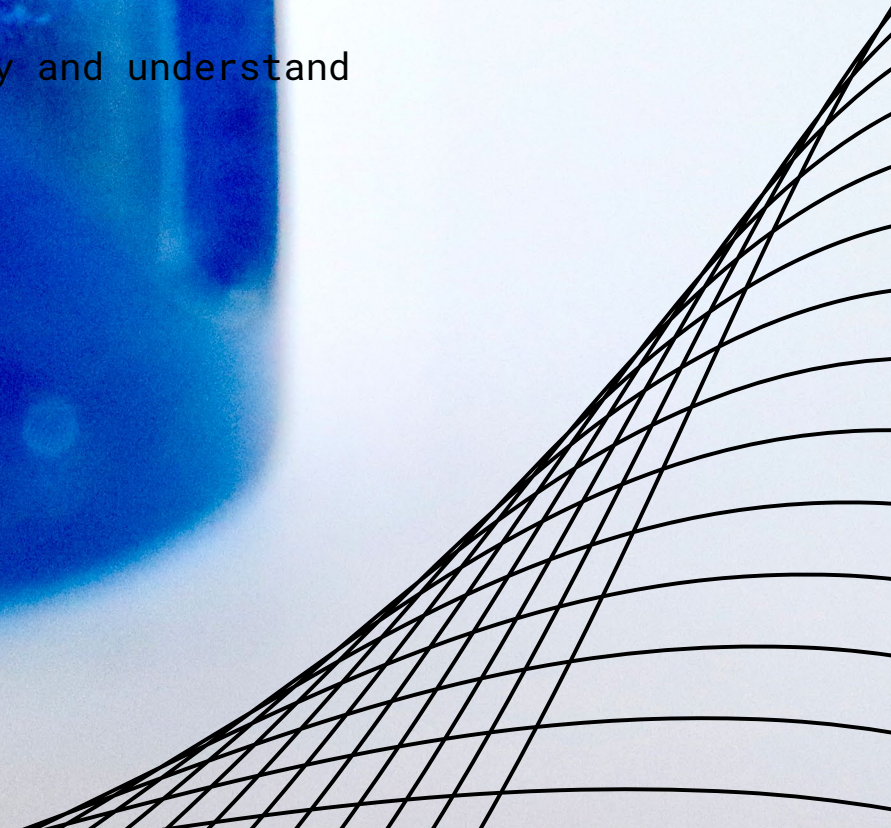


3D Printing for Creatives
Anne Jenster
S3961044

POSTHUMANISM.

Digital fabrication as tool to embody and understand
posthumanism



INTRODUCTION.

The last couple of years design has been focusing on user and human centered design. However lately technological and environmental changes in our society cause this dialog to change (Forlano, 2017). This can be defined as post-humanism. Post-humanism is a critique on humanism, it does no longer reflect the ideas of the 18th century where the man is the center of the universe. Instead it articulates the idea that a change is happening in our understanding of the self and its relation to the natural world, technology and biotechnology (Andersen, 2019). For design this means we have to take a different viewpoint, instead of focusing on how the thing we design fits its user we think of how it fits its surrounding environment how does it interact with nature and the machines it is made with. It can also be that a designer is not asked to understand what humans want but what a frog or algae wants, what frameworks do we then need? Next to the change of perspective on how we interact with nature, this view also can be taken on how we interact with technology. Technology is becoming smarter and possibilities arise that we can live together with AI, for example in 2010

already two robots -apollo cluster and Daria XR-1029- became a partner in a law firm (Neil, 2010). This also fits with the earlier philosophy object-oriented ontology (OOO), this philosophy discusses that we humans are elements, but not sole elements. Nothing has status, a doctor has the same position as a DVD player (Bogost, 2012). In short, "The posthuman resists binary categories and, instead, integrates the human and nonhuman. As such, it is an important concept that provides an entry-point into thinking about socio-technical systems as both socially constructed and society shaping" (Forlano, 2017). But how do we make this concept easier to grasp how do we make sense of this complexity? Rosi Braidotti explains 3 ways of posthuman thought, all three create an understanding that science and technology are able to help reshape our understandings of self and the relationships we have to other species and machines (Braidotti, 2013). In this paper the assignment lays on the role of digital fabrication as tool to embody and understand posthumanism, how do we work together with these machines and how can they help us to grasp the complexity of it?



