HYBRID 3D FASHION DESIGN

documentation sprint 1

CONTENTS

introduction

INTRODUCTION

Virtual Fashion is on the rise. The industry is slowly getting familiar with the benefits of virtual clothing. Back in the nineties, the 2D digital revolution started. Most companies nowadays draw their patterns by 2D CAD programs. Recently, we have seen some huge developments in the 3D virtual way of presenting clothing. More programs are developing for fitting garments on models in a virtual environment. The industry sees the possibilities and the benefits, but also the negative aspect of the story – considering the complexity of the programs. It takes time to educate your employees. Also high-end brands are starting to show interest in the virtual developments. As a group of researchers from various backgrounds from the MediaLAB Amsterdam, we are interested in the way 3D modeling is going to develop in fashion.

3D modeling is widely used in various industries like the automotive or the architectural. Since the material used in those two departments is static, it is easy to simulate. The problem with fashion is that it always moves on a body, but also with a body. A body is not a static object, it moves with every single thing we do. Until not so long ago the technology was not able to simulate a body, because there are so many mathematical calculations to make it seem realistic. Nowadays, computers have evolved so much that it is possible to simulate body movements and even fabric movements.

Even though it may seem like it is one of the first to adapt to the developments in society, the fashion industry is very rusty. Since there is so much demand for seasonal changes, the industry keeps on supplying these goods in which the customers get used to buying more. It is like a

Figure 1: Geoffrey Lillemon for Iris Van Herpen

vicious circle that keeps on turning faster. Since there is still a huge profit to make, companies will not change their attitude towards the environment. Change is hard, since it costs time; which fashion companies never have.

Virtual fashion design is a sustainable as well as a smart solution for the industry. The patterns are cut digital in a 2D environment, then fit on an avatar in a 3D environment. This way, mistakes can be corrected and designs can be altered immediately before a physical sample has been made. This saves money, time and also material. The samples that are usually thrown away are not there anymore, they all have been simulated digitally. In the chapter Industry we will elaborate the further advantages.

The second amenity the fashion industry could provide from is the fit. In the fashion design programs it is very easy to create a model that has a specific size and fit the garments on there. There are ways to change the avatar and even upload a body-scan. If the industry is willing to invest, which some companies are already doing like Tommy Hilfiger and Paul Smith. it would solve a lot of issues in logistics companies nowadays run into.

For young designers the 3D digital environment could be very renewing. Since the possibilities are endless, the experimentation phase is broad. The fabric is never finished, and the sewing machine never breaks. With a good computer, it is basically possible to work anywhere. As you can imagine, this makes the work space of a young designer very flexible. If there is inspiration, it should be possible to immediately translate this into garments if needed.

THE TIME IS NOW

The second advantage the young designers would benefit from is the fact that realization can be done in a digital environment. The designers could show clients the virtual outfits, the clients would buy the outfits and then the production is started on demand. This saves money, time and material; which is crucial for an entrepreneur. It stops the overstock and also keeps it exclusive. The digital presentation could become a focus point for the designers to sell their products, but also to express themselves.

For the customer, digital fashion could create a new kind of experience as well. Imagine it would be possible to have a body scan at home and fit clothing you find online on your body in the digital environment. You can immediately see what it looks like, whether it fits nicely and whether you can combine it with other garments.

The possibilities of the digital environment are literally endless, and as a group we see that the time to develop this is now more than ever. The technology is there, the knowledge is there, the only thing we need is the creativity to establish a new way of designing. It is not a matter of whether it works or not, it is a matter of opening your mind to it and embracing the possibilities.

assigners

assigner

Figure 2: Andres Sarda f/w 2009

VAN DE VELDE

As a Luxurious Lingerie producer and seller, Van de Velde is an establishment itself. For almost 100 years they are working in the industry. Their brands are Marie Jo, Prima Donna and Andres Sarda. All three of those brands have a different range in clientele. With a lot of experience in shaping bodies, Van de Velde produces bras that have a perfect fit. They are aiming for a good customer experience and e personal approach to selling their products.

Within their department of innovation the help of technology is starting to itch. The images of digital fashion portray better views of reality and as a company they are looking for new ways of improving their current system. They are looking for is the realistic simulation of fabrics and skin. To be able to simulate fabrics, colors and looks digitally will reduce lead time and costs for sample making. We think that a realistic model to fit the bras on, a realistic simulation of breasts and their movement in daily life will also help to improve the fit.

STUDIO JACOB KOK

As a young entrepreneur, Jacob Kok is a fashion designer based on aesthetics. He dreams of a world that is not ours, a world in a far future. He is interested in the virtual identity of a person. In which way the human can evolve in a digital environment. One's virtual identity can be diverse, which means it doesn't have to be a body, but can be something that has link to a body. He is looking for new ways of presenting his digital work, to portray a new kind of surrounding. Currently he is dealing with design of virtual elements rather than a real product.

We interviewed Jacob Kok to get more insight in his world, but also to understand his demands for the project. Van de Velde has more focus on the real marketing product, while Jacob is thinking about something more than realistic, something more sexy, fancy, even weird. Both of them think realistic body motions are very important, however in Jacob's view the avatar does not have to be human. The garments can also be deformed into other elements. He is tired of the "traditional seduction". To Jacob, using virtual platform has more potential since people are free to have their own virtual identity there.

Jacob also talked about several technologies and media that really interests him. For example, motion capture. Motion data is collected from motion capture device then can be applied to different models. An interesting idea is to make the presentation live using motion capture. Motion-track wearables(such as those of Xsens) are also based on motion tracking. Another one is emotive headset, which can detect brain activities so that help people manipulate objects with only "thinking" This can also be useful for navigation experience in virtual world.

assigner

Figure 3: Jacob Kok in eigen creatie. Photo: Elle.com

industry

INDUSTRY

sketch

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production process

From sketch to end product in the stores; the production of clothing has its own system. The way of working is not very sustainable.

The sample making costs a lot of time, because it has to be fitted and altered up to seven times for one garment. Sometimes samples have to come from the other end of the world, so the carbon emission for one garment is ridiculously high. Even when a garment is produced, there could be a mistake and the whole batch has to be thrown away. The waste this produces is extremely high and the wrong garments get burned. Of course this is not something that can be changed right away, but we think that the digital way of working can definitely improve these circumstances.

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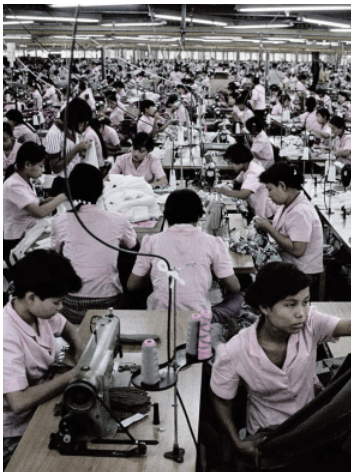

production

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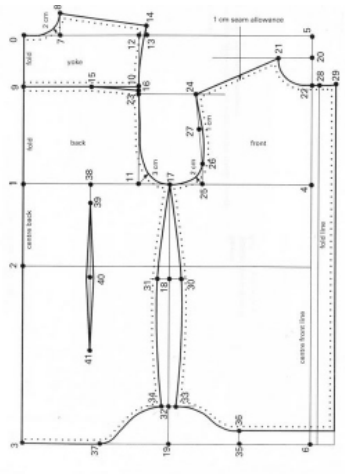
Figure 4: Fashion Chain now



pattern

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sample

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fitting

end product

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advertising

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sell

adays

NOW

sketch

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production process

The digital way of working can reduce sample making by spotting early mistakes in the patterns. The garments can be fit on all sizes and the fit can be improved to almost perfection. It might be possible to reduce sample making to one or even no samples at all. The production can be more efficient and therefore faster.

The down side of the story is that the programs cost a lot of money. The education of employees and the adjustments in the system also cost a lot of time. It is an investment that has to be made and for a lot of cases companies are discouraged.

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virtual presentation

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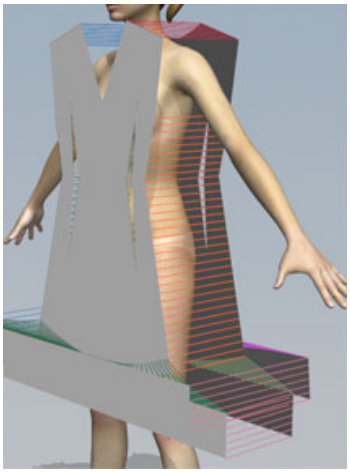
Figure 5: Fashion Chain in th



2D pattern

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3D fit

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sample

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supply & demand

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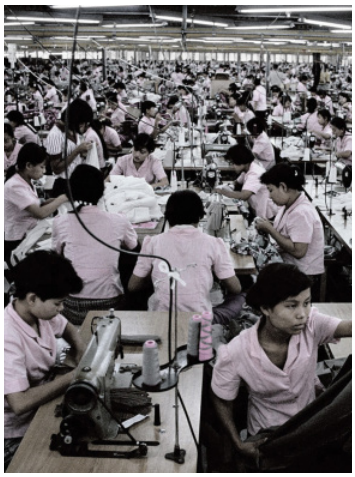

production

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end product

e future

FUTURE

technical research

technical research

Figure 6: Creation made in Marvellous Designer

AVATARS

Avatars are a representation of humans in the digital environment. The most critical thing is to get the avatars to act as if they are human. Right now, most avatars do not behave like humans enough for us to relate to them. They appear as if they are stiff or almost alien like. No emotion, no personality. If we are able to create realistic avatars, it would also be more attractive for people to look at.

3D MODELING

In our search for the accurate way of presenting digital fashion we are looking for the best simulation possibilities. There are many 3D fashion design programs, but sometimes these programs are just not very easy to use or very realistic. We are also investigating a way of presenting without these programs but with regular 3D modeling programs; so we are not limited by the certain borders 3D fashion software have.

One of the first steps we took was to educate ourselves in 3D modeling. We asked our 3D modeling specialist – Freark Broersma – what was the best program and where we should start. He told us Maya was the best program for 3D modeling, animation and rendering. One of our teammates was more experienced with modeling, so we asked him to give the rest of the group some classes. We experimented with creating, modeling and sculpting shapes. In the end we all created a living room with furniture to prove we mastered the skill.

technical research

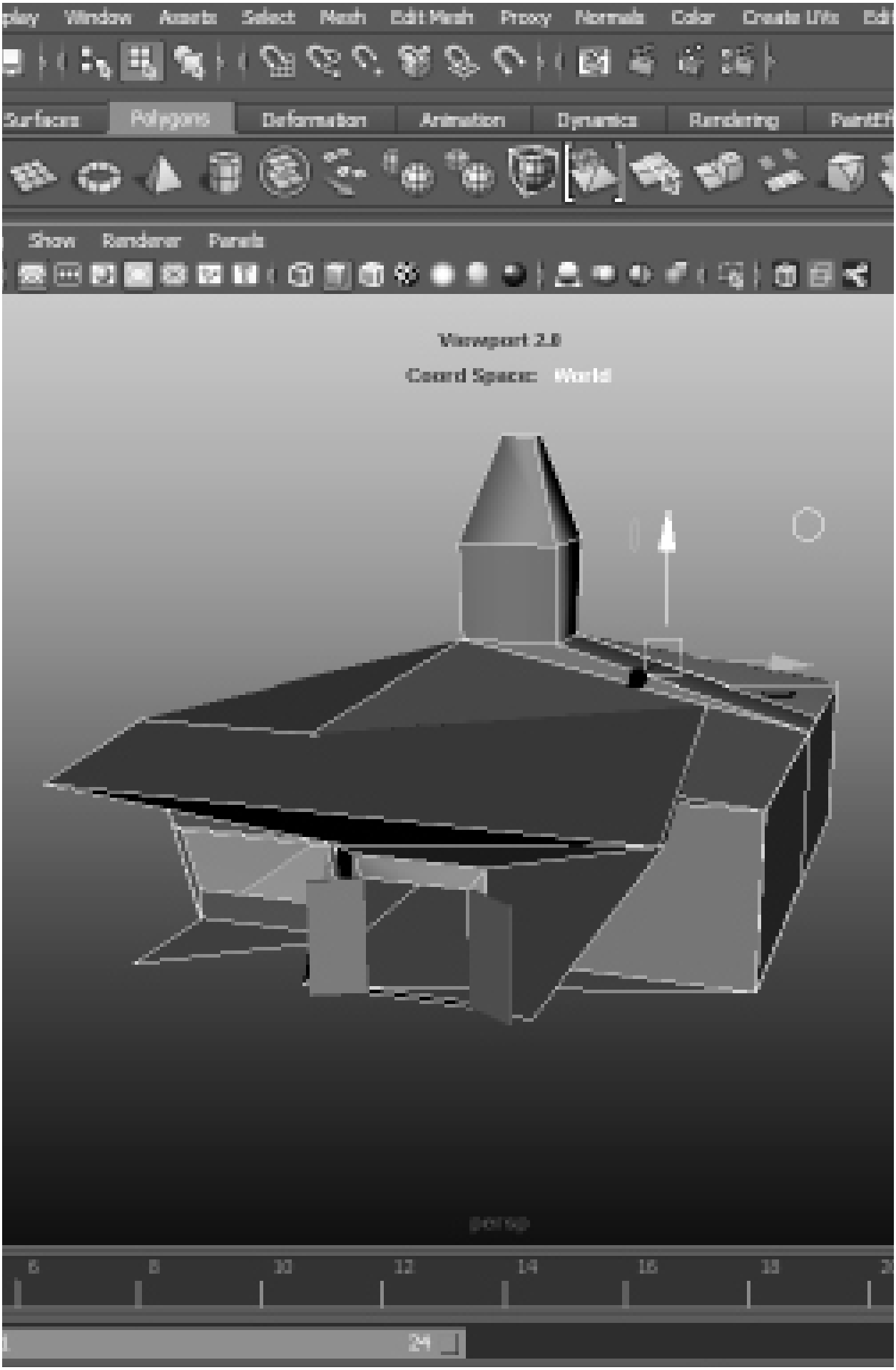

Figure 7: Interior creation made by Michael Lovett

technical research

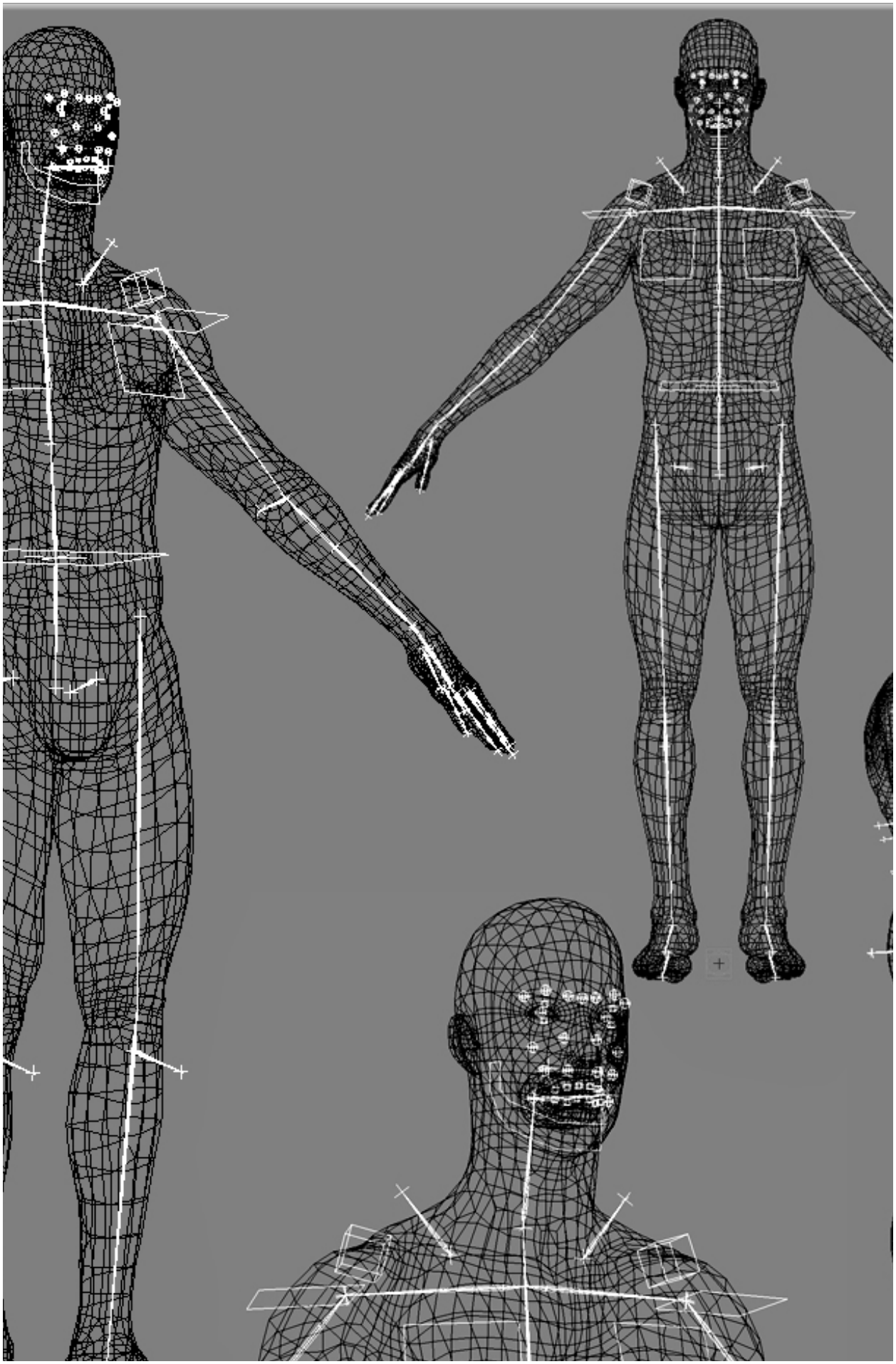

Figure 8: Maya Skeleton Rig by trlbaron

ANIMATION

After the modeling part we moved to animation and rendering. The animation part is needed because we want to be able to create a realistically moving environment for our new way of fashion presentation. We were very excited to see all the possibilities of the program because they are endless. Maya is very complicated but now we are learning the basics so we can implemented and combine our findings with the fashion programs. Together with Freark Broersma we created a skeleton for animating a character. Our assignment was to create an animation with a character, so we get little knowledge how objects are made to move realistically.

BREAST MOVEMENT

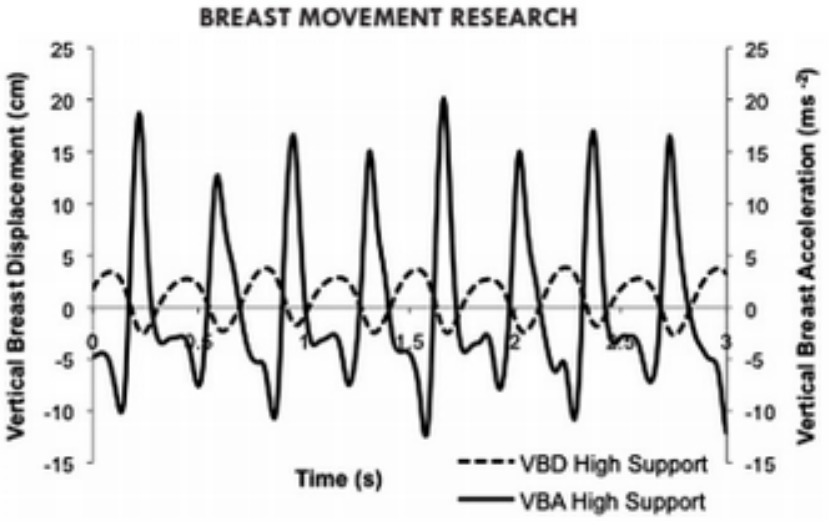

Figure 8: Graph of vertical breast displacement (cm) and, vertical breast acceleration (ms2 for one participant (bra size 14E, running at 8.6 km/h) running in the high and low breast support.) versus time (s).

In an interview with Hein Daanen, head of the Fashion & Technology Lectoraat, we asked him what he knew about breast movement in the body. He sent us some articles to study on breast movement.

The article tries to determine the bra-breast forces generated on women with large breasts while these women wore different levels of breast support during both upright standing and treadmill running.

Large breasts can contribute to numerous negative health outcomes in women, including upper limb, neck, back and head pain. These problems and also the limitations of participating in physical activity make women with large breasts to seek reduction mammaplasty. On the other hands less physical activity can contribute to weight gain and, in turn, increased breast mass. Breast mass was significantly correlated with vertical breast displacement in the high support condition. The wide range of breast masses of women with large breasts is an important consideration for designers of sports bras to ensure these bras can reduce force generation and breast discomfort by providing a high level of breast support while these women participate in physical activity. Greater vertical breast movements make greater breast discomfort during physical activities. So breast masses and kinetics may be important considerations not only for women but also for designers. Improved breast support could assist to increase the comfort of women with large breasts during physical activities. During exercise such as treadmill running, the breasts and trunk have been moved with a time delay between breast movement and trunk movement. The lowest point of vertical breast displacement occurs a short time later and results in a “slap” of the breast against the anterior thorax as the breast is descending while the trunk is ascending.

During physical activity such as running the net forces include force of gravity and the driving force of the trunk, that are restrained by the stiffening and dampening forces of the anatomical restraints of the breasts and the bra.

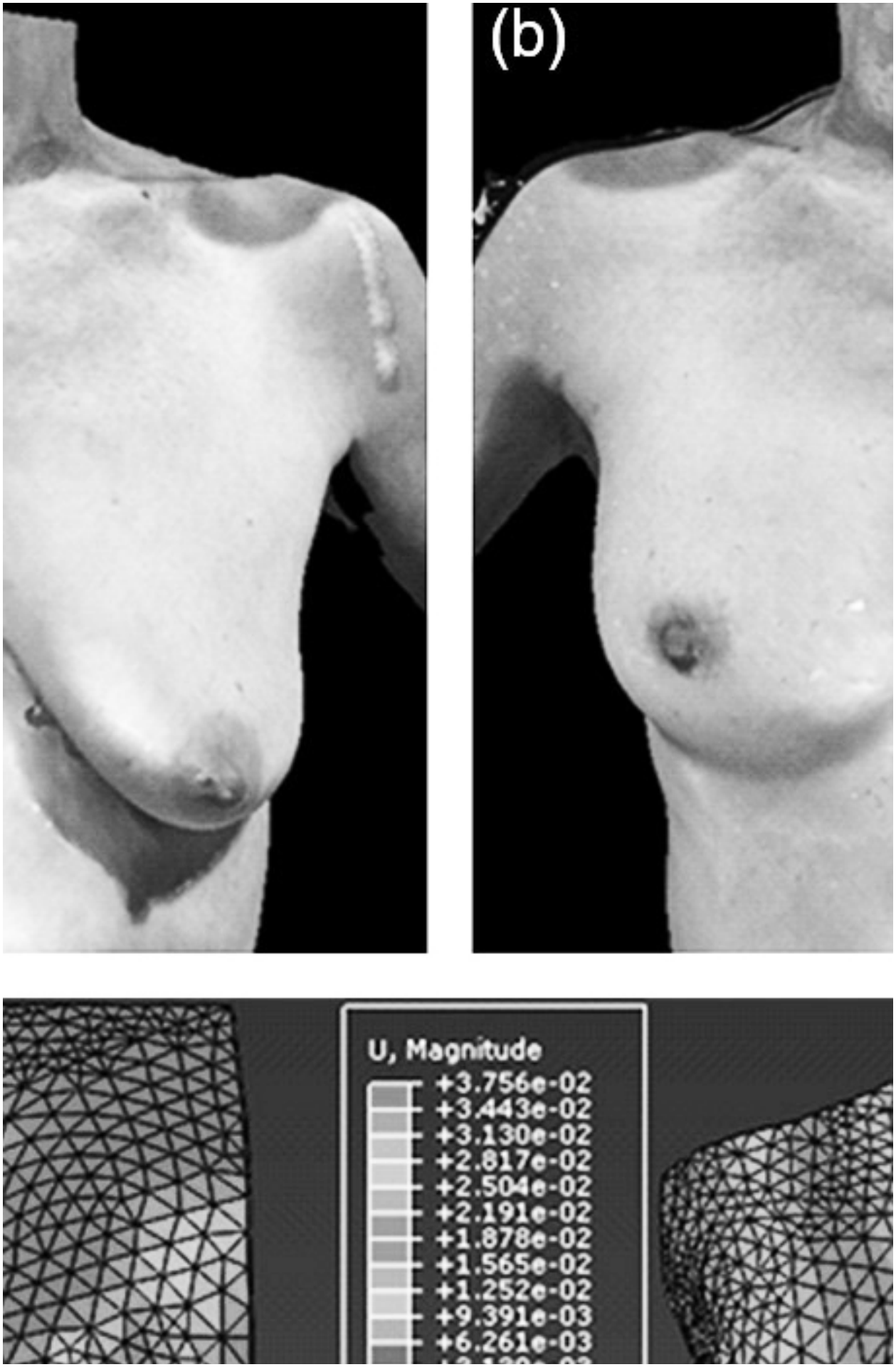

Figure 9: 3D images of breasts with subject (a) standing upright and (b) lying supine. Finite element analysis can be used to quantify changes in breast shape, such as those occurring with the subject's position as shown in this example (c). Other methods can be used to quantify changes in skin texture and coloration. Figure prepared by Hamed Khatam.

technical research

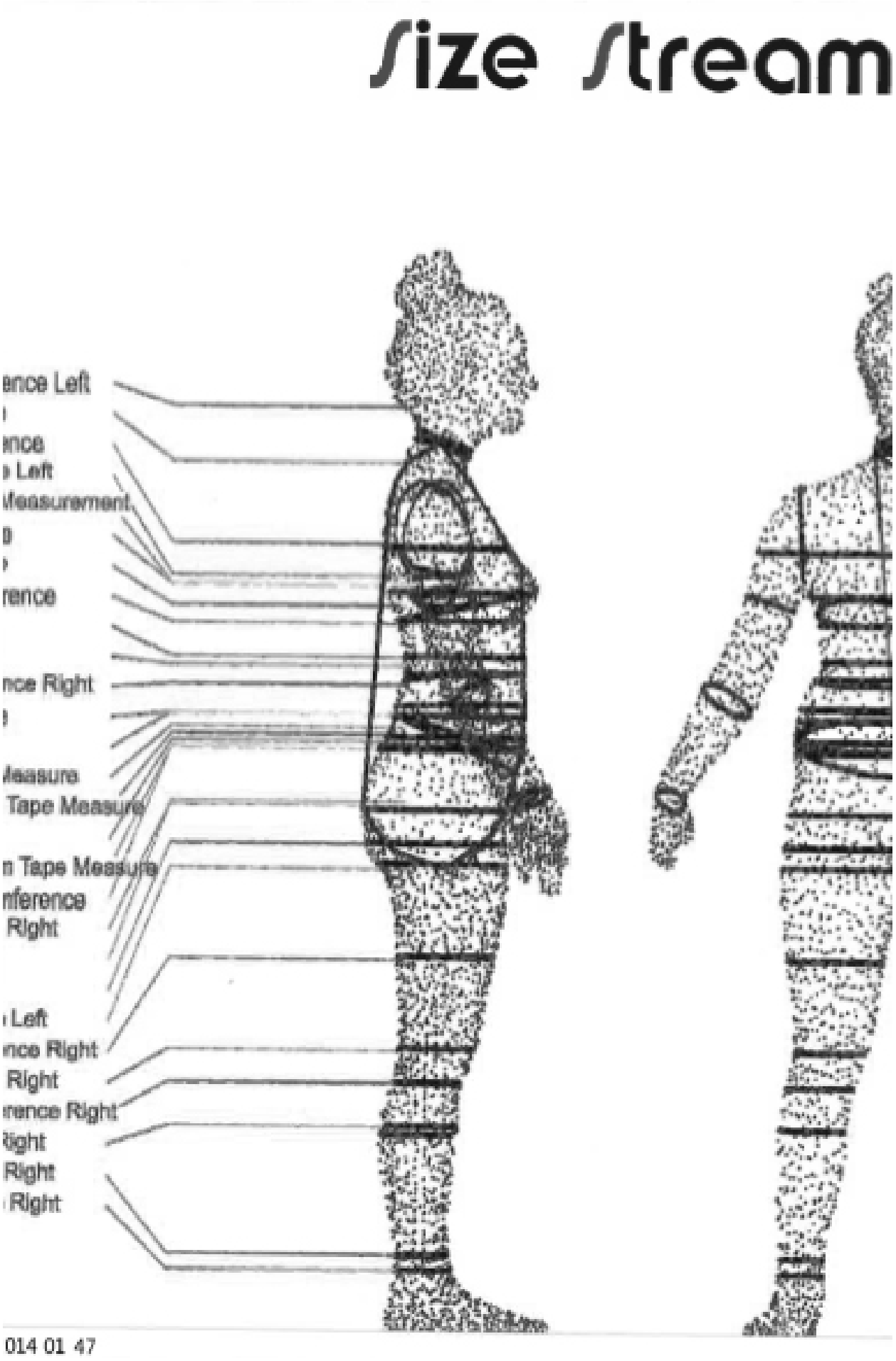

Figure 10: 3D Bodyscan of Sophie Schaminée

3D BODYSCAN

We have visited the 3D bodyscanner from Amsterdam Fashion Institute (AMFI) and we made a bodyscan of ourselves. The body is captured by 16 individual cameras in a frame that is located around the person. It makes a scan of the outer shell of the body. There is also a possibility to capture 6 images a second of a person, so there is a way to capture some kind of motion.

young designers

INTERVIEW

One important research questions is as follow: "How can virtual fashion help to improve design process by skipping some design process?" Compared to traditional design process which contains a lot of handcraft, virtual fashion is newly-born and waiting to be embraced by the new-generation designers. It could bring something new to current design process. But what are the opinions of young designers? Are they willing to use this new approach in their design process? Are they excited or even scared about it? We are eagerly to talk with some young designers or fashion design students. That's also one of our user stories.

We had a discussion with three young designers in the MediaLAB. There were two second-year students from Rietveld Academie, where they are studying fashion design. There was one that studies fashion design in AMFI. She graduated from there 3 months ago and now she is looking for a job. We discussed about virtual fashion in some very interesting aspects:

Opinions on design process

Both Rietveld students are used to working in a traditional way. Starting with feeling the materials by hand, they make make samples and test them on the model. They agree that the traditional hand craft working is not the perfect way, but they already formed a workflow of it. It's difficult to change. But the use of software is not something they will definitely reject. Fashion design software is convenient and easy to use in a way. They can help designers to have a better time management by shortening the time cost in making samples and testing, also allowing designers to be more creative in their design process. Unlimited materials, models and methods are provided in those softwares. There's a lot of freedom and space to experiment. However,to those who are already used to the old way it's hard to get started in the beginning. What's more, to one of them who thinks she is not so "technical", getting those softwares working could be a big challenge. "I know a bit how to use them, but it's really hard for me to learn. Why putting in so much time?"

Virtual fashion and its technologies

One of the Rietveld students sees something positive in a combination of tradition and new technology from a sustainable perspective. Virtual fashion helps to reduce sample cost in design process, as well as extend the way of product presentation. This is especially beneficial for some small brands and young designers. Still, she thinks that virtual fashion "will not be the start point or the end point in the design process", since in any case fashion design will start with real materials, and end in real products. "Virtual fashion may result in the losing the soul of garment." she said. She had a good reason for that. After all,virtual fashion is not dealing with something real. But in design process it is very necessary for a designer to meet real customers, and communicate with them. That's also the difference lying between real shops and on-line business. With the development of so much on-line shops, inevitably some fashion shops are disappearing. What are increasing are various types of fashion events. But real shops and traditional techniques are not going to disappear, since there will always be people who make real clothes.

What do you think of the current situation of the fashion industry?

"what is amazing about fashion is that you can dress up yourself into different characters." said one of the Rietveld students. This is also a very important reason for her stepping into the fashion world. However,what in the current fashion world now are "too many fashion weeks, too many collections, too fast seasons and too identical copies." "This is not what a real designer wants." Said the other one. The AMFI student also said that she got tired of seeing so much collection in which she could not see any point."There should be

Figure 11: Student 1 - Gerrit Rietveld Academy

Figure 12: Student 2 - Gerrit Rietveld Academy

less of them, but more special." One of the Rietveld students said she felt"scared" about some collections she saw in the Paris fashion week. She doesn't want to participate it. What they all observe about the fashion world is that everything is moving too fast now. Compared with the "slow fashion" which is normally viewed as hand craft-dominant and environment-friendly, new forms of fashion technology keeps giving birth to new stuff. "I see it as a danger." The other one said said.

Fashion Design Education

In some fashion schools, the competition is rather fierce among students. However, Both students from Rietveld think they have a very different environment in their school. One of them said they work in a small group, namely, 10 students. They have nothing to do with each other. There's no competition, no copying, everyone works as individuals, which is a good way to keep their personalities. She is "very proud and happy about that". Sometimes they need to work together, and it's a nice way to get interesting ideas from people with different background. "Codesign helps you to develop your own styles and ideas", said the other one. In their school, they learn how to be a real designer. They both agreed that a good reason is an very important factor in fashion design. "As long as you know why, and you have a strong view, fashion can be anything there."

Personal Development

When being asked "do you have a clear view for near future?", Marianna didn't answer directly. Instead, she replied "I don't want be apart of this fashion world. " She told us she really wanted to do fashion, but not in this way. She got tired of seeing so many fashion shows, one show a year is already a lot to her. "You have to belong to this world to earn your success, but that' s not something I am interested in." Meanwhile, Therese saw more possibilities by noticing that many young designers create their own brand without having so many fashion shows a year. In her opinion, getting successful is not only about design, how you connect to people and brand yourself is very important as well. One interesting phenomenon is that many customers seem to favour designs of a not so famous designer. Chances are that they are trying to find a way out of this already too commercial world. And to a young designer, new presentation ways such as virtual fashion could be a very good approach to gain their fame.

"Virtu-al fash-ion will not be a starting point or an end point in the design process"

comparison analysis

There are several 3D fashion design software available. As a designer and as a group, we wanted to find out what the best programs were to simulate clothing on the human body. To compare the programs, we created a comparison analysis with several options to look at when testing a program. The subjects include user friendliness, design possibilities and realistic simulation (see Appendix A).

comparison analysis

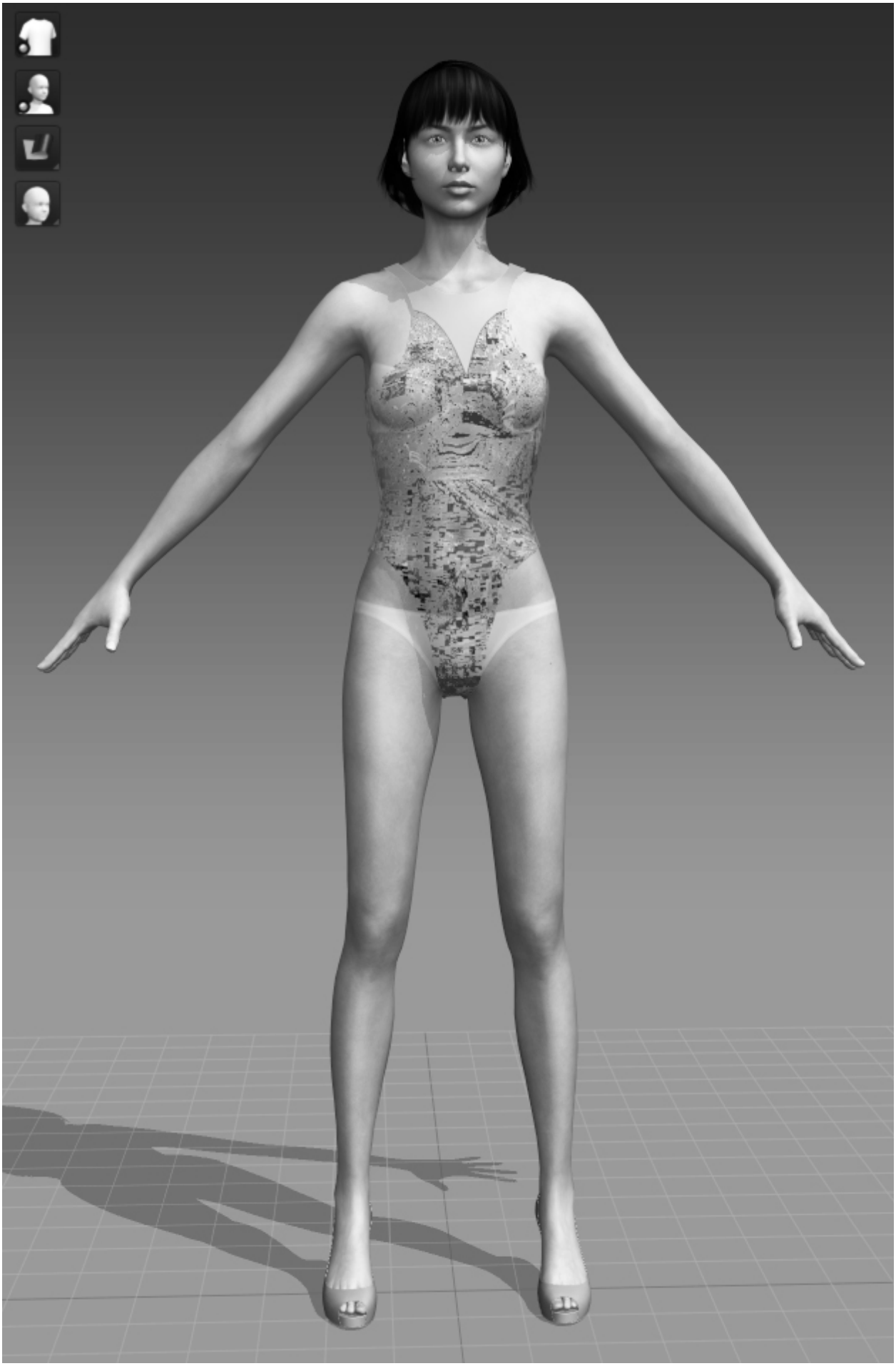

Figure 13: Creation made in Marvelous Designer by Amber Slooten

MARVELOUS DESINGER 4

This program is meant for dressing characters in CG animation. It simulates clothing very realistically but the pattern drawing is not that accurate. The program has very nice shading that simulates the reality well, but the avatar is still a bit alien like. Also because of the unrealistic proportions. The program simulates fabric properties amazingly, but it is simply not meant for the garment industry which makes it hard to use in a serious way. For playing around and designing it is very lovely, because it is easy to alter the clothes and stitch one part to the other. You can almost moulage around a doll. The simulation is also dynamic, which makes you see how your design moves with the body, which is very important for a fashion designer.

LECTRA V7R2

One of our team members had a lot of experience with the program already and therefore it was easy to explain the structure and the user interface. The 2D and 3D environment are separate from each other. The fabric drapes realistically but the simulation is static, so you do not really see the fabric move when the body moves. Because the pattern software is separate and very complicated, it is also very broad and accurate. The 2D CAD software is used by many companies in the industry. Lectra is able to create very detailed patterns with, so for a pattern-based designer or company, the software is lovely to use.

comparison analysis

Figure 14: Creation made in Lectra by Amber Slooten

comparison analysis

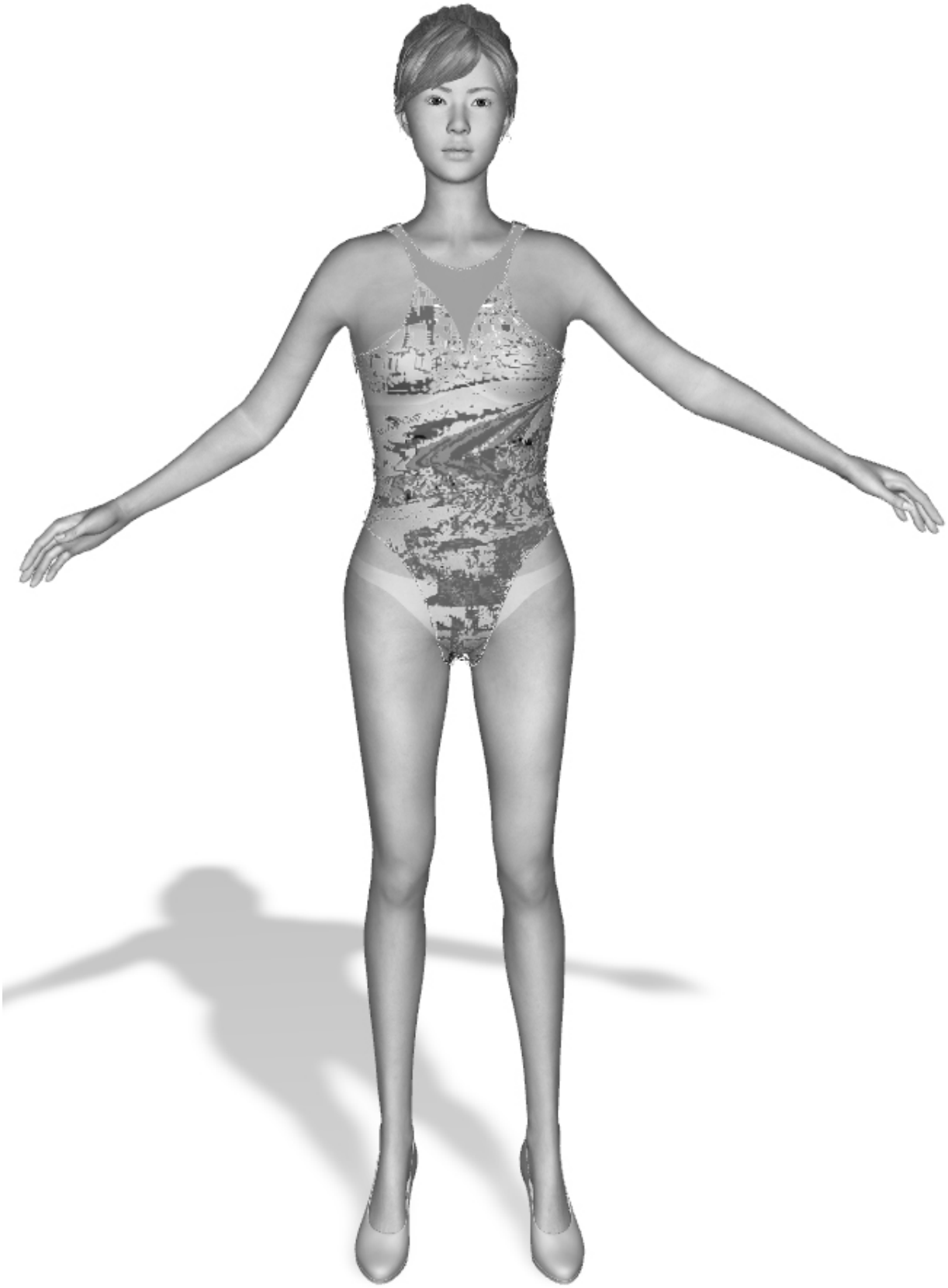

Figure 15: Creation made in DC Suite by Amber Slooten

DC SUITE 5

Again one of our team members had experience with the program and therefore it was faster to work with and compare with the others. The pattern drawing options are quite broad which suggests that they put a lot of effort into making it actually suitable for the industry. The program has an avatar that can change sizes, but the avatar does not look like a human being. The simulation can be static or dynamic, and there are several options in how the avatar moves. The simulation is cached and loaded onto the body. You can import .obj's and DXF pattern files which make it easy to use for the industry. Shaders of the fabrics are also quite realistic – which make it nice to simulate textiles. In the future there should be a plug-in with Maya available for the program.

HYBRID 3D FASHION DESIGN

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