperamental, unpredictable, even more when you push the material and the machine near their limits (strength, flexibility, for the yarn for example, weight, needles possibilities for the machine, elasticity for the outcome), when you push them till their own limit together. You have to forget the rules, forget about the standard and usual settings of the machine, you’d better pay attention and adapt the system little by little, sometimes course by course, till you find the one which allow you to go along the limits that I previously talked about.

These machines will let you know very fast when you have to give up or not. What I mean is that even the smallest wrong setting will make the sample break, fall, leave the needle, get stuck, and offer you half an hour of self - questioning while you try to take of the two beds of the machines f the hardest piece of fabric you’ve ever touched. First it gives you time to think, then, it teaches you to vise before you shoot. You think before jumping on the machine, staring at the available bobbins, trying to see their suggestive side: which yarn, which trick would allow me to succeed in knitting what I want to?

This is definitely a real on going surgery, involving my body, the fabric, and the machine. And even if the skills evolve, even if the solutions appear, the body and the machine have to keep listen to each other and support each other: a extra plastic monofilament will certainly enforce the strength of a very thing metallic thread, it won’t totally avoid its breaking.

Thus, the body, as the one that I use to “make the machine work”, has to be ready for any breaking thread or jumping needle: one or the other is almost all the time possible to fix, which allows me to not do the whole thing from the beginning again, which is sometimes very long. It is a bit like when you drive a car: the body and the machine are linked by the armchair, the wheel, and the pedal, and one will feel very small stone under your wheel tires like if it was the feet’ skin. Sometimes, to make sure that my knitted piece wouldn’t break while I was knitting, I had to replace the machine’s part which balance the tension of the yarn, or because the yarn was too thin to be controlled by the (in comparison) thick metal-
balance the tension of the yarn, or because the yarn was too thin to be controlled by the (in comparison) thick metallic pieces of the machine, or because it needed some extra guide to make sure it would go through each wanted/necessary needles. It is a very high moment in the making, because you have to pay fully attention of what you are doing: you can yourself break the thread so easily.

This physical relation ship coming from my body and the machine working together actually refers to this surgery atmosphere I talked about previously: because my attention is non-stop required while you move the carriage along the machine, my eyes were continuously staring at the fabric from its “section” side, from its thickness side, its profile, from in between the two bed.

I was fascinated by the travel of the yarn and its behavior on the needles according to the settings and the selected bindings and yarns, and I actually tried to play with more than with the actual result of a binding. Most of the time, I was having a look at the actual fabric outcome when I had to move the weight upper to be able to knit. I like the surprise. I like to have absolutely no expectations about what the fabric will look like, and this, even if I am following some directions. On one hand, I came up afterword with a series of different samples still kind of similar (always a small development around 2 or 3 bindings, 2 or 3 yarns, 2 or 3 gauge, as the recipe says so); on the other hand, I investigated the volume, the 3D side of fabric, the structure, from a not expected point of view: the inside itself. No front, no back, but a profile. Constantly between the 2 beds, the hands trying to manage threads tension, raking, and bindings settings at the same time, but the eyes aware, aware of any interesting direction coming up, aware of any potential fatal mistake…

I could thus even develop some “last chance” tricks to not reinstall the whole system again and be able to continue to knit big pieces. Since the chosen setting didn’t really fit with the ideal ones for the machines, it happened quite often that, in a moment where I lost my concentration, or some needles jumped, or some yarn stayed hooked in a wrong way on the beds, bordering on some unwanted and stressing time. It also happened quite often, at the end, that I lost my patience and simply “forced” the knitting movement to knit the knots again: I didn’t even take the time to use a tool to fix the problem, or it didn’t matter anymore to brake the unity of the sample and use few course of full rib to get back all needles in work and a stable base to knit: even the limit of the “mistake” was challenged.

As long as you listen to the yarn, you have chances to get your situation better. So, the samples are actually covered by what would usually be considered as “defects” coming from the fight of the machine against its own limits; and sometimes not just few threads out, but big holes every 3 or 4 centimeters.”

(Workbook autumn 2011, personal notes)
4 Succession

All the outcomes of the development have been thought based on the previous one. This is very seen in the last knitting session: the samples are all different but call each others. The mechanization atmosphere that I instaure and lived in while knitting is transferred into the production of pieces.

No samples is identical to the next one, because I don’t use any permanent settings. The knitting is “constructed” while knitting, based on the observation of the moment of knitting, where behaviors of materials, machines, and technic interact. It allows to deconstruct the knitting act sample by sample, to force it to unbuild itself, in stitches, surfaces, objects, solutions, pieces, and then, in mechanism, movement, living thing, and even actors.