**TRADITIONAL
PRECEDENTS.**

Actor–Network Theory.

This theory can be seen more as an approach and originated in the 1980s as a way for scientist to deal with the role of objects in social studies of science and technology (Latour, 2007). It focuses on the connections between human and non-human entities. It discusses how these connections lead to the creation of new entities that do not necessarily practice the sum of characteristics of the constituent entities. For example, a chemist puts together two chemicals, the entities together mean something than they do together (Dankert, 2012). Or a guitar player is becoming a guitar player when you combine a man and a guitar. A guitar player would not be a guitar player without a guitar. In this theory these 'actors' share equal agency in participating in the shaping of issues.



A cyborg manifesto.

Donna Haraway has been one of the pioneers of manifesting thinking beyond the human, with her two popular manifesto's on cyborgs (Haraway, 2006) and companion species (Haraway, 2012). In *A Cyborg Manifesto*, Haraway discusses the history of the relationship between humans and machines, and argues that three boundaries were broken throughout human history which have changed the definition of what is deemed cultural or otherwise natural. Human and animal, animal-human and machine, and physical and non-physical. The first boundary was between humans and animals, and was broken in the 19th century after the publishing of *On the Origin of Species* by Charles Darwin, where the lines between human and animal got blurred. The second boundary was between machines and organisms, and was broken with the industrial revolution where human activities got automated. The third boundary concerned the technological advancement that has produced evermore complex machines which can be miniscule in size or, in the case of software, altogether invisible. As a result of these boundary-breaking events, the boundaries between the cultural and the natural became more and more intangible (Haraway, 2006).

<https://www.goodreads.com/book/show/17420442-a-cyborg-manifesto>



Whanganui River.

The Whanganui River is a sacred river to the Māori people of New Zealand and holds great spiritual, cultural, and historical significance. The river was given legal personhood status in 2017, which means that it now has the same legal rights as a human being. This recognition is a major victory for the Māori people and helps to protect the river from pollution and development. For 140 years, the tribe has been arguing that the river should be regarded as a living entity rather than a resource (Roy and Jong, 2017). This is a great example of post-humanism, because hereby there is legally now difference between human and nature phenomena.



<https://www.newscientist.com/article/mg24332492-800-giving-nature-human-rights-could-be-the-best-way-to-protect-the-planet/>

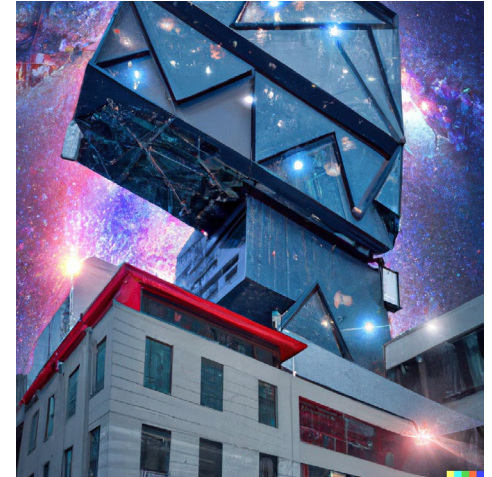
The background features a series of thin, black, wavy lines that create a sense of motion and depth. These lines are arranged in a way that they appear to flow from the left and right sides towards the center, where they meet a central white rectangular box. The lines are closely spaced and curve in a similar direction, giving the overall composition a dynamic, organic feel.

DIGITAL FABRICATION PRECEDENTS.

