ADAPTIVE
CLOTHING

Digital Craft: Tools of the trade Robin Zegelaar 0850198

The thing newer technologies and fashion share is innovation, looking forward. However fashion does not only look forward, it keeps the past as a central part of the craft. Trends celebrate the past while looking at the present and the role newer technologies play are how to make those trends innovative, new, fresh. The role the newer technologies play don't have to be obvious, as using digital prints instead of screen printed ones. But they can be very invasive on a trend like a new type of fabric (fermented fabric, made from grapes using a certain type of bacteria) which drastically alters the way a standard silhouette looks and feels. They can be practical, like using a certain type of polymer to create waterproof garments or completely decorative like laser cutting leather to appear as lace. But all of the techniques add something new, making it relevant to the now and revisiting its original value.

In the case of global warming there will be a need for clothing that can adapt to changes. Not only will the temperature rise in general there will also be extreme colds, droughts and storms. A part of fashion is about adapting and creating ways to deal with change (or go against and make a stand against change), be it political, cultural, escaping reality or in the case of global warming practical. There will arise a need for clothing that has the ability to adapt to certain conditions.


ADAPT:

make (something) suitable for a new use or purpose; modify.

modify, alter, make alterations to, change, adjust, make adjustments to, convert, evolve, transform, redesign, restyle, refashion, remodel, reshape, revamp, rework, redo, reconstruct, reorganize, customize, tailor, improve, make improvements to, amend, refine, tweak;

become adjusted to new conditions.

adjust, acclimatize, accommodate, attune, habituate, acculturate, conform; familiarize oneself with, habituate oneself to, become habituated to, get used to, orient oneself in, condition oneself to, evolve to, become naturalized, become seasoned, get one's bearings, find one's feet, blend in, fit in
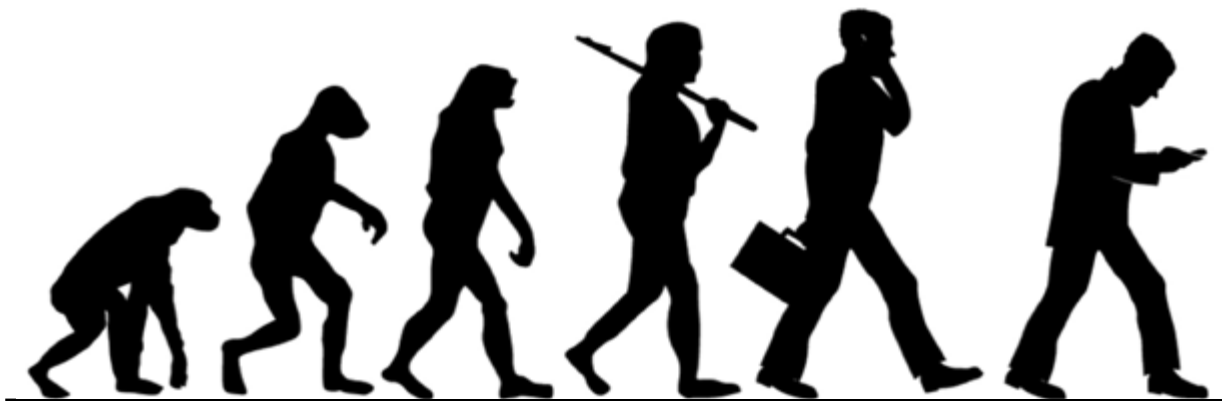
Evolution and meme

This led me down the path of evolution. What if humans can't evolve fast enough or we have different needs? Newer technologies can play a significant part in how to deal with evolution, they can fill the gap of what there is and what is needed/ wanted.

In one of the first classes, where I presented my idea, we talked about god mode and that I essentially take over evolution because I shape the evolution myself. In evolution changes come because they need to change, there is no end goal just a survival. But fashion is more like a second skin, not just for protection. Fashion can be an expression, show social and economic status it can even be political. It is more than simply adapting to a new situation to survive.

I also received the suggestion to look at a book of Susan Blackmore, dealing with meme. In short meme is copying certain traits. Meme can be anything, from genetics to cultural. This includes genes that know how to deal with predators, a symbolic dance passed through to the next generation as a tradition and even speech can be considered copying. I find this fascinating as a concept and also see it clearly in fashion, where it uses copying traits frequently, mostly visible in the form of trends.