A focus is put on pieces’ interactions at the textile dead skin level, with a tendance to multiplication.

5 Family trees

To educe six samples to embody the six topics, I had to materialize the successive production of unit (pieces). To do so, I made different samples arrangements that ended – up in multiple versions:

family picture

family tree – process order

Fig. 69 Family picture, 2011, The sample are displayed according to the order they have been made, and by knit session.

Fig. 70 Family tree #1, 2011, The sample are displayed according to the order they have been made, and by type, nature, structure, or solution.
Fig. 71 Family tree Dead Skin, 2011,
The sample are displayed according to aesthetical, material and structural decisions regarding behaviors.
The tuck stitch, as an original model, went through many transformations in scale, place, look, function, sizes, materials, until very distant shapes. However, each technical decision is made from the continuous observation and dialog with the tuck stitch.
The final arrangement consists in 3 branches: the Dead Skin branch, the Tuck branch, and the rest, which are evolution, example, mistakes, from the 2 others.

Arranging the samples allowed identifying 6 samples illustrating the chosen behaviors to be activated, but it also allows extra links between the samples:

6. Machine building (video) (under construction)

Shooting film required the construction of “stages” and tools that supported the process. The videos stage six mechanisms to inspire textile building developments.
They evoke textile as an observed and studied substance, utilizing medical domain. The 6 videos have been shot by using the fabrics of Dead Skin, Living Machine. The scenari were written so that each mechanism was projected into a short story, relating to textile as a living material.

Fig. 75 #Lunette, 2011, installation film shooting

Fig. 76 #Quake, 2011, installation film shooting

Many paper devices were built to record fabrics, especially regarding angles: several video camera were used sometime to multiply textile expressions example, and play further while editing.

Fig. 77 #SelfCulture, 2011, installation film shooting

Fig. 78 #Cell, 2011, installation film shooting

Fabrics were used as actors and stage building.
Questioning everything was also for me a way of learning, because my background is not related to textile. Because of this, I considered myself as “ignorant” (not knowing) and made a point on observation, manipulation and “fictionization” as main method tools to learn by designing. The development find interests in everything regarding knitting, from the needle of the machine until the idea of perception, but is anchored by the invincible Omni-presence of monofilament and tuck stitches, as actor of textile behaviors.

5 Discussion II

Analysis

Nescience, fiction, perception: design idea and design process background

As mentioned in the introduction, the seed of this development is in the feeling of ignorance provoked by objects, which cannot be identified at first sight. Not knowing leads to a process of research of identity, which refers to perception. The actions of self – projection into the design process by interacting or fusing with the machine, together with the process of disarticulation, dissection and extension of knitting technic, are the results of the influence of literature concerning Greek theories about the role of sensation in knowledge and the phenomenology of perception of Husserl.

Aristote, in “On the soul” (Aristote, between -384 et -320) states the sensation as a necessary element for life, in that sense that it connects to the external world and allows adaptation by sensing.

The Phenomenology of perception (Husserl 1913) defines the perception of a body as the body itself, instead of considering it as a representation of the body. It relies on the consciousness as series of intentions, act – aims, instead of using it as a container to filter the outside. In other word, consciousness should go to the external world instead of receiving it. Also, Husserl declares that perception is not isolated, and that it consists in an articulation of “perception – sketches” which completes each others in a process of understanding and identifying.

Design process position: naïve attitude

To palliate my ignorance, I transferred it to the concept and assimilated it to the feeling of ignorance that identifying induces. This allowed me to define my own behavior regarding learning about textile and making fabrics in the context of this development. This also frees me from any previous potential influences or inspirations. It is at the origin of the development of a specific knitting technic and probably influenced the idea of piece / unique as a clue to follow.

The fiction as a tool is a second way to get around lack of experience by being in - printed during the act of knitting. At a certain point of the knitting sessions, bindings, yarns specifications, stitches sizes and gauge have been covered by behavior definition and stitches travels, until such a permanency that knitting turned to knitting - feeling tensions of all kind. I think it is very determinant of the way concerns are handled and talked in the development.
Associated with a focus on monofilament and behaviors, they allowed pushing the aesthetic of Dead Skin Living Machine. It is characterized by a group of pieces, which lead the exploration very far from the original personas, the tuck stitch, without departing from textile identity. Knitting is the technique and the subject at the same time.

The fictionization of the act of knitting tends to enforce the research of its identity’s basics, consider them in three dimensions and motion, and if artifice it is, it is the knit’s one, not mine. I felt this particularly when I tried to impose the feature of an object over those of knitting: it was disappointing, in somehow. This made me reconsidered the place of the idea of object in the development: apply an object’s behavior model on textile was not working out in this case, it could not be pushed that way.