DALL·E

Is a new AI system that can create specific, realistic images and art from text. It can combine concepts, attributes, and styles. It is from the makers of Open AI and is based on GPT-2 model. There is however an ethical dilemma regarding this AI, It is so advanced it can fake situations that did not even happen, like celebrities being on a place they never been. When looking at this design the AI could be used to produce graphics or art or help with ideation.

Here on the right I asked the AI to generate an octopus in a 3d printer, digital art and an RMIT building in space in photo realistic style



Iris van Herpen.

One of the pioneers of 3D printing in fashion design is the Dutch fashion designer Iris van Herpen. She is most recognised for her 3D printed "fractal folds", which feature unique curves, bends, and loops. By fusing technology, fashion, and the arts, she created successful partnerships with scientists and creatives. Iris van Herpen blends a dedication to aesthetic design with extremely technical details. She combines the digital, the material, the human, and the non-human in her designs. What is typical for posthumanism, in which she proposes a dynamic view of life in which non-human objects like fibres, silicones, clothing, and technologies are intimately bound to human bodies. With this she is creating an avant-garde aesthetic and develops a visual and material language of fractal folds to portray the emotive mood of a posthuman world using cutting-edge technologies, novel materials, and exquisite craftsmanship (Smelik, 2022).



<https://zeitgeistofficial.com/fashion-archives/iris-van-herpen-the-designer-blurring-the-boundaries-between-art-fashion-and-technology/>

Edible Growth.

Chloé Rutzerveld questions, researches, and creates novel approaches to food production and consumption in her role as a food futurist. She translates interdisciplinary research into hypothetical future scenarios that illustrate potential societal adoptions of new food technologies. She uses interactive installations and prototypes to bring these “What If” ideas to life. She therefore provokes a large audience to consider about desirable or undesired food futures. One of her critical design projects is called Edible Growth. It explores the potential application of additive manufacturing to the manufacture of food and illustrates high-tech food that is completely natural, healthy, and sustainable because to the integration of natural growth, technology, and design (Rutzerveld, no date).



<https://www.chloerutzerveld.com/edible-growth>



SPECULATIONS.

https://www.youtube.com/watch?v=W4oZs_N6wxU

How can we work together with digital fabrication machines?

- If we consider machines as our own contraptions that embody us in extended and collaborative ways, rather than as tools of automation and semi-automation, what does it mean to make with, collaborate with, or become a machine?

- In which ways can we share autonomy rather than delegate automation? That is, in which ways can we make things together rather than delegate the making to the machine?

- Can we imagine a field of experimental design driven by a desire for a new kind of making, in response to the changing gears of our world?

- Is this machine capable of producing different things? What Use might choose it to perform itself?

AI as machine operator, what if we let AI design our products?

- Similar to the speculation above but than asking the question, what if we let a machine operate a machine? As we have seen at with DALLE is that AI is now capable of producing art, how might we use this in our collaboration with digital fabrication techniques?

How can we use 3d printing and other digital fabrication techniques as way to speculate about posthumanism?

- 3d printing and laser cutting could be a great tool to use for speculative design it can manufacture futuristic looking object and can embody something still quite farfetched. Design should be a part of the discussion in posthumanism because designers have the ability to Visualize and embody complexity (Gardien et al., 2014). This embodiment will make this concept less abstract.

The background of the slide is composed of numerous thin, black, wavy lines that create a sense of motion and depth. These lines are arranged in a way that they appear to flow from the left side towards the right, with some lines curving upwards and others downwards, creating a complex, layered effect. The lines are most dense on the left side and become more sparse towards the right.

FINAL RESEARCH.

AI as designer.

Working together with the machine and Ai as machine operator, what if we let AI design our products?

Scientists and engineers are constantly developing new materials that can be used for 3D printing. However, figuring out how to print with these materials can be a complex and costly process.

Often, an expert operator must use manual trial-and-error to determine ideal parameters that consistently print a new material effectively. These parameters include printing speed and how much material the printer deposits.

MIT researchers have now used artificial intelligence to streamline this procedure. They worked on a machine-learning system that uses computer vision to observe the manufacturing process and will correct errors in how it handles the material in real-time (Piovarči et al., 2022).

In the future, artificial intelligence (Ai) tools will be so intuitive that anyone will be able to express their ideas visually. Ai will remove the need for designers who are just good at sketching and rendering, similar to the way photography removed the need for painters who simply depict reality. Instead, design will come down to creating concepts that solve real

problems. It is going to be about what you actually have to say with your designs.

Ai has incredible potential for new design workflow. We have been using the same sketching tools, the same 3d modeling software's and the same production methods for decades. Can Ai be a creative assistant to a designer?

If everyone is using the same data inputs and everyone is using the same AI tools, will we end up making the same homogenized boring products? A lot does come down to the curation of the data that it was trained you might have one really good curator that is really good at talking with the AI what is a different skill set. It becomes more about the designer who is talking to it.

We are already talking to computers with giving it comments with the mouse, but we are doing it in a way the computer understands it instead of how we understand it. AI has the potential to humanize the way that we speak to technology maybe even bring it back to nature. Maybe a poet will be the best artist or designer of the future because they are able to talk to the ai in the best way possible.

Experimentation Process.

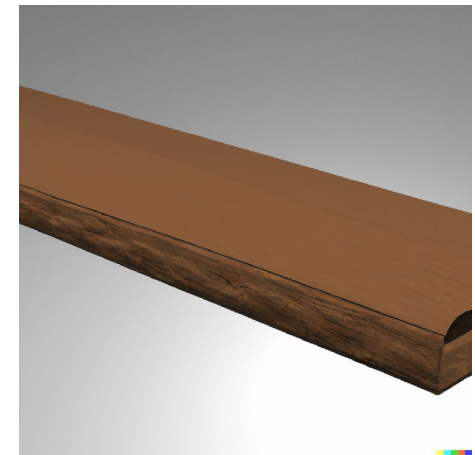
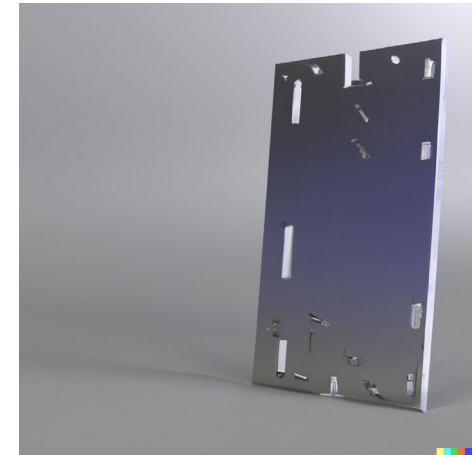
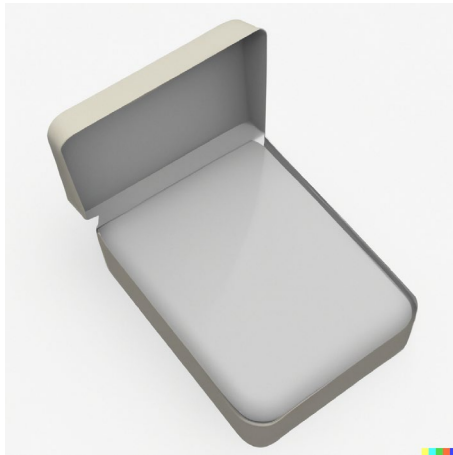
Working together with the machine and Ai as machine operator, what if we let AI design our products?

For these experimentations I tried to design something with the help of an ai. I explored multiple tools to generate these designs such as 'Midjourney' but decided that in the end DALL-E was the most advanced and appropriate for this goal. I started out with giving only little direction to the AI with asking it to create a "3D render of a product" and a "render of a new kind of product", only this did not give the wanted result see page