Trends have a lifecycle after which they disappear, but most of the time they are reincarnated in a later period.

When they do reappear they are envisioned in a contemporary way, using technologies, ideas, knowledge of that time (they evolve/adapt). As a fashion designer I'm not that interested in trends as in what specific colors to use for a season, but more in trends that surface because of certain conditions at that time. Conditions could vary from cultural to global weather changes.

The image below shows not only a meme (a copy of a garment, even the whole concept of a little black dress can be viewed as one) but also a response to the use of animal leather and using a vegan version of it as a stand against it.

First sketches
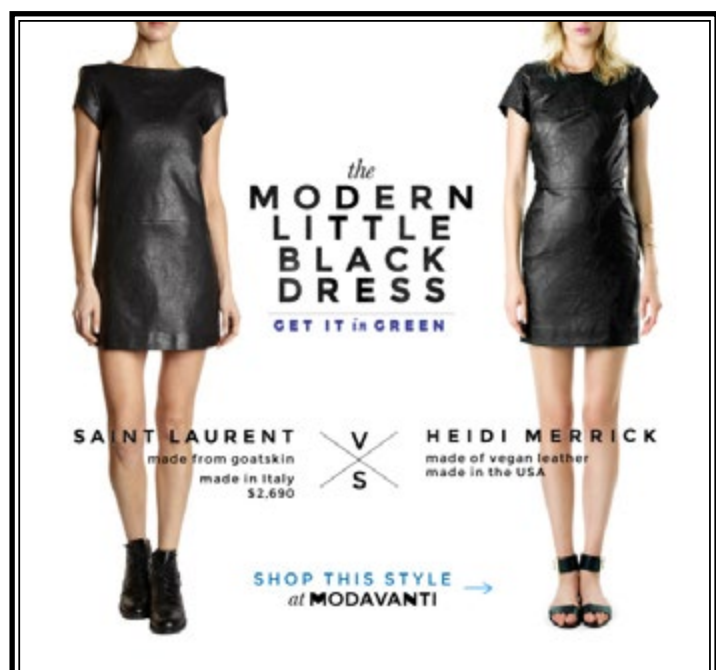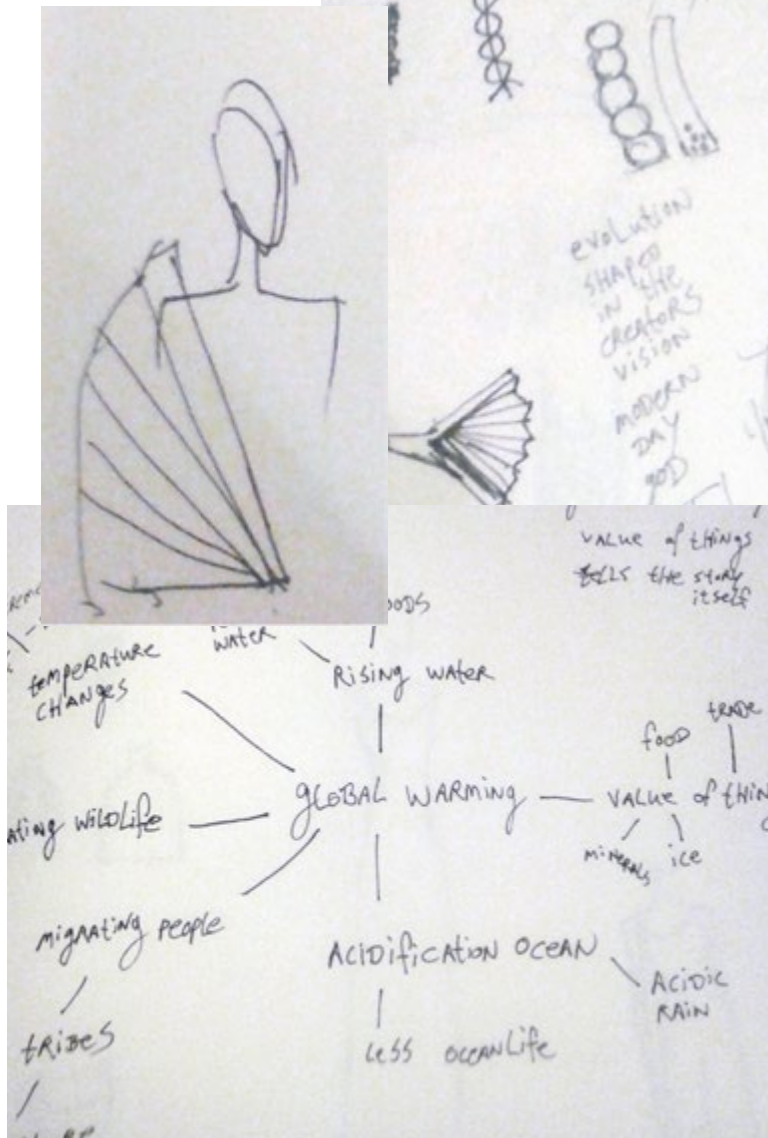
www.fabricanltd.com, Wearable Fashion, 2005