Living machine: trigger the emergence

This specific position has set the rules of the practice as a permanent production of agencement.

As the designation dead skin, living machine is a copy – pasted translation of the intuition, vague but remaining. It is a primary direction in the process, which stayed vague but allows developing the textile and aesthetic languages, respectively behaviors and dead skin.

Making textile dead skin is characterized by the multiplication of tuck stitch experimentations, versions, sizes and behaviors. The production of one piece leads to the next, and each of them acts like the derived from the previous one. They are different perception of the same thing.

The monofilament, as a permanent material focus regarding behaviors, shapes the nature of the samples (and literally shape the samples): it restrains the interaction of the knit with the machine and with me. Although the textile materials resulting are all different, the repetition in material choices, technic and actions guarantee a constance regarding aesthetic and material expression. The remaining materiality expressions put under the light the unity of the textile material.

Method

In Man, Play and Games, written by Roger Caillois in 1957, fictional aspects are approached in a reflexion about playing, playing at a game. Games belongs to human culture since ever, and many researches have been done to understand what is it and why we actually “play” games. According to Friedrich von Schiller, games, as well as art, come from an over abundance, a pulse of vital energy besides the needs. Thus, playing a game is actually only “spending” energy, in that sense that the player uses energy in a superfluous way. Indeed, the game in itself has value only in precise limits (J. Huizinga, 1938), like the time of the game, or the territory (real space or board).

The biggest specificity of playing is its difference compare to reality: indeed, playing at a game actually is playing a role, it is the act of replacing the confusing rules and order of reality with precise and chosen rules, that, still, you have to follow.

Playing at a game is agreeing to enter to an illusion, where the final situation (you win, you lose, etc.) is valid only inside its own limits. This is the essence of the game to actually cancel results once out of its limits.

The exploration of knitting by knitting (the action and the principle/persona) of Dead Skin Living Machine required a lot of fiction in the act of knitting itself, certainly to keep on avoiding any human measurement intrusion and stick to the knits languages. The parameters are reduced to the stich and the needle as strong singularity evolving in plurality. It has the main place regarding textile behavior research because it is thought at each unity which compose the whole, in a successive but non-linear way. The time and the distance are back down to the scale of a few stitches to knit, decisions are taken.
which compose the whole, in a successive but non-linear way. The time and the distance are back down to the scale of a few stitches to knit, decisions are taken every few courses.

Emergence

My position inside the design process quite settled the limits of the making process. As a integrated part of the making time, the aesthetical choices had to be relevant yet not anticipative: decisions were constantly taken during while making. Thus, each outcome materialized a judgement time, where the situation was observed and appreciated in order to go to the next step. The global methodological approach is based on a permanent observation and following of the textile material expression. A specific focus was put on the identification of the expressive element of the entire group of samples, therefore, even a failure had a role to play in the emergence of the constant of the expression of my samples. A mistake is often interpreted as a wrong direction because it leads to chaos, whereas it is an key point in design process as it indeed shows up a unstable limit of the program.

Knitting occurrence

The contance of reconsidering the act of knitting progressively arranged the production of textile material in a way that every needle position or yarn tension had to be considered as a circumstance more than a result. Moreover, pushing the possibilities of the machine forced me to consider irregularity of the occurrence of the act of knitting as an aesthetical result to follow. The resistance of the materials on the machine became a trigger in the making as well as an energy provider regarding textile mechanisms within the samples. The technical structure of samples are the consequence of the occurrence of the act of knitting, therefore the samples hold the history of the act of knitting and appear as a combintion of circumstances.

Textile behavior: an agencement

The materialization of the act of knitting into textiles was conducted within the exploration of material interactions. As I positioned myself alongside and not ahead the materials, their expression relies more on an agencement of composing elements (here stitches for example, or yarn choices) than a precise recipe. The agencement of the choices made during the design process actually don’t aim at producing an aesthetic expression but more at producing conditions, circumstances. It gives a distance and an independance to the materials that fits quite good with the idea of pieces. Indeed, the idea of pieces to build up a bigger construction (fabrics) underline an initial position in the hierarchy of a group of element, like in Beuys happening (blanket). Eventhought they are outcomes, the samples of DSLM get this status of axiom thanks to their emergence.

I feel particularly inspired by the work on felt material of Robert Morris (fig. 79) because he makes a point of the expression of the material, considering the potential of imperfections of the material. He states in the article Anti–form, 1968, practice of sculpture by quesitoning the place of the material in defining the final shape. He stands for the independence of the material in its expression to let it organize itself. He works by following the material and its behavior, almost personality.

Folds, cuts, and space arrangement are followed to investigate and emphasize the expression of the material. The textile outcomes, yet precisely shaped, react and stand under the influence of the whole agencement, and get back to some kind of primary position because of natural conditions such as earth attraction.
Visual VS haptic

It exists a very close relation - ship between textile and human - being which relies on at least two things: its specific status as it protects the body but also its importance in showing the body, and its legitimacy in this role, as it could be state as a need. Tactile aspects regarding textile are obviously prevalent since textile are physically touching the skin on the body. Hapticity usually includes the study of direct tactility and indirect tactility, as touch is also a sense used to identify, understand, recognize.

I got the opportunity to exhibit three times my fabrics, and got to observe people’s reaction regarding textile. It is necessary to precise that if I used tactile experiences as satisfying results, they were never a part of the design process as a element to arrange. Tactile characteristics guided the choices of expression but not the aesthetical choices. Yet, the samples seemed to have a strong tactile attractiveness, as I saw the viewers frantically touch the fabrics to understand what it was all about, (until which technic I used !). Many people manipulated the sample like a necessity, as they faced an unknown phenomena. I could often see suprise in the reactions once they touched, particularly regarding materials.

Another important point regarding hapticity concerns the evaluation of the fabrics. The consideration of the samples throughout touch give back to the samples a status of piece. indeed, their size and shape make it possible to imagine combinations, or dream up scenario of more concrete productions, into a garment, or objects.

Fiction / videos

The object dimension of my samples were explored with the editing of the videos. Assemblages and mechanics were observed and used to insits on textile building methods.

Besides movement, intrinsically related to video and used for activation purposes, shooting super short films provides a space for telling about textile interactions with behavior language. The textile dead – skins are actor, elements of a projects and subject to observation at the same time, regarding building textile. On another hand, it is a very playful medium to manipulate parameters such as scale, and give a territory for the materialization of a certain closeness between textile dead skin pieces and a viewer.

Also, such a medium is very well known as a fictional tool, therefore the viewers are quite naturally installed in a fictional environment where senses and consciousness are sought at the same time. Finally, giving to textile a status of living body, associated with medical inspirations, create a very close if not intimate meeting between the viewer and the outcome.
Shooting videos was finally the materialization of the use of fiction in the design process. Design processes, conceptual or practical, are very often (if not all the time) based on organized intentions, a system of more or less directions, a pro-ject(ion), establishing, for example, what is the idea, or what is the goal, or what is the procedure, maybe all of it at the same time. I believe it is a key step of design process as it already induces a shape of a project as well as making an inside thinking clearer and is also a stable / known base to rely on any time during the further development.

Aslo, I think it is very much related to fiction/reality issues, as it is squizzed between marking the present (reality) of a series of intentions by/and shaping (planning) a very near future (fiction). What I mean is that when planning to do something, the plan is real but the materialization of the goal related to the plan is'nt (yet). One could then ask about the limit between reality and fiction and what are the elements that specify each of them. It also relates the idea of language / communication as an activity and consciousness, in that sense that one can question the value of thinking, talking, expressing an idea or an opinion. Human being is probably the only living body who actually plan its interaction with the outside as he can think about it and maybe decide, but science has also probably not understood yet all about physiologic interactive system of Nature.

The exploration of knitting by knitting (the action and the principle) of Dead Skin Living Machine required a lot of fictional inputs in the act of knitting itself, certainly to keep on avoiding human measurement intrusion and stick to the knits languages. The parameters are reduces to the stitch and the needle as strong singularity evoluting in plurality. It has the main place regarding textile behavior research because it is thought at each unity which compose a whole, in a successive but non-linear direction. The time and distance are back down to the scale of few stitches to knit, decisions were taken every few courses. The materiality is chosen as the aesthetic dimension of the making process to follow. This, together with the accompany side position of mine, has set - up a design process context where to arrange the condition of the material used. That way, my own judgement or wishes are intergrated very early in the thinking / making, giving plenty of space to the material to emerge.

The articulation of the different steps of the design process was very much ruled by my interest for fiction as a key tool in design practice. Indeed, I tried to define its role and time frame in processes by stating fiction much closer to reality than it seems. Perception is the tool which filters other bodies in the external environment to produce signs, while fiction is the tool which assemble signs to produce bodies, including, in DSLM, a process of desassembling signs into several entities that can be recombined into an/other body/ies.

