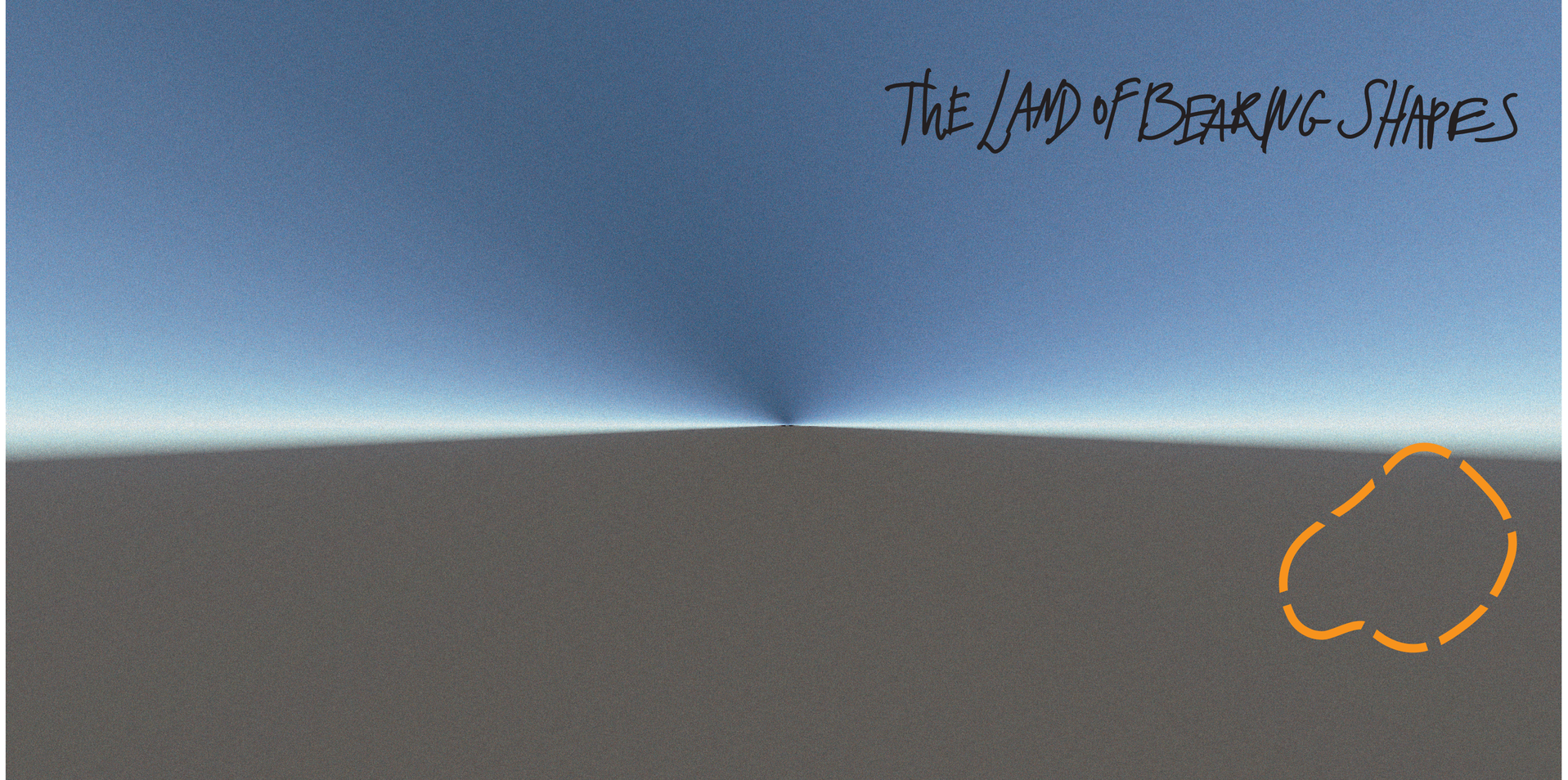
In this place I would also like to say a big thank you to all the people who brought their performance and polygons into realising this piece.



The Land of Bearing Shapes is neither entirely fictional nor real. This work is a sample of one kind of digital world, with its laws and rules taken from the 3d world. Its construction however is based on my personal observations of matter, emotions, behaviors and games.
In the Land of Bearing Shapes, everything is already transformed into polygon meshes, though it might have once been built from NURBS.
Meshes can be modified, transformed and moved, but can not be changed in their root, reason or concept. Each operation, on each face, vertex and edge, has a performance cost and is calculated proportionally. Nothing comes for free, for elements existing as meshes.

Artistic diploma thesis
The Land Of Bearing Shapes
Speculative reality concept
Agnieszka Zagraba

Summer semester 2024
University of Applied Arts Vienna
Diploma degree programme Media Arts
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ANY KIND OF IMAGINED WORLD CAN EXIST ON TOP OF A REAL WORLD AND CAN MOVE AROUND IT LIKE BUBBLES OR ANY KIND OF SHAPE ONE MIGHT IMAGINE.
THE LAND OF BEARING SHAPES IS ONE OF THOSE WORLDS.

1. ANYBODY CAN ESTABLISH ANOTHER PARALLEL WORLD ANYWHERE

2. THE LAND OF BEARING SHAPES MIGHT BE HERE BUT CAN ALSO BE ANYWHERE BECAUSE IT IS DIGITAL

intro

Welcome to the Land of Bearing Shapes.

We are living in a world that is being more and more shaped by technology. Over time, we perceive reality more and more through a technical scope. Concepts like “re-charging our batteries”, “staying connected”, “googling something” or communicating through messages, graphics and short videos are obvious to most of us, even though these are references to terms that were not common until recent years.

I think that using a medium as a metaphor could enable new ways of thinking about things and getting to know them better. Just like what happens when we get to know the world better by learning a new language or the logic of another culture.

In this work, I have decided to create a metaphorical reality around a 3d graphics software, a kind of “default” environment, where each operation or technical solution, briefly speaking, means something.

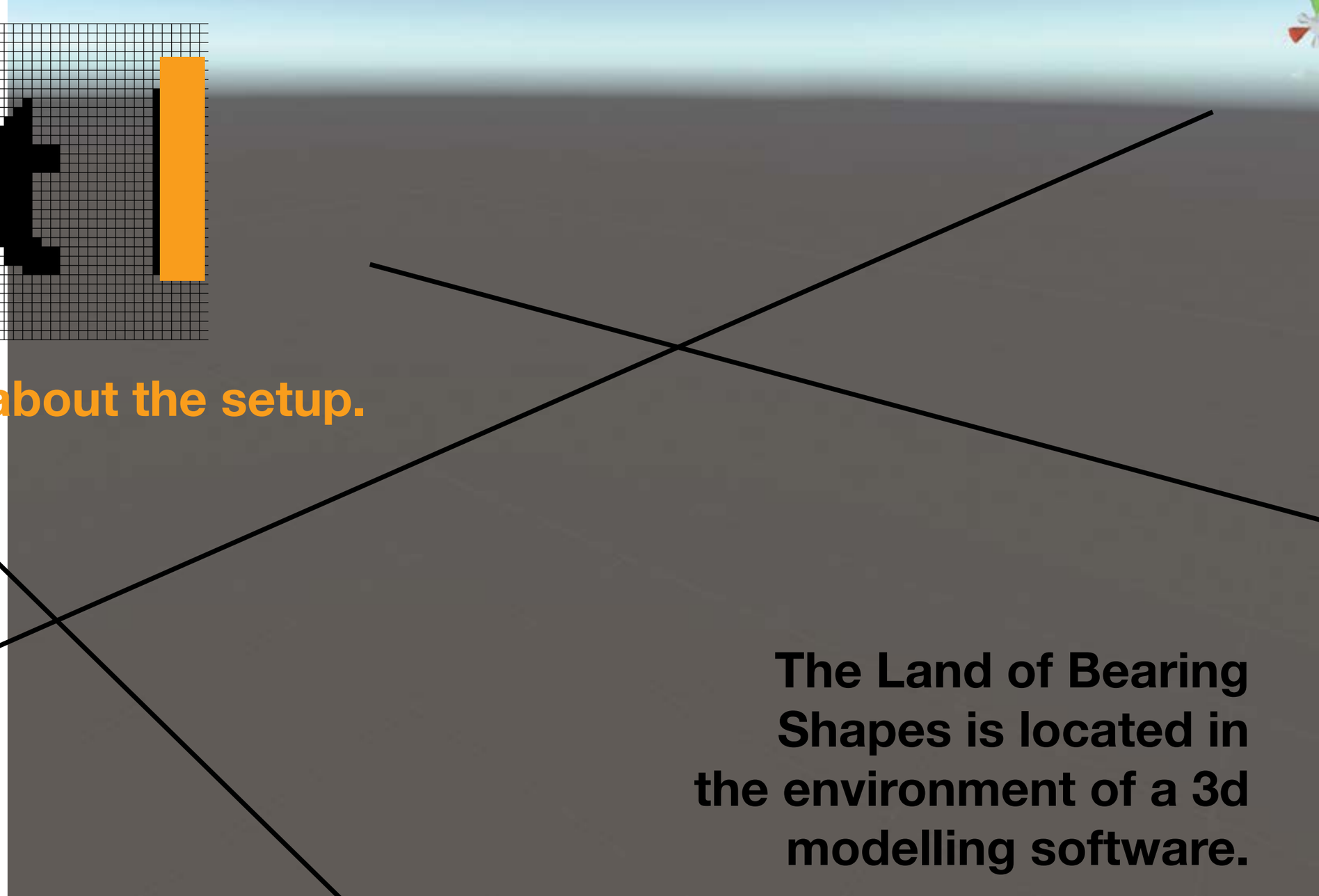
Those metaphors primarily refer to the concepts of understanding words, emotions, psychosomatics, issues of passing, appearances and interpersonal games.

The Land of Bearing Shapes is a separated part of reality, that is ruled by its own laws, somehow also similar to the laws of our real world.

But different, due to technical limitations.

Part I

The first part is about the setup.



The Land of Bearing Shapes is located in the environment of a 3d modelling software.