Constant motion

Seeing how everything fits into this time, what do people want/ need. And of course looking at the future, what could be the next big thing, what evolution in techniques can we bring and use?

In that way fashion also stimulates new techniques by demanding progress and testing boundaries. Thinking of ways to make 3d printing more wearable/flexible, spraying fabric from a can (fabrican company) and Ultrasonic bonding to create more durable clothing are all examples how fashion also pushes new technology forward.

The "old" trends become new by using what is available at the present time. If newer technologies had a breakthrough in developing a new fabric an old silhouette or detail can be transformed completely.

The advancing of techniques and production of new ones led to new ways to create, for example durability. Production methods where they use sound waves to bond seams instead of regular sewing to create a sturdy and fully closed seam. Developing new fibers from coconuts that is durable yet breathable (and has the added perk of using less water to fabricate than regular cotton). There is also sustainability by dying fabrics through a new process where the dye adheres better, costing less water and energy or creating intricate designs using a laser cutter (diminishing the cost significantly but uplifting a product to a new level of intricacy.

The shift in the need for certain clothing shifts the value of certain materials too. If it is constantly raining a water resistant synthetic fabric gains the upper hand over a cotton that just soaks up the water and provides no protection.

These are all ways in how new technologies add to the world of fashion, its trends and how they interact with changes in the world.

www.vocalbond.com,
Quilt dark grey, 2013

Marks and Spencer, SS 2012

Global warming, its effects on the world and designers

For the research of my tool I took a look at the effects of global warming to form a setting for my tool. Global warming brings serious changes in the environment. Most of us know that the sea level is rising and the polar cap is melting, but the shocking thing to me was how fast it happens. By 2100 researchers expect a rise in sea level of 3 to 6 feet, which is devastating to coastal areas (Florida would be mostly flooded). Other problems are ocean acidification which results in diminished sea life, a temperature rise which will not only bring warmer weather but also more extreme weather changes and storms, migration of wildlife and flora to different regions (or simply the extinction of certain species), and drink water that is rapidly depleting (which usually takes a backseat when talking about global warming but will be a real issue in the years to come.

Issac Cordal, "Politicians discussing global warming.", Berlin, 2013

Learning these facts I decided to go with the weather changes, seeing how this will be a major influence on fashion, trends and seasons while still giving me the freedom of how to deal with it.

Raincatch
CIID, 2011

Designers

During my research I came across several designs inspired by global warming. The first one was a raincoat that stores rainwater. The Raincatch rain coat was designed by Hyeona Yang and Joshua Noble to provide clean drinking water to people. The water gets collected through the open collar and transported to a storage in the jacket where it gets filtered by charcoal and a chemical process. Eventually it is purified water which is drinkable from a straw near the face. This design really got me thinking about the seriousness of what they are representing, a limited supply of drinking water. And although not practical does confront people, telling a story without the need of an explanation.

Another design is a jacket that reacts to pollution. The Aegis Parka is designed to offer protection from pollutants in our environment. The design studio Nieuwe Heren created the parka which reacts to the level of pollution through leds. There is also a built in respirator which filters various pollutants like carbon monoxide and diesel emissions. The fabric of the jacket is treated with the photo catalyst titanium dioxide (which is a compound with anti-fouling and sterilizing properties that activate when exposed to ultraviolet light). The treatment for the fabric came from developments made on products that are ''self-cleaning''. I find it interesting that they were able to integrate that treatment into fabric because it is a very useful treatment in respect to clothing that is prone to collect dirt and bacteria.

A polar opposite is the designer Tino Seubert, who uses pollution to dye his clothes. He has two main goals: using something harmful and give it a useful non-harming purpose, as well as generate awareness about the pollution surrounding us in our daily lives. "Despite the introduction of diesel filters in the western world decades ago, our polluted environments still remain a constantly growing problem," he writes on his blog. "People living near busy streets, pedestrians and cyclists all suffer from the smog pollution risking cancer, asthma, and heart diseases."

He was inspired by the way how the ancient Egyptians made their ink. They suspended carbon dust in water to create a rough form of Indian ink. He translated that to using diesel filters and collecting the pollution to use as a dye. Not only is it a reaction to the extremely damaging dyeing process that is currently used it also uses the existing pollution as a way to enhance/adorn the fabric making the wearer aware of the problem and recycling the pollution at the same time. I find it interesting how he uses pollution in a traditional manner such as dyeing to not only create an image but also awareness.

Tino Seubert, the colour of air, 2014
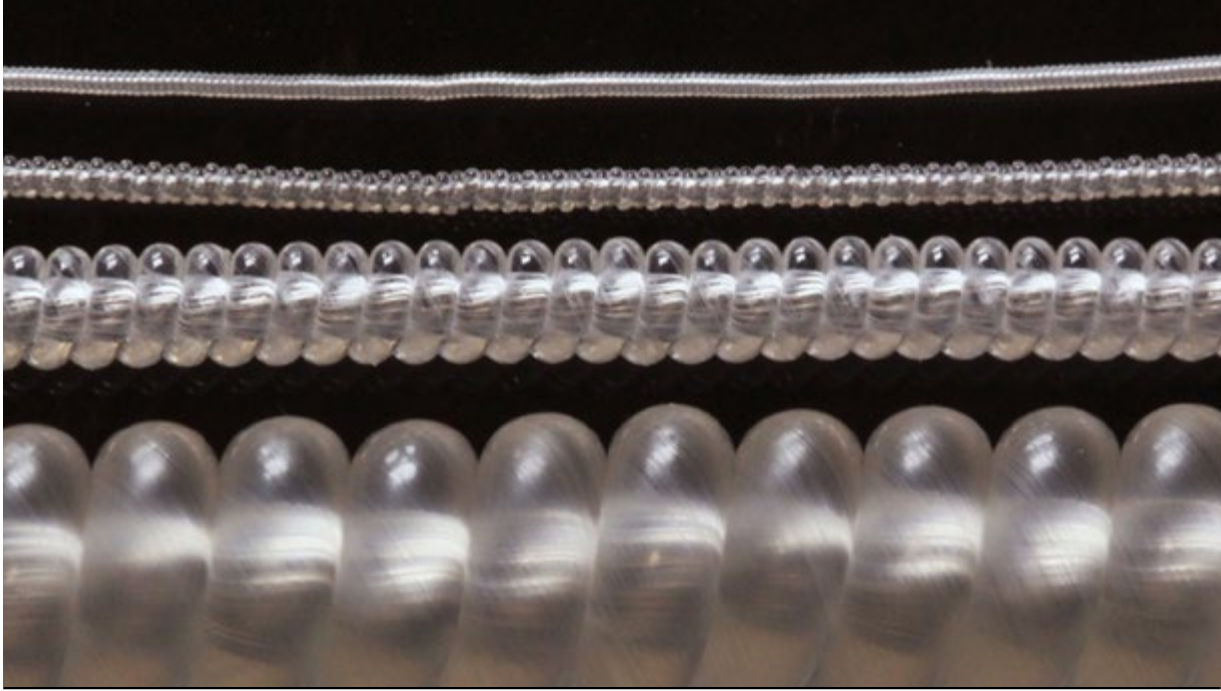
I also encountered practical technologies that are already in use like ThermaDown. It is goose down treated with a Nano coating which converts body heat to infrared energy. The idea is that the goose down keeps you warm while the resulting infrared energy improves athletic performance and overall physiological condition.
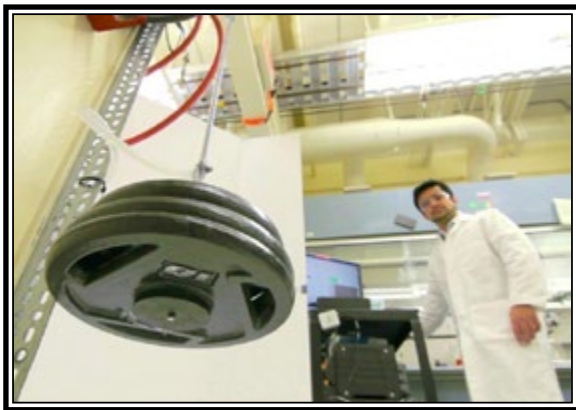

The idea of clothing enhancing human capabilities is extraordinary and an interesting field to research. Most of these developments are either from the military or sportswear companies. They look for new ways to create practical and useful gear, which gives them a huge impact on fashion with all their developments. Materials like neoprene have been around since 1930 and were developed further into wetsuits by sport companies. And the popularity of neoprene just started in the fashion world because of the way the material has adapted since its origins.

There is even the making of superhuman artificial muscles using coiled fishing line. The fishing line is twisted with sewing thread and can lift 100 times more weight than a human muscle of the same size. It was developed at the University of Texas and revealed in February 2014.

The thing that I find highly intriguing is that they show how the artificial muscle is made. There are no expensive machines required to create a twisted fishing line. The only threshold there is in on how to integrate it into something where it will function. But the idea of an exoskeleton without being a huge robot seems plausible by using the strength of coiled fishing line. I imagine it would be useful for other things too like in corsets to shape the body or high strength backpacks for example, it opens so many doors to create gear or garments useful in a changed environment. It excites me that there are so many interesting developments happening that push the boundaries.

inspiration
crinoline

peplum

blow up
inflate

inspiration
life vest
pleats
lining
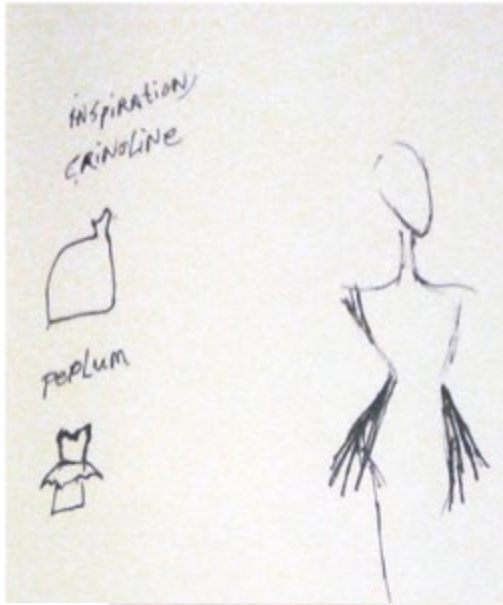
Fase 2
sketches

Suzanne Lee, BioCouture jacket, 2012

Technology, a new point of view

New technologies give us the way to deal with change. New innovations can be a practical approach like using certain types of polymer to create waterproof but breathable clothing, flame resistant outerwear or even bacterial killing microbes infused in fabric. It could be manipulating biology to create an organic fabric, like the use of a kombucha culture to create a form of plant leather. There is also the possibility of looking at old techniques, like making lace, and create it in a different way using for example a laser cutter. This allows for a different feel and use of material while still showcasing the lace influence, keeping the richness of lace but taking it to a modern place.

New technologies can even be pure fantasy like the garments from Neri Oxman which are created by 3d printing and allow "living" on a different planet. Each garment is created with a different planet in mind changing its appearance and functionality.

I think the designs really hit the mark of what innovation could lead too. From big evolutionary steps to small practical things, they all change the way we think, use and perceive. In the case of 3d printing it elevated the 3d print to a higher level, transcending the aesthetic and giving a deeper message (namely a way to use it in our evolution as a species). It also tells a story and that is something I am highly interested in, something I strive for with my own designs, tell a story or convey a feeling with my designs. But it is also something I struggle with when I'm using new technologies even though new technologies have the capacity to blur the lines between reality and fantasy.

Neri Oxman, Wanderers: An Astrobiological Exploration, Zuhal, 2014

Neri Oxman, Wanderers: An Astrobiological Exploration, Mushtari, 2014

Anouk Wipprecht, Smoke dress, 2012

New steps

What new technologies bring are opportunities to me as a designer. It gives me the options like laser cutting to create details I could never have done by hand or digital printing for the most amazing fabrics or really using technology to create something that interacts with the environment like the smoke dress from Anouk Wipprecht that produces smoke when someone gets near the wearer. But also looking at material usage and what the impact of its use is.

They make it possible to create the ideas in my head and craft a reality. We get a new perspective by looking at things through new technologies or using new technologies in an old way. That is what I find fascinating about new technologies how they bring innovation, a new look or a new meaning to something.
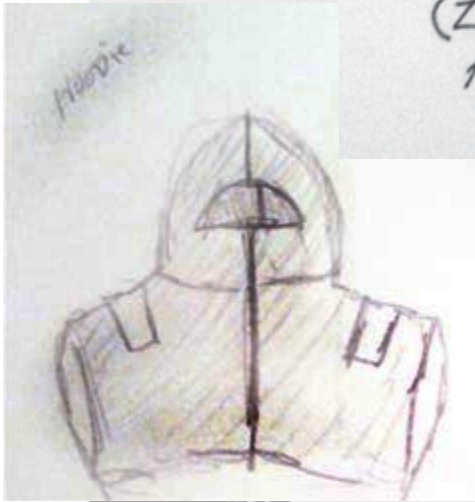
Designers should not be afraid of new technologies or resist them, which does not mean they shouldn't question them and think about what they mean in their particular craft and how they could affect another. It is possible to think from a new mindset and not use a new technology or the other way around. For me it is a way to bring innovation or a new perspective on things, not only fashion but also the world surrounding it.

The research for my tool of the trade made me look at technology and fashion and their futures in a different way. I see them evolving and adapting together, creating new meaning for old trends/materials/stories. Old techniques will not be lost but envisioned in a new way, using a different material, approach or an innovation in the technique itself.

The idea of fashion evolving and adapting is not new, it basically sums up the core of what it is. That is also what connects it so clearly too new technologies which also evolves and adapts in time. But it is more than just technologies it is also about the cultural context, what is playing in the world around us? With my tool I gravitated towards the culture and the changes in the world of now, and how fashion can respond to that, using materials with a certain mindset. It is about evolving aesthetics and practicality.

△ BASE
- STAND ALONE piece
- Different ways to
ADD PARTS
(Zippers/Belts
Presser Buttons
etc

Hoodie

Final
sketches

FLAPS
combine
LAYERS

HIDDEN Zipper
to ADD lenght
to BASE

Dunne and Raby, United Micro Kingdoms, 2012/13

Speculative design

The relationship between speculative design and critical design is explained by Dunne and Raby '' Critical Design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method. There are many people doing this who have never heard of the term critical design and who have their own way of describing what they do. Naming it Critical Design is simply a useful way of making this activity more visible and subject to discussion and debate.

Its opposite is affirmative design: design that reinforces the status quo."
The book speculative everything from Dunne and Raby, talks about design as a tool to not only create things but also ideas. The tool I created has similarities with the work of Dunne and Raby as it is not only an object but also a medium for a problem (global warming). It makes us think and could have diverse effects, from creating a debate to raising awareness of the problem it can even provoke action. My tool takes into question how we could adapt in a changed environment, a very real but also widely underestimated problem. By sketching a changed environment and showing my tool adapting it will show people the changes and make them aware, talk about it maybe even let them take action

United Micro Kingdoms, 2012/13 from Dunne and Raby is one of their projects I can relate my work too. It is about a fictional future where England is divided in 4 parts. Each part is self-contained and can make their own choices in cultural, political and economic ways. They thought about all the different "counties" and fleshed them out in detail. This creates a surreal and fictional world, yet it addresses problems, views and ideas that are happening now. By magnifying and visualizing that future it makes the viewer think. The problem of global warming that I'm dealing with could be viewed in a similar way. Not every part of the world will be affected the same way and we will adapt differently.

The thing that is the most difficult about speculative design is the line, the thin line where speculative design balances on. That it cannot be too weird as it will be dismissed as art, but at the same time not be too normal as it will fade in the background and blur into nothing. An example would be a sketch of an environment changed by global warming, it can be extreme but still believable. However if I combine it with a tool that gives you wings to escape sudden earthquakes it goes too far in (unbelievable) fiction and loses its value as a tool that makes people think. This fine line of exaggerated (potential) reality and nonsensical fantasy is where it can go horrible wrong or just right.

''What if?''

During my research I found a text from James Haldane. It talks about the responsibility designers have, to acknowledge their potency in shaping the future. He also commented that we shouldn't rely passively on repackaging past creations, which is something I agree and disagree with.

In my eyes there is a use for repackaging past creations if it transforms into something else. Fashion is a good example of repackaging past creations as we see certain types of silhouettes, colors, fabrics returning. By using new techniques (for example the Kombucha grown leather) and an old silhouette you can add a new layer of value (sustainability) transforming the copy into something new.

I do agree with his first statement though, that designers should acknowledge the potency they have in shaping the future, especially if it's derived from speculative and critical design.

Memes

One of the things I find difficult to place are memes in speculative design. Seeing memes are copying or copied traits and speculative design posing a ''what if'' question, can it be a copy? Isn't ''what if'' a speculation and therefore can't be a copy, simply because it didn't exist until the question was asked? Or is it a copy but a highly exaggerated one of a current existing scenario?

This is a difficult question to answer. For me speculative design in itself is not a copy, the way it is build up could be consisting of copies, but the what if question is only a copy if the question was asked before. I think speculative design and critical design are ways to look at memes, looking critically at a copied trait. The resulting design could be a meme making use of copied traits but it has a critical outlook on the meme in question.

A quote from William Gibson, ''The best speculative design offers 'nucleation points' from which the citizen can extrapolate and assess a potential future, attractive or dystopian.'' The reason I find this quote interesting in relation to speculative design, is because it sums up what it is. Offering a tool, medium, concept to think about and leaving it open for further thinking from the viewer. My tool has the same build up, it shows a problem setting, a tool that adjust to it but leaves room for input. To be precise the input to adapt the clothing to suit someone's needs.

The tool

My tool will be a garment that can adapt to its surroundings through the user, evolve or copy a trait that is wanted at that time.

The thing I love about this idea is how it touches fashion and technology in a similar manner; both make use of evolution and copying traits and are in a constant motion. It also means the two can be combined and react to each other, there is a demand in fashion and technology is created to meet that demand, a new technology is created and can be adapted to fashion etc. They are like two wheels pushing each other further and further without a finish line.

The tool will be a visualization of the idea of adapting through the user, specifically focused on global warming. The starting point will be a base module, the first brick or gene in the evolution. From thereon you can add, detract and change the base to meet your needs. The user ''evolves'' the garment to suit their needs.

Looking from the perspective of global warming it will not only touch on the practical needs but also the question of material. Using things like waste and or uncommon materials in combination with ''normal materials'' to think of ways to depose of waste or looking at durability. Testing things like insulation, protection against rain, a new look at fur etc. Eventually it will be different ''evolutions'' that can be used on the tool.

Conclusion

Global warming will change the environment, technology has the potential to help us evolve/ adapt to these upcoming changes. Newer technologies can play a significant part in how to deal with evolution and can fill the gap of what there is and what is needed/ wanted, from materials to production techniques.

In the case of global warming my tool focuses on a ''speculative'' need for clothing that can adapt to changes. The idea of fashion evolving and adapting isn't new, it basically sums up the core of what it is. Adapting/ evolving is what connects it so clearly to technologies which also evolves and adapts, they are in a constant motion like two wheels pushing each other further and further without a finish line. By allowing the room for the tool to evolve, it can evolve.

With speculative design the main goal is to make people think in a ''what if'' scenario. From big evolutionary steps to small practical things, they all change the way we think, use and perceive.

It confronts people with an issue and tells a story. And creating a story, a vision or concept is something that returns in most of my work. But what I did differently with this project was finding the thin line where speculative design balances on. That it can't be too far from reality as it will be dismissed as art, but too normal and it will fade and blur into nothing disappearing in the background. I also came across the question of designers not embracing technology. Designers should not be afraid of new technologies or resist them, but that does not mean they shouldn't question them and think about what they mean

in their particular craft and how they could affect another. It is possible to think from a new mindset and not use a new technology or the other way around. For me it is a way to bring innovation or a new perspective on things, not only fashion but also the world surrounding it.

With all the new technologies available designers can stretch the boundaries of reality further and/ or cater to a person on a personal level, by making the clothing adaptive to the user. This enthralls the use of desired material, sensors that react to the specific user etc. This creates two sides; the first is that a designer can create so much more than what was thought possible years ago (with the possibilities expanding further in the future). They will reach a line between fantasy and reality and blur that with all the technology possible. On the other hand there will be a need for individual clothing that adapts to its user, which could restrict/challenge a designer but give more options to the consumer. That could even go as far as consumer made content, an open source database to share your own ''evolution''.

Still designers can also make use of an open source database to spread their own designs into the world and shape the future.

My tool is not only an object but also a medium for a problem (global warming). My tool takes into question how we could adapt in a changed environment, a very real but also widely underestimated problem. By sketching a changed environment and showing my tool adapting, it will show people the issue of global warming. Making them aware, discussing it maybe even let them take action.

Sources

Suzanne Lee, Kombucha leather, biocouture.
co.uk, http://www.ted.com/talks/suzanne_lee_
grow_your_own_clothes?language=en
Fabrican, http://www.fabricanltd.com/
Speculative Design: Playing Devil's Advocate,
http://www.architectural-review.com/comment-
and-opinion/speculative-design-playing-devils-
advocate/8659931.article
Dunne and Raby, http://www.dunneandraby.
co.uk
http://journal.fashionspyder.com
http://www.ecofriend.com/big-question-
planting-forests-deserts-cool-planet.html
http://www.coolhunting.com
Global warming in daily life, http://
homeguides.sfgate.com/global-warming-affect-
daily-life-78745.html
Transit jacket, http://www.designboom.com/
design/gravitytank-betabrand-germinator-
transit-jacket-09-18-2014/
http://startupfashion.com/textile-innovation-
germinator-jacket-avoiding-illness
http://startupfashion.com/tino-seubert
http://www.innovationintextiles.com/smart-
textiles-nanotechnology/
http://www.activelifestyle-blog.com/hyperfuse-
innovative-sportswear-im-trend/?lang=en
http://www.takepart.com/article/2012/11/08/
next-thing-climate-change-will-ruin-your-
outfit
http://www.dailymail.co.uk/femail/
article-1256668/Paris-Fashion-Week-Chanel-
fights-global-warming-fur-suits.html
http://www.textileworld.com/Issues/2010/
July-August/Dyeing_Printing_and_Finishing/
Climate_Change-Carbon_Mitigation_And_
Textiles
http://www.theguardian.com/lifeandstyle/2014/
feb/08/vivienne-westwood-arctic-campaign
http://www.dezeen.com/2014/11/25/neri-
oxman-mit-media-lab-stratasys-wearable-3d-
printed-structures-interplanetary-voyages-
synthetic-biology/
http://styleobserver.com/2009/05/is-adjustable-
clothing-in-our-future/
http://www.muelaner.com/design/ultralight-
temperature-adjustable-clothing/
http://www.wired.co.uk/news/archive/2014-
12/08/3d-objects-in-mid-air-through-
ultrasound

Climate change in London, http://
www.telegraph.co.uk/news/earth/
earthpicturegalleries/8044199/Postcards-from-
the-future-illustrators-imagine-how-London-
could-be-affected-by-climate-change.html
Underwater city, http://www.ibtimes.co.uk/
floating-city-submarine-taxis-unveiled-fight-
asias-population-squeeze-1451113
http://apocalypse.cc/
http://www.yatzer.com/the-next-black
Raincoat, http://www.cnet.com/news/
raincatch-concept-coat-for-intentional-water-
gain/
Raincoat, http://www.thecitrusreport.
com/2011/headlines/a-jacket-to-collect-the-
rain-a-collection-to-drink-water/
http://www.huffingtonpost.com/2012/10/22/
climate-change-global-warming-
hurricane-sandy-style-apparel-fashion-
industry_n_2001510.html
http://www.crunchwear.com/darpa-developing-
breathable-exoskeleton-made-fabric/
http://www.nature.org/ourinitiatives/
urgentissues/global-warming-climate-change/
threats-impacts/
http://discovermagazine.com/galleries/zen-
photo/g/global-warming-future
http://www.epa.gov/climatechange/science/
future.html
Lucy McRae, http://fashioningtech.com/video/
lucy-mcrae-how-can-technology-transform-
the-human-body
Synthetic muscles from fishing line, http://
www.popularmechanics.com/science/health/
breakthroughs/synthetic-muscle-made-of-
fishing-line-is-100-times-stronger-than-the-
real-thing-16514805
Sonja Baeumel, http://www.sonjabaeumel.at/
http://www.livescience.com/43536-yarn-
muscles-100x-stronger-human-muscles.html