In a way, fiction is much closer to reality than one can expect because it is a tool that can give a structure to what is (perception) and what can be (creation?), so basically, the moment where things are being planned (in general). I think that the most disturbing part of the idea of fiction is the one that keeps it as the contrary of reality, an opposite, because it shows it as a separate and passive facet of how can things be, whereas it is actually the action of filtering one into the other one and vice et versa that trigger the ermergece of new bodies.

Taping fabrics movement and build short films aimed at considering the application of unity in plurality within interactions at a bigger scale to make textile from a fictional media work. Beside its ludic aspect, editing films was an opportunity to test and see fabrics in movement, and put under the light interesting knitted elements to use to constuc fabrics by pieces.
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> Available at www.youtube.com/watch?v=bSSxTmzxzXo

Appendix
All illustrations are taken from:

- Dr. Samuel Raz, - 1993 *Flat knitting technology* C. F. Rees GmbH

Images:
fig. 0 : *I like America and America likes Me*, 1974, J. Beuys, happening, New York
fig. 59 : *Skin cross section*, www.onlinehealthcaredegrees.com
fig. 60 : Microscope view of cell skin www.onlinehealthcaredegrees.com
fig. 79 : Robert Morris, felt material work
fig. 1 to 58, 61 to 78 : Dead SKin, Living Machine, 2011 - 2013, Jo - Anne Kowalski personal document
INDEX

act of knitting
name the action of knitting
agency
relates to the idea of prevalence, what conducts, what leads.
behavior
relates to the state of things (here fabrics) in the natural shape, mostly refering to material tension
balance.
behavioral textile
refers to the samples as source of agencement examples
body
phenomena offering the three dimensions
conceptual process
concepts development, ideas articulations (≠ practical process)
DSLM
short name for Dead SKin Living Machine
dead skin
status, tag of the samples in the project
design process
names the full process of making, including reflection
emergence
concept evoking leaving an environment to appear at the surface, a manifestation
external / internal
external considers outside the head/body, internal considers inside the head / body
family tree
refers to the representation of same family members regarding their relation - ship
fiction
usually refers to any thing not in the external world, which is not (yet ?)
haptic
science of touch, of tactility. It includes two touch nature: the natural touch and the intentional
touch.
identity
also synonym of knowledge, recognizing.
interaction
action of bodies on each other(s)
limits
understand decision, or fixed rules of the design process. They are the rules like in a game.
living machine
refers to the fusion between my body and the knitting machine during the act of knitting.
macro mechanic
mostly concerns flexibility and elasticity of fabrics
mechanism
agency and reaction of the materials within a samples ± behavior
micro mechanic
evokes the interactions at the scale of a stitch
naive attitude
names the position taken in the design process, willingly not anticipative, naive be
cause not anticipative
nescience
ignorance, acknowledge
object
body as a *thing*, including human being
occurrence
occasion, opportunity, focusing on circumstances
perception
sensing, interpreting, understanding the outside world through our senses and consciousness
practical process:
≠ conceptual process, concerns the making time
skin
symbolic vehicle allowing me to travel between concept and practice, the skin is or considered as
a model, so as it is, or is a metaphoric name for my samples. They also refer to the idea of *bag or
c开幕式* to relate to the idea of body.
sself projection
self-introduction inside the practical process
stitch stitch
specific stitching technique where a thread is kept on the needle during few courses, creating a hole in
the knit.
flat hand - knitting machine / general principle

two needles' beds, along and from top

set up / weights

set up / pulling roller

scheme needles’ beds, front (bottom) and back (top)
3 positions of a needle, from open to closed
technical drawing of needles + stitches

needle
needles active position

> Active needles close up
> Active needles in action
> Needles Active position setup

Needles Active position
Up to grab yarns
needles ready to grab

yarn's travel / carriage
1. Needle grab yarn 1
2. Needle goes up to grab yarn 2, yarn 1 leaves the head of needle, yarn 1 makes a loop along the needle body
3. Needle goes down to loop yarn 2
4. Needle is down, yarn 2 made a loop in yarn 1

Interbed view, yarn feeder approaching thanks to carriage. Each passage of the carriage on the needle beds knits a series of stitches and is called course.
Technical drawing of stitches on needle, after one course

On the needle bed, the width and flexibility of the knit can be settled by activating a needle or not.

On the carriage, the size of the stitch and binding of the knit can be set.

two courses of 4 stitches plain knit

two courses of 4 stitches, yarn “travel”

course 1
course 2

active needles, set up.
inactive needles.

buttons and rulers

stitches specifications
tuck stitches

plain knit / with a needle getting off

plain knit / with a one course tucking operation

plain knit / yarn arrangement after two consecutive tucking operation

tuck stitches / top view on needles

tuck stitch / in a knit

tuck stitch / after 10 tucking operation