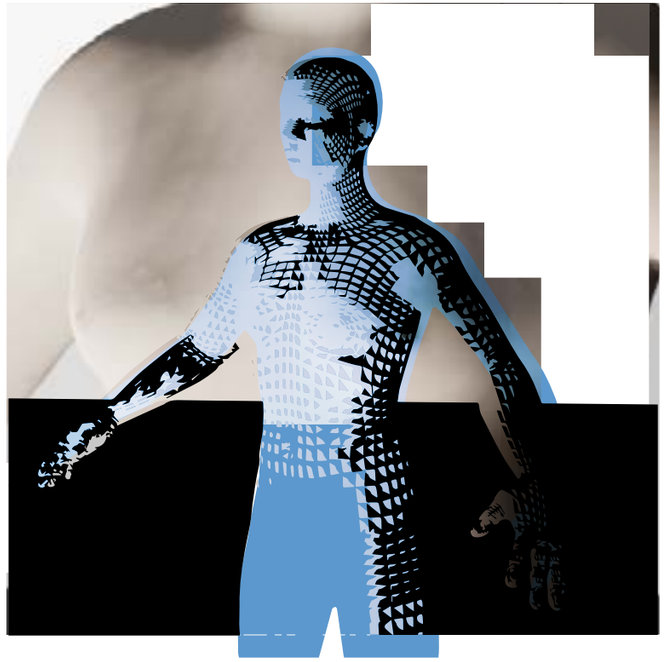
searching for parallels

Throughout the centuries people have been looking for an answer to the question of what a human actually is. Depending on the point in history and current state of technological development, there were different possible answers and interpetations.

In brief shortcut, we can relate to some tendencies. For example, an ancient human was something that could be sculpted in stone and through it, its corresponding forms, geometry and philosophy, could be understood. In medieval times, focused on spirituality, the human was reduced to the so-called soul. The industrial revolution has brought comparison to a mechanism; the era of computers has seen incessant variations on comparisions of the human brain with better and better processors.

And here we are, in the era where any kind of fantasy world can interfere with so-called reality using digital creation media. Motivated by the idea of describing the world with technology that is currently accessible and affects how people understand the world, the establishment of The Land Of Bearing Shapes took place, thanks to the widespread accessibility of 3d creation software and broad libraries of default elements.

Establishment of The Land Of Bearing Shapes took place thanks to the widespread accessibility of 3d creation software and broad libraries of default elements.



copy – reflection

In the real world, according to scientific data, everything is built out of particles. These are constantly undergoing some changes following the laws of physics. Humans for centuries have been trying to investigate the structure and general laws of nature.

So far, it is still not possible to create an exact copy of the world as it is, by copying precisely its actual structure. This is why every time we create some kind of mimesis, we need some kind of simplification on many levels. Just like a drawing or photography is kind of a copy of certain observed properties of an object.

Development of a 3d modelled, digital world is based on a similar approach. In each particular virtual world, we need some agreement of what aspects of reality we are trying to reconstruct. Whether there are shapes, colors, structures, movement, micro or macro scales – as long as there is an agreement between creator and observer, we can create remarkably customised universes.

vertices

What are vertices in the Land of Bearing Shapes? Maybe we could compare them a little bit to atoms – vertices would be special kind of particles. Similar to particles, the position and amount of vertices is somehow defining the shapes and physical properties of the 3d objects.

The difference between atoms and vertices is that atoms or particles are present throughout the entire volumes of things, while vertices are most of the time only on the object's surface, visible as the spots connecting the edges of polygons to one other. Each polygon of the mesh can be handled using its edges, vertices and faces.

Vertices can be moved around, there can be more or less of them, they can occur in particular orders and patterns – each time giving a different geometry as a result.

limitations

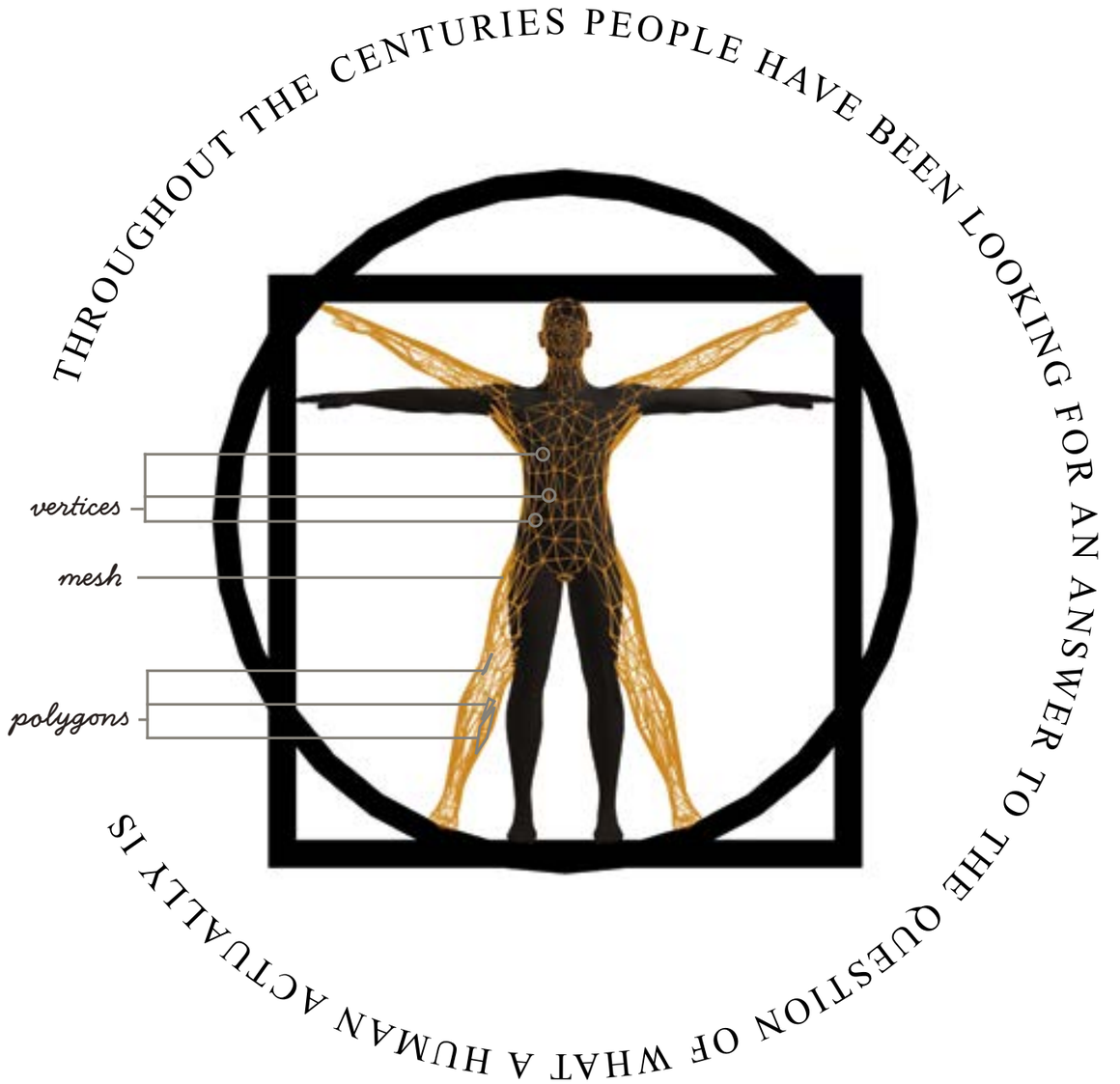
Digital 3d graphics measure their contents' geometry and position in space, as well as a certain reflection of time. The quality of digital graphics reveals information about the technical qualities of the hardware and software, and in which era it was created. All this information is able to be read and understood through a comparison of how far from reality the 3d depiction is.

In the Land of Bearing Shapes, those limited possibilities are used as a metaphor of life itself and what might happen during life. For example, elan vital corresponds to how much performance a model would use, psychosomatics can be somehow related to distorting shapes, and the individuality of interpretation is given as differences between rendering engines.

structure vs appearance

In the following sections, I divided the issues based on two main components of The Land of Bearing Shapes: the internal vertice structure and how things look from the outside, i.e. the render. The structure, i.e. the underlying geometry, is something that is basically not subject to much discussion and can be taken in the Land of Bearing Shapes as something objective, like a picture of bones in a Roentgen image. The render, or final appearance, still

orange color means "active" – an element relevant for this moment



passes through the filter of interpretation and vision. Some illustrations are presenting internal meshes while others show examples of renders.

Some illustrations are presenting internal meshes while others show examples of renders.

Render (wikipedia)

Rendering or image synthesis is the process of generating a photorealistic or non-photorealistic image from a 2D or 3D model by means of a computer program.The resulting image is referred to as the render. Multiple models can be defined in a scene file containing objects in a strictly defined language or data structure. The scene file contains geometry, viewpoint, textures, lighting, and shading information describing the virtual scene. The data contained in the scene file is then passed to a rendering program to be processed and output to a digital image or raster graphics image file. The term "rendering" is analogous to the concept of an artist's impression of a scene.

STRUCTURE


APPEARANCE
OR RENDER
VARIANT

Part II

Human Geometries

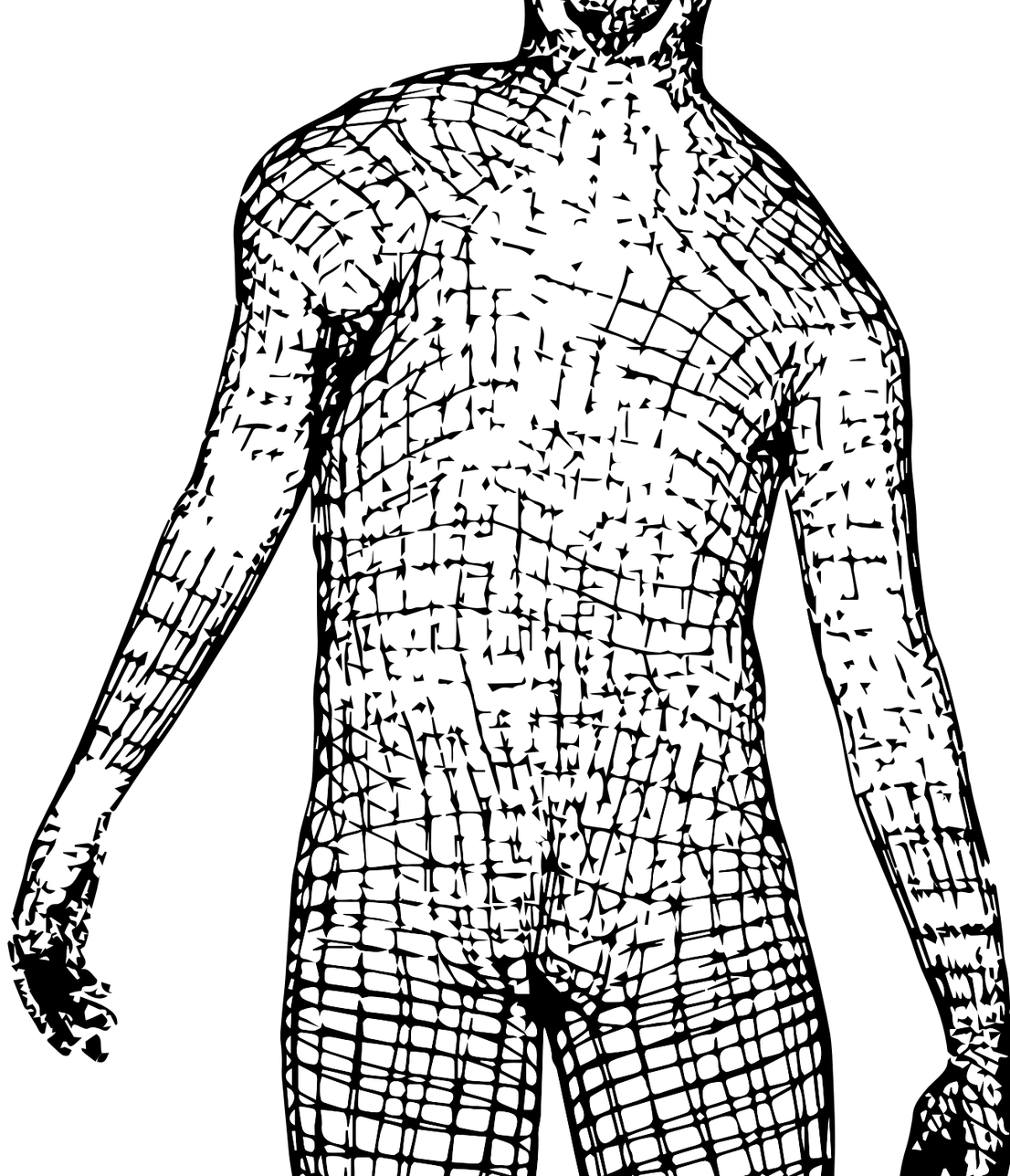
Let’s talk about how a human could be constructed geometrically.

NURBS or mesh?

Maybe, if a person composed out of love or any other infinite thing would exist out there, that would be a NURBS person.

Regarding 3d modelling structures, we can distinguish two basic construction methods. The first, called NURBS, is based on mathematical models and generative approaches. It means that it can be modified without losing its qualities. The second is mesh.

Mesh can be compared to the NURB as something that is already somehow printed, not that easy to modify. Vertices of the mesh are usually independent from each other.



NURBS

NURBS can be read as a source, a perfect drawing, reflecting the essence of what one can be. I have never met NURBS people. I don't know if they exist. The majority of people are made out of meshes, I would say. However, for every mesh person, there is at least one potential NURB person existing in the world of ideas.

Do the NURB people collapse with time? Actually, they don't. They have their original, mathematically precise stencil, a pattern that they are always coming back to. You can try to distort them. If you manage, they would carry the distortion with the same dignity as the original shape and become the base for their new normal.

The most structured mesh person could never be as structured as the NURBS one. However, NURBS people are not possible to fabricate. They are not point clouds, easy to read by fabricating machines. They are just an idea and pure mathematics.

Maybe, if a person composed out of love or any other infinite thing would exist out there, that would be a NURBS person.

NURBS structure stands behind what might be seeming just as an idea. Mesh makes everything real.

mesh

In the Land of Bearing Shapes, everything is already created. It is a little bit like a silicone mold that has already been hardened, creating a form. Changing it is not really possible and results in damaging the object.

This is why every person in the world is already transformed into a mesh of polygons, even though they might have once been built from NURBS. And, sadly, this is why we need to leave the NURBS for the rest of this book.

Meshes can be modified, can be transformed and moved, but not changed in their root, reason, concept. Each operation, on each face, vertex and edge, costs performance and is calculated proportionally. Nothing comes for free for things existing as meshes.

Every person in this world is already transformed to a mesh of polygons.

NURBS (wikipedia)

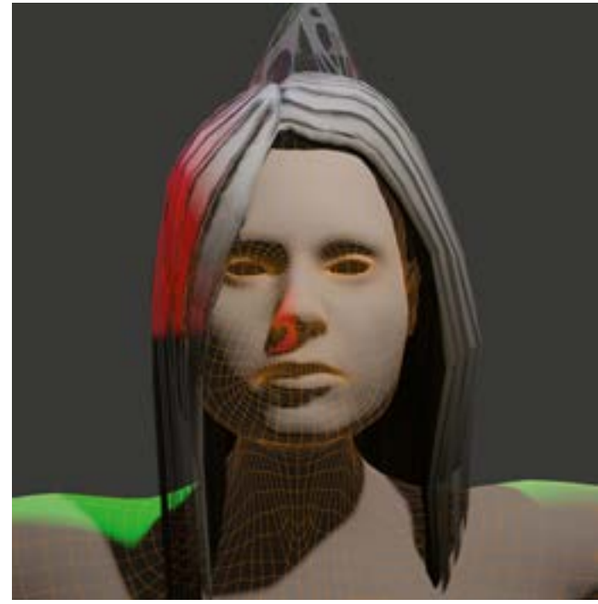
Non-uniform rational basis spline (NURBS) is a mathematical model using basis splines (B-splines) (...) representing curves and surfaces (...). They can be efficiently handled by computer programs yet allow for easy human interaction. (...) In general, editing NURBS curves and surfaces is intuitive and predictable.

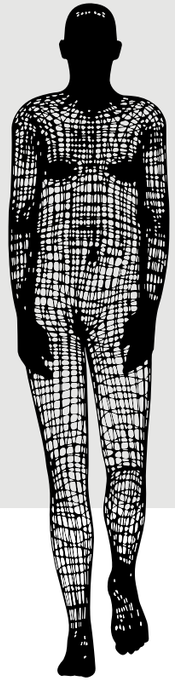
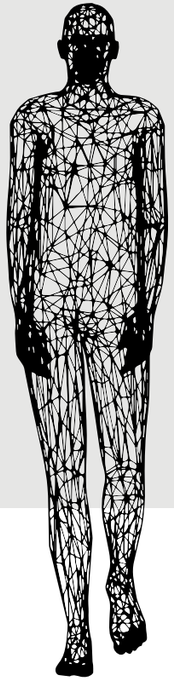
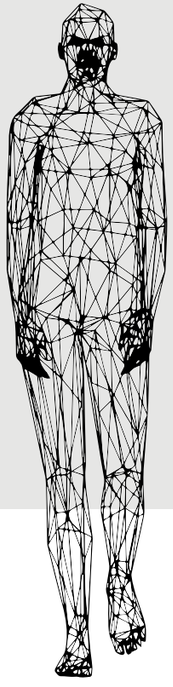
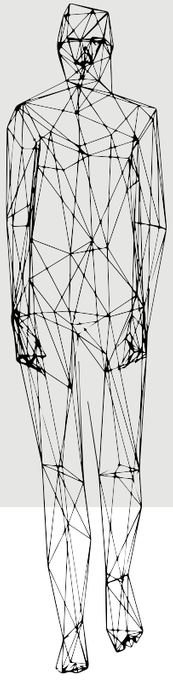
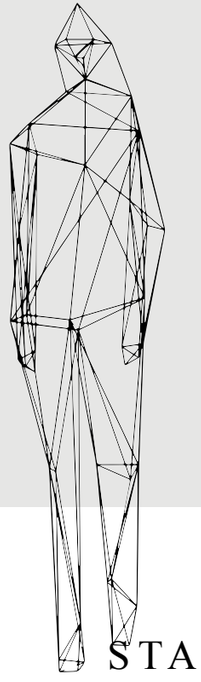
human properties

Similar to the real world, in our new universe, people differ. Their meshes are varying depending on different factors, like for example age or gender. Also their mesh structure varies among similar demographics.

People are created differently on the start, because of closer unidentified reasons. Some are born with more dense meshes, some are born with less dense meshes.

Also, mesh can change differently throughout their lives.



STARTING FROM THE BEGINNING, WE DECREASE IN LIFE ENERGY AND GO FOR COMPROMISES TO SURVIVE

performance

Every living creature needs energy to live. Some are getting it from food, others from the sun. In The Land of Bearing Shapes, in order to survive, one needs computing power.
Some people need more of it, some less.
The more polygons one has, the more costly their existence is.
The more sophisticated, humane, healthy and worthy one wants to be, the more polygons they need and their mesh needs to be also better structured.
Polygons cost performance, but give life quality.
On the previous page, there are examples of people of different performance.
A person with a lot of polygons, in the best case – also, in this case, with a nicely structured quadrectangular mesh– needs quite a lot of computing power to preserve their existence. Moreover, such a person is very vulnerable to any damages, as restoration of damage costs a lot of energy and purposeful action. Restoring from any damage requires lace-like work for a person with this kind of mesh, because they need to restore the precise position of each vertex one by one.
A person reduced in polygons however, is easy to fix in case of distortions. There are not too many vertices to be moved. Living this style has less of a complexity but is more sustainable than preserving a dense mesh.

mesh reductions and distortions

In order to survive, most of people need to reduce their meshes. Moreover, the mesh reduces itself with time anyway.

However, the way the mesh collapses with time can be influenced by our beliefs, and we usually reduce differently.

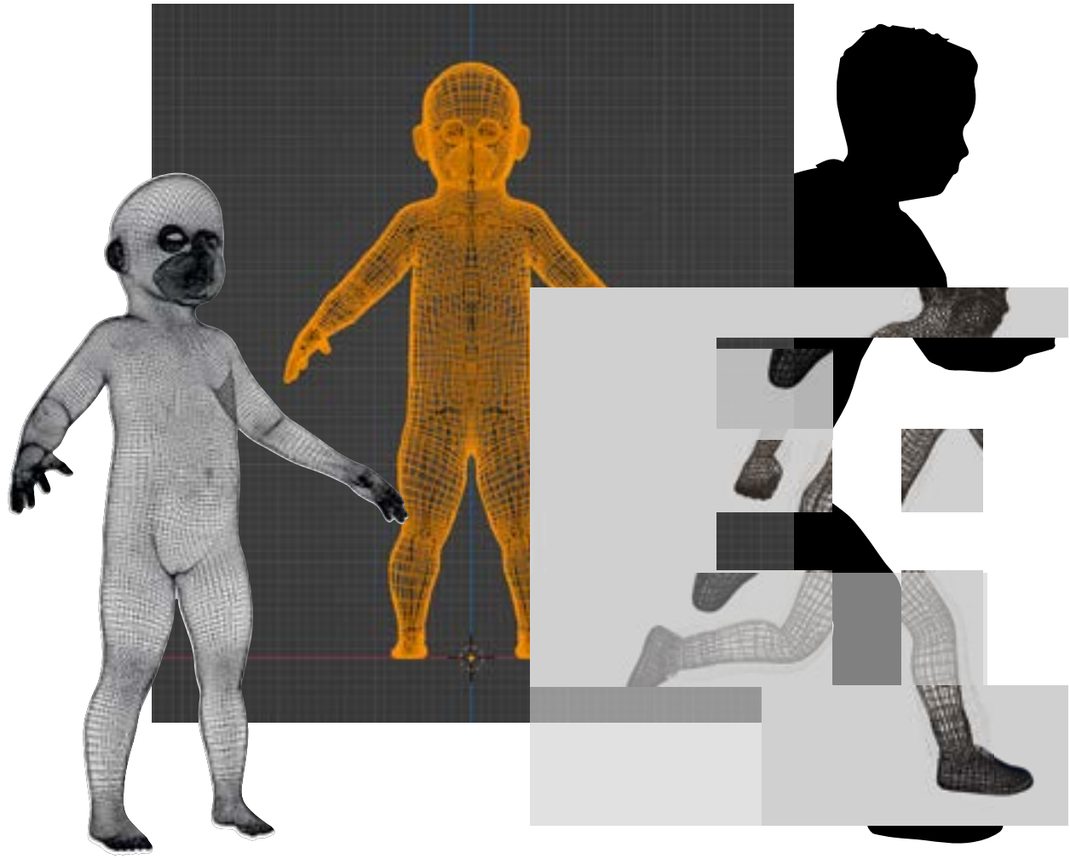
General reduction with time is a natural process. We can speed it up by not getting enough computing power, we can speed it up by just wanting it like that, or for some other reasons as well, I guess.

Apart from general (global) reductions, there are also so-called local reductions.

There are several reasons for local reductions. Polygons need performance capacities and energy. They are reduced in order to make life easier and less energy consuming. If we don't use or nourish or use parts of our bodies, those body parts are getting reduced in polygons.

Another reason for local reductions is happening more "purposefully". If some body parts are haunted by the need to protect, the mesh is getting reduced in the areas around them. Thanks to this process,

Vertices and polygons cost performance, but give life quality.



A KID HAS USUALLY NOT YET MANAGED TO GROW A SHAPE OR TO DECREASE IN MESH SIGNIFICANTLY

there are less points to fix in case of damage and that costs less energy. Even though reduced areas are usually not the most pleasant ones to look at, the fact that they exist is worth much less, because it protects the existence of the mesh.

Local reductions can also be result of the creation of shapes inside the body. That is, some people, in order to survive or save their meshes from rapid destruction, decide to invest their vertices in the creation of shapes. Those shapes are supporting the mesh from the inside and protect vertices from displacement.

The more vertices are spent on creating a shape, the more visible and obvious for others the shape becomes – it happens also through distortions, as discussed below.

Even though creating shapes is costly in vertices in certain areas, shapes are quite an efficient way to protect the mesh on the long run.

Some people, in order to survive or save their meshes from rapid destruction, decide to invest their vertices in the creation of shapes.

A DISTORTING SHAPE AFFECTS BOTH STRUCTURE AND THE FORM OF A MESH BECAUSE IT ORIGINATES IN THE MESH

distorting shapes

Here we are, let's talk about distorting shapes. As we already know, they are forms created out of a native mesh in order to protect certain areas. They are reducing mesh in the areas from which they need to harvest vertices. However, they leave some original mesh vertices in strategic points – namely, in the points where the new shape can support a reduced mesh.

Shapes can come out of inner disagreements, visions or emotions felt for a longer time.

The moment when the shape starts its existence, is a moment of feeling powerless towards something. If the mesh itself cannot handle it, it goes into survival mode, releasing a new shape.

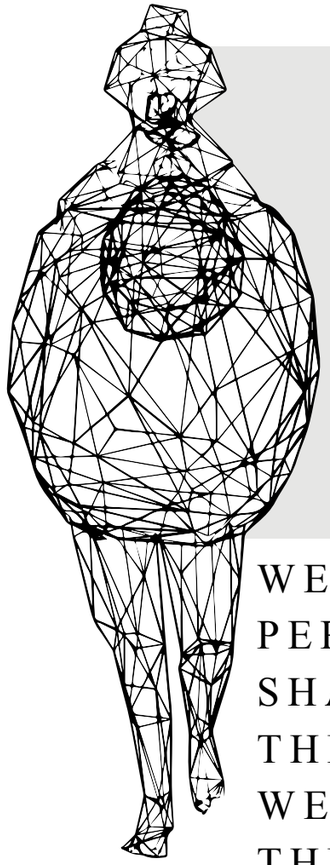
In the last part of this book, you can find a precise description of several examples of distorting shapes.

recovery from reductions

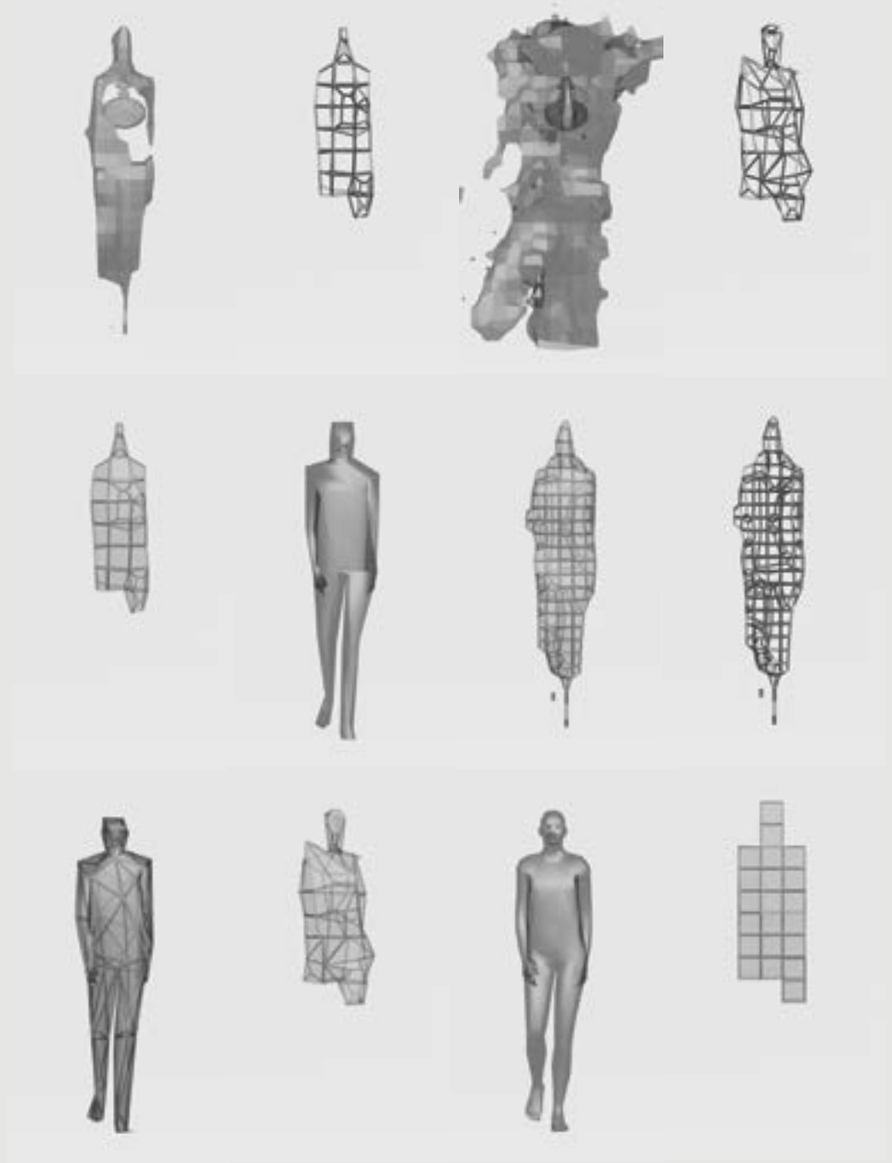
One might ask: is it possible to get more vertices, if conditions suddenly change? To somehow restore?

The answer is: yes, but it is – similar to recovery from injuries while having dense mesh – not easy. It is also very precise work, vertex by vertex. There are several things to do that could make it easier and faster, but still – one needs a strong will to do it.

Bearing and growing a shape inside for a long time can affect the shape of a mesh.



WE INVEST OUR PERFORMANCE IN SHAPES THAT WE THEN CARRY
WE SHAPE THEM, THEY SHAPE US



VICTIMS OF REBUILD AND REMESH

rebuild, remesh, subdivide

Everybody at some point is getting reduced here or there, to a smaller or larger extent. As the process of getting vertices back is long and demanding, many people are searching for a way to do it quickly. Sometimes they just want to fit their environment in certain aspects.

System provides us with different ways to rebuild. What goes with it however are so-called rebuild consequences.

Quick solutions are out there. However, because a solution is quick, it is also far from perfection. Quickly rebuilt shapes are very often very distorted and one could easily recognize the way they have been rebuilt.

Of course, everything is for people. Sometimes applying this quick algorithm really helps. However, it is not too hard to overuse it and in some cases the results of it are severe and impossible to reverse.

System provides us with different ways to rebuild. What goes with it however, are so-called rebuild consequences.

System (wikipedia)

A system is a set of entities, real or abstract, comprising a whole.

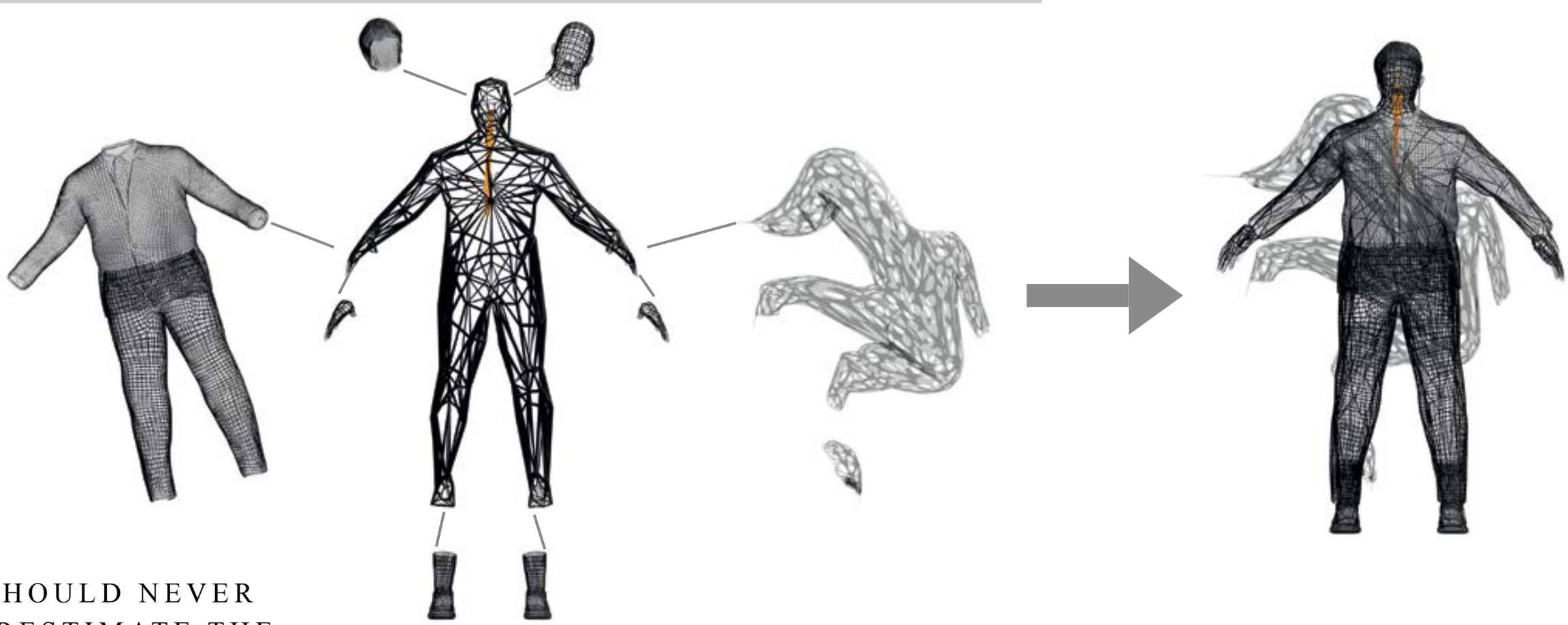
accessories

Some people, after their mesh has gone through various processes such as reduction and distortion several times, nevertheless want to keep the impression of having the best possible structure. In addition to the aforementioned, rather risky remesh, one can also work in this case with accessories and details such as hairstyles, for example.

New and well-groomed elements are characterized by a good quality, orderly mesh. If a person with a reduced mesh uses such an item, they make an impression on others as if their mesh was well ordered. While it is easy to recognize that this is just an illusion and that their original mesh may not be in such good shape, often the effect of a first impression can play a key role.

Accessories and details, like everything in our universe, are also subject to reduction over time. Taking care of them, styling them, and performing other maintenance activities, can keep the mesh of things in good shape for quite a long time though.

AN EXAMPLE OF WELL-EQUIPPED MESH, WHEREIN WE CAN'T REALLY DISTINGUISH PART OF THE INTERNAL MESH FROM ADDED ASSETS



ONE SHOULD NEVER UNDERESTIMATE THE POWER OF PURCHASABLE MESH SUBSTITUTES AND COVERS

GOOD ACCESSORISATION COULD MAKE ONE'S MESH APPEAR UNDESTROYED

society

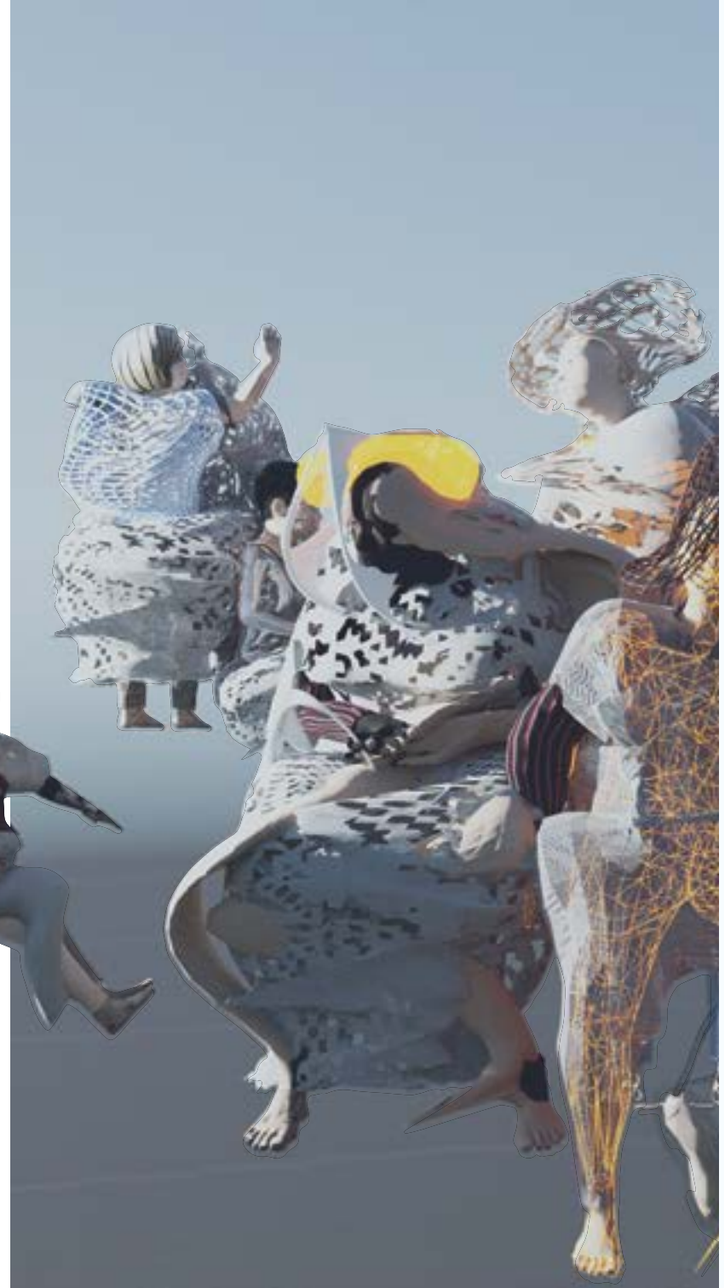
imitation

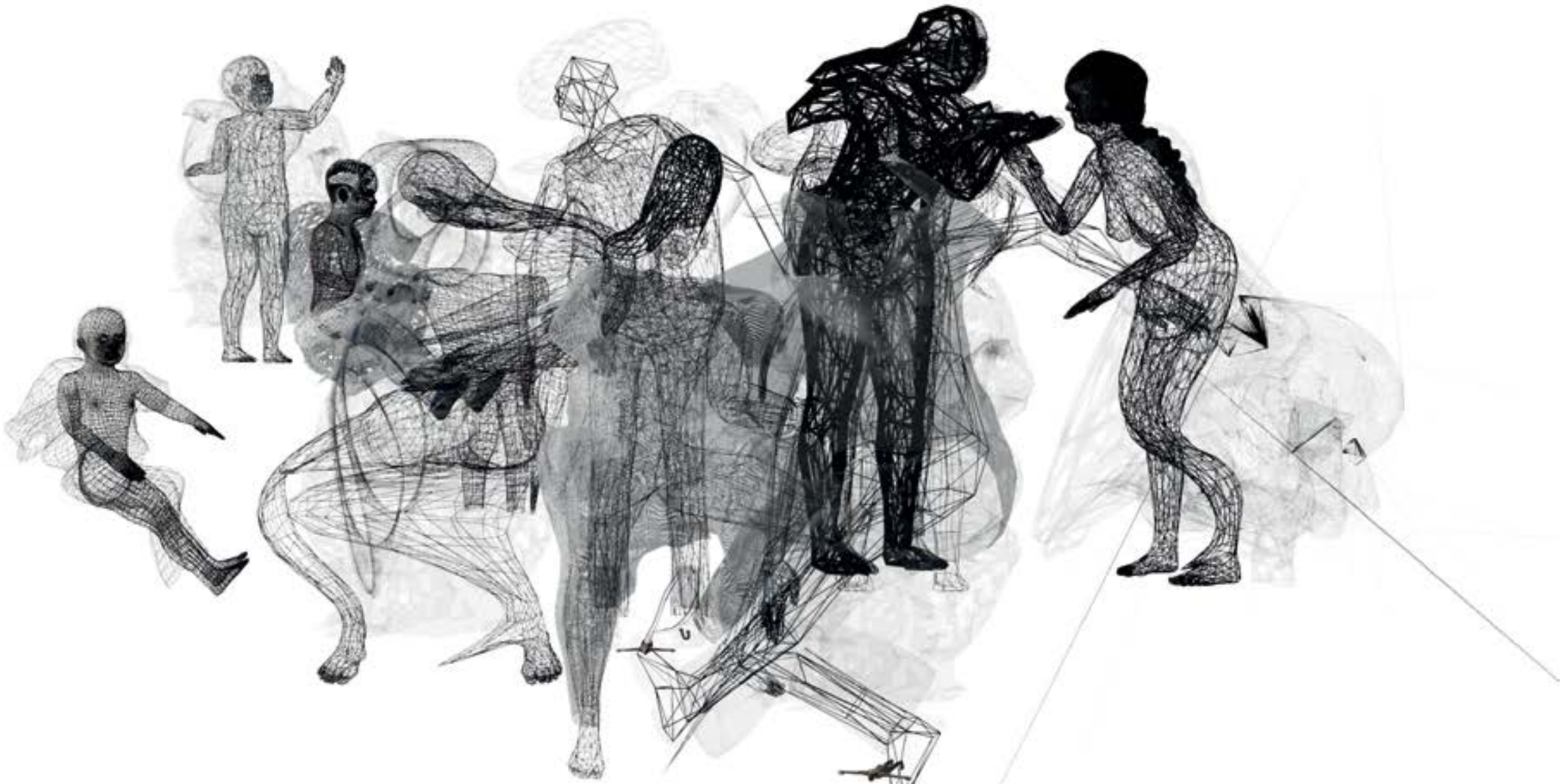
In the Land of Bearing Shapes, as in the real world, people like to get into groups and interact with each other. Here we can also observe a similar tendency to resemble each other within the group. People who spend time with each other, and whose relationships are marked by equality and empathy, tend to adopt each other's behavior, make their meshes more similar, and even take over the "shadows" of each other's distorting shapes.

power

Things are slightly different when dealing with asymmetrical levels of power. Some people try to enrich their nets by taking over the polygons from certain areas of others, causing them all sorts of reductions and damage.

It's easy to recognize a person who has quickly ascended with polygon count at someone else's expense, because then you can see a lot of disordered, kind of "out of place" or "unnecessary" polygons in their grid.





fascination

Sometimes people with unusual grids arouse the interest and fascination of others. This also leads to interesting processes, where they begin to create modifications for the sole purpose of gaining the attention of others.

group

These dynamics make each group's image specific. People create landscapes of grids and shapes, in adaptation to the environment and to each other. The encroachment of a group's particular grid landscape usually has an impact on the grid modifications of each person who enters the group's boundaries.

Part III

Display

This part relates to seeing.

Can we recognize the structure of someone's mesh from the outside? What might get in our way?

seeing

Everyone sees things a little bit differently. We may agree or disagree with each other about what we see. While the structure of the mesh is rather difficult to question, anything that affects how structures become visible, like the physical properties of materials, textures and colors, can be debated.

engine

The render engine generally decides how one can perceive the meshes around. People are equipped with different engines as well as different settings and computing powers.

The render engine is responsible for how all surfaces and materials look. The same material can look different depending on the render settings. Each render setting as well as engine calculates how things look differently. People differ between engines and settings, which is often a source of confusion.

When it comes to rendering, the issue of computational ability is also important. Each person has this slightly differently. Probably, the better someone's mesh is, the better that person also has the computational ability to see (render) matter. However, this is not an absolute

People differ between engines and settings, which is often a source of confusion.

rule – the exception, for example, are children, who usually have relatively orderly grids, but their capabilities do not allow them to fully understand pictures they render.

tranpsarency

Among the meshes, we can see those that are more transparent and those that are less. Some people are protective and don't show their shapes inside while others don't care as much about hiding them.
However, the transparency of the meshes can also vary depending on who is looking at them. Some people see all these nets as transparent and are able to easily read what shapes people are hiding inside, while others see them less transparently.

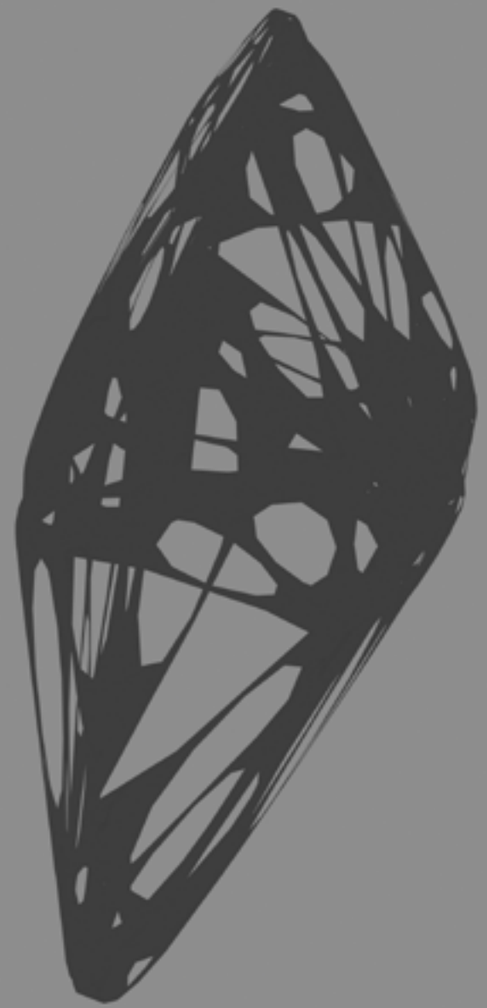
textures, materials, shadows

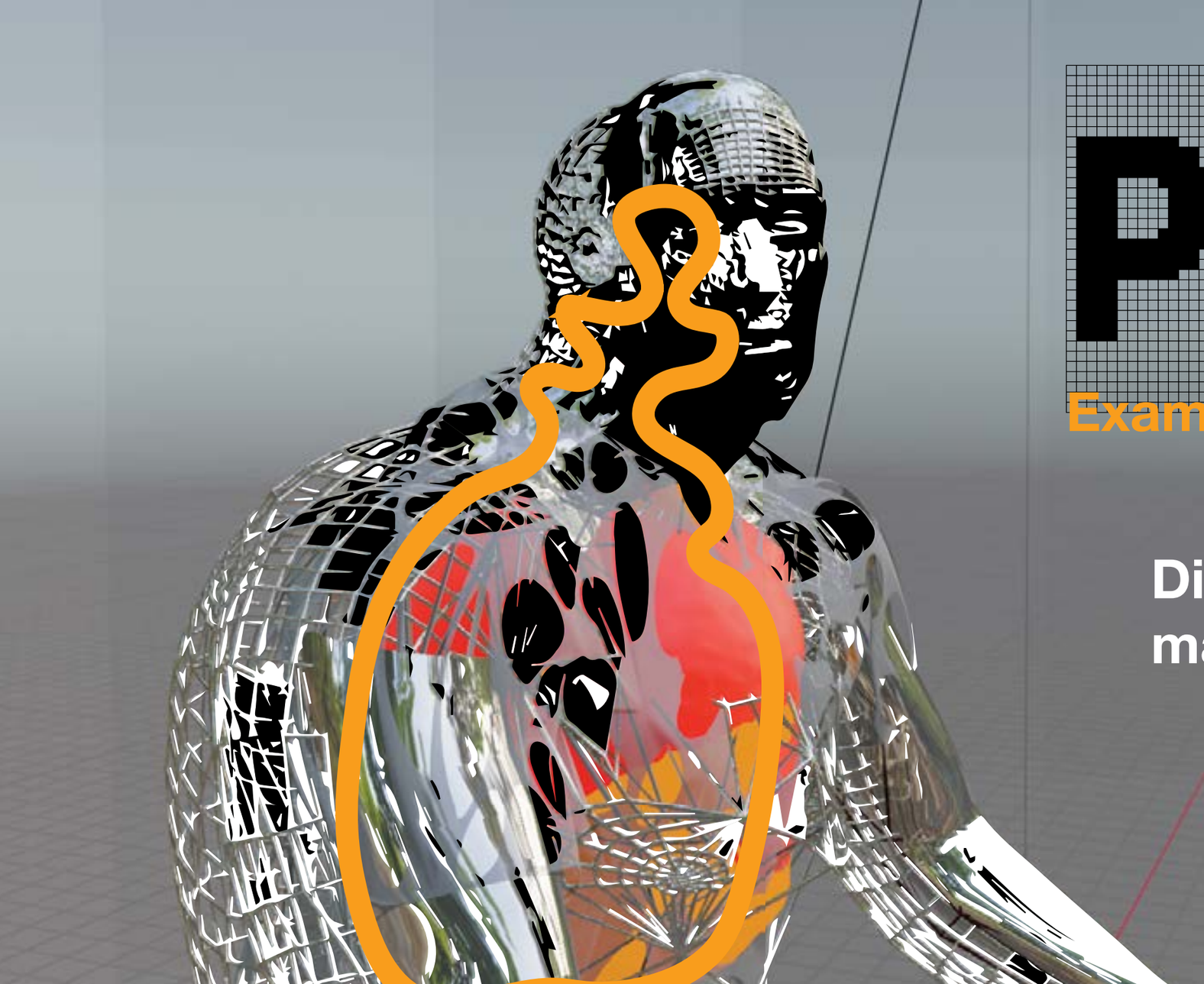
People are born made out of certain materials. During their lives, however, they are free to consciously shape them, depending on how they want to appear to others. Materials can mimic the distortions of the mesh or correct them.

light

Light is what gives us a fair amount of information about what an object looks like.

People usually look for a place in a space that will allow them to expose certain properties or hide them – or hide completely in the darkness, depending on their needs.





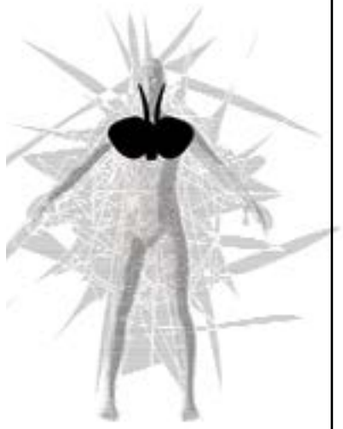
Part I

Examples of distorting shapes

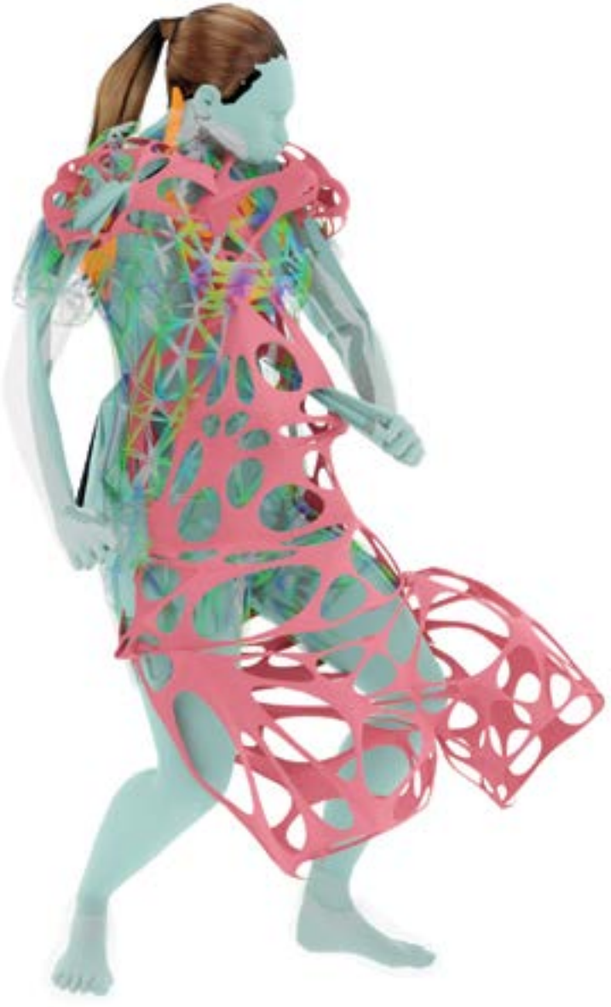
Distorting shapes have been marked with selecting orange

PROTECTIVE FIGURE

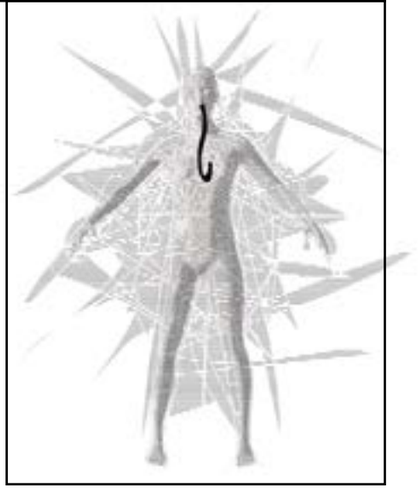
A symmetric creature that has no limbs, even though it seems like it has tentacles behind its ears. The protective figure lives in the chest and arm area of a mesh, making one's mesh ready to protect or fight back. It finishes with a spike towards the front, a little bit similar to The Pipe of Pain, but usually made out of a different material.



Material	Possible reason	Mesh influence
Usually kind of a hard foam	Feeling uncertain and not knowing what to expect, while regretting something	Reductions around neck, chest and behind the ears



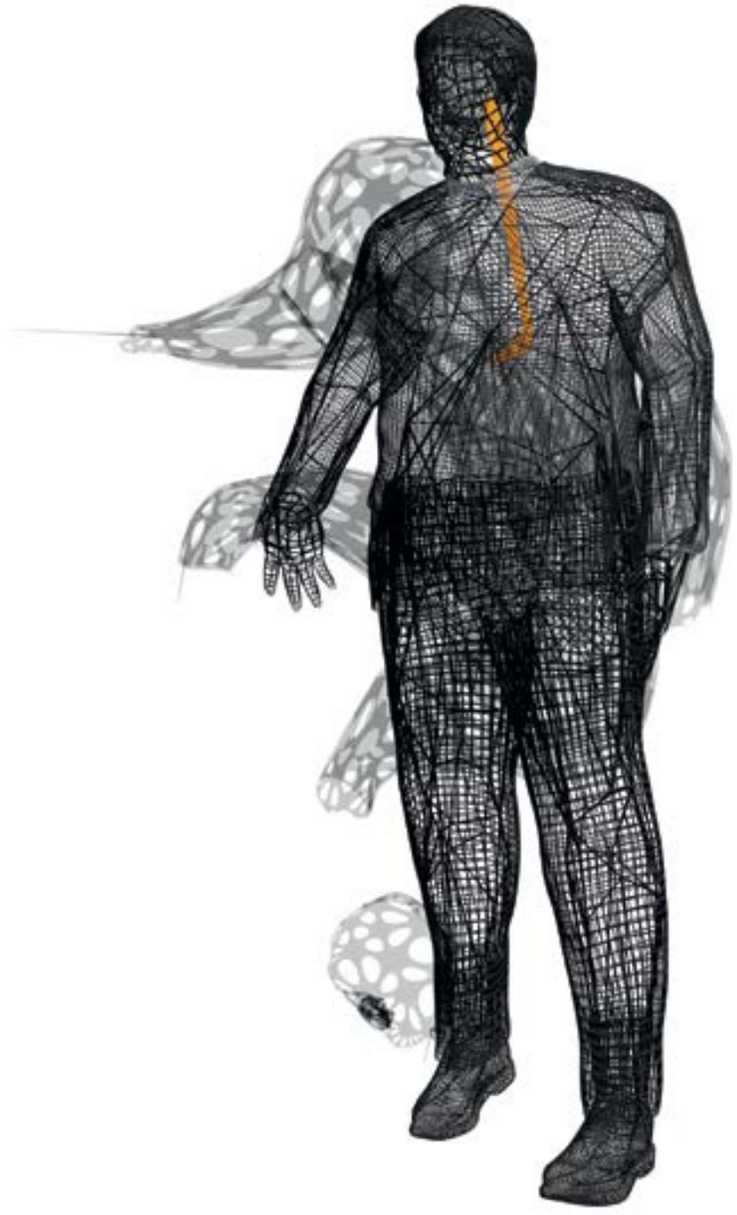
PIPE OF PAIN



The Pipe of Pain or Pain Pipe of Sorrow is very often lodged in the spine, clogging it, and is very hard to get rid of.
At first it looks and feels pretty innocent. Like a thing that is triggering, pulling for action.
Then it becomes a more solid, shiny, white pain coated and smooth piece of metal. Then one gives it endings, made of plastic, to protect the pipe itself from damage. The tricky part about those protectors is that they start to acumulate water with time and cause pipe to rust. This is the moment, when it starts to be a Real One and it starts to cause real pain.

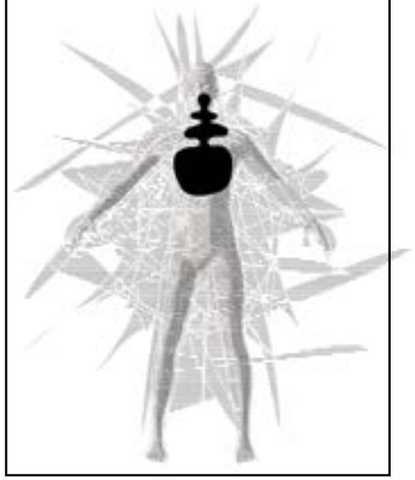
There are theories saying that it is actually a crowbar that is ready to force open one's heart, when this is the only way.

Material	Possible reason	Mesh influence
Metal with plastic endings	Sorrow?	Reductions around the heart and upper part of the back



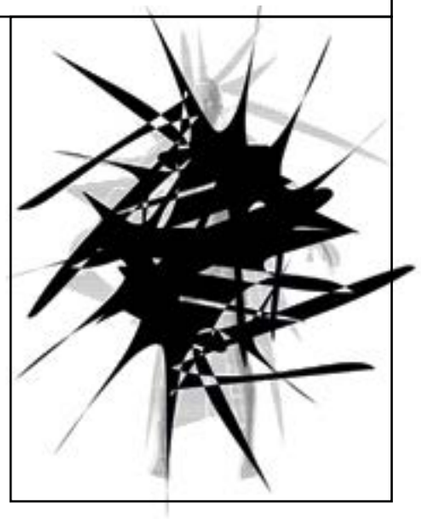
DOLL OF LONELINESS

Observed in the ones that have ever been left alone. This cute little doll-like looking shape is actually affecting breathing. It seems like it always has some need but it refuses everything, like an angry kid.
It wiggles a little bit inside of the body. The slightly antrompomorphic shape without human details makes it feel creepily anonymous.



Material	Possible reason	Mesh influence
Different materials from glass (breaking painfully) to soft structure, that one can live with for years	It grows when one holds their breath and longs for another person who does not come.	Reductions around the chest neck, upper part of the stomach and deep in the eyes.

SHARP WINGS

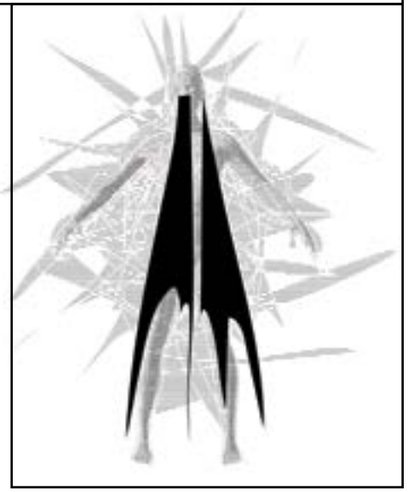


Sharp wings are occuring with people who want to protect themself and effectively process with their goals. Sharp wings might be hurting other people around.
Sometimes people with sharp wings are teaming up – their sharp wing are not hurting one another, but supplementing each other forming a hurtful lattice for others.
This Shape is particularly not comfortable to use. It seems like a weapon, but it is actually a very burdensome costume. Because of its proportions, it might really hurt the one wearing it pretty badly when coming in contact with an obstacle.
Sometimes sharp wings are very dense, so it is hard to spot a person behind them. People might also grow in their sharp wings, so one can't really say where does the body mesh end and the sharp wings start.

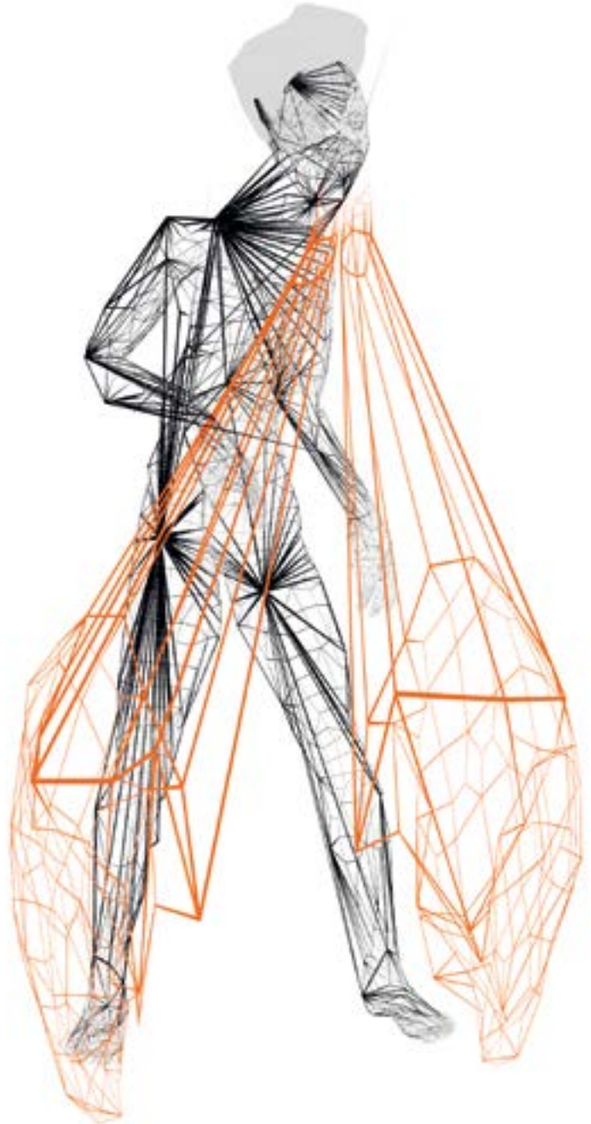
Material	Possible reason	Mesh influence
Usually different materials. From thin plastic, shaped like feathers, through wood until sharp metal.	Need to protect one's mental and physical space	Hard to identify some of them cause total distraction, while others can be done with just a couple of vertices.

BAT CHIN

The bat chin is a bat-like shape growing out of the chin.
It is hanging directly from one's real chin, protecting the front of the body.
Bat chins often originate from vertices on the inside of the human mesh, which is then becoming more vulnerable.

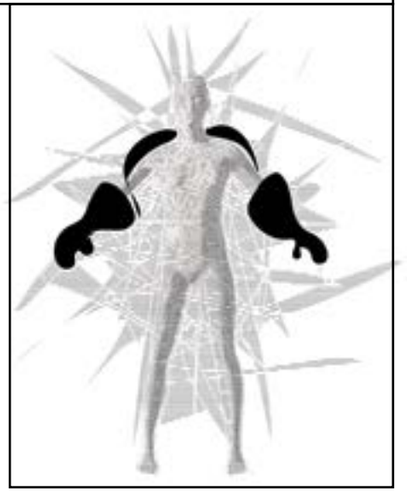


Material	Possible reason	Mesh influence
Skin and bones, like bat's	very strong will to know what is going to happen next and even bigger need to be protected.	Reductions in the chin and a little bit on the back. It is quite effective in saving original mesh from the front side.



EGO GRAB

An ego grab makes people a bit clumsy, because vertices from the hands and arms are intertwined with this shape. However, the idea of the shape itself is not that bad. People with this shape can easily make more space for themselves and be comfortable without bigger damage to others.

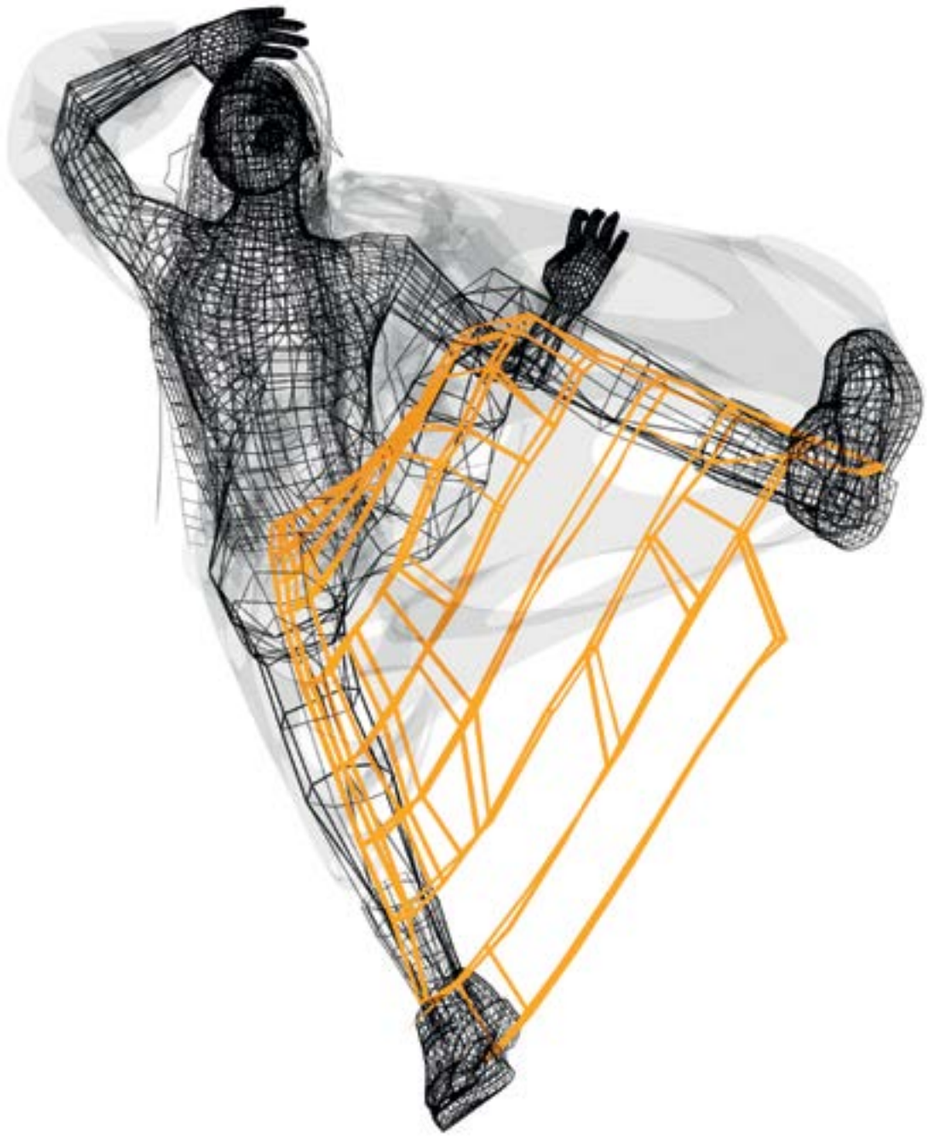


Material	Possible reason	Mesh influence
Similar to boxing gloves but firmly attached to the body.	very deep need to grasp more freedom and independence	Increase in volume around the neck and hands

LEG TAPES

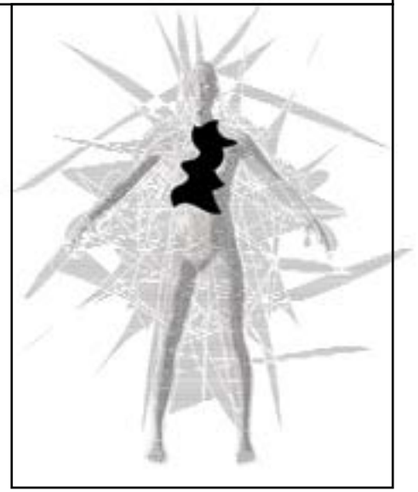
Some people experience leg tapes.
Leg tapes are objects localized in front of the legs, reducing their mesh. Sometimes tapes are connected with each other. Leg tapes prevent them from taking the next step. They are also making it hard to overcome any obstacles, even such basic ones like uneven ground.

Material	Possible reason	Mesh influence
Different kinds of stretch	It starts growing when one stays in one place for too long	Legs reductions and bridge between them.



TOXIC FILM

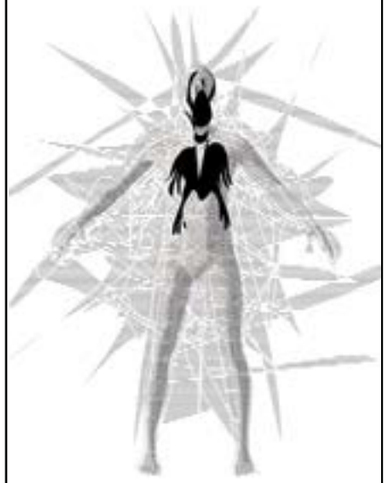
The toxic film is something that remains in one's body after witnessing something awful. The biggest problem with toxic film is the fact that once it is built and hardened, all the organs are getting kind of dependent on it. It gives an impression of being necessary to hold everything, but the truth is that everybody can live without it. It just has a fake purpose in the whole system.
Moreover, it blocks natural flow. Every time a new energy of joy, fresh ideas and life comes, it is getting hurt, bumping onto a toxic film.



Material	Possible reason	Mesh influence
Glass, plastic or some kind of gelatine, depending on the stadium of development	Witnessing something awful	depending on the exact shape and size of witnessed impression

LOUD CHICKEN

A loud chicken is not always really loud. It quitens a little on some things and shouts some others. It causes internal pressure. It makes one's voice adjusted to telling the right truth.
Some people can recognize the person with a loud chicken by the voice. The chicken changes it to be more bitter and squeaky.
It might seem like having a little bit of masculine energy. However, it has no gender.
One is getting a loud chicken when there is too much to say in a short time under pressure. It is often present in those who try to hide some things while highlighting others that are not necesserily true. Not everybody with a kind of loud chicken is lying, some people are just in fear of expressing everything in the right moment. Loud chickens have a very specific kind of hair-feathers. They are tickling the carriers of that shape with every step – sometimes more from its tail, sometimes more from its tongue or eyes. As it is with most of the Shapes, loud chickens come in different variants, proportions, sizes and colors. Colorful or white ones are easier to ignore than the ones in black. Black loud chickens might be present in people, who would have no consideration to others.



Material	Possible reason	Mesh influence
It's a living creature similar to a condor. It is more slimy though.	Constant need to confidently manipulate reality	Small reductions around throat, neck and lymph nodes, as well as chest and part of the eyeballs

empty template to describe observed shapes

shape name

placement in the body

shape description

Material	Possible reason	Mesh influence

photo or sketch of the shape in a real person

ONE COULD ALSO LEAVE THEIR SHAPE BEHIND, WITH THEIR OLD POSITION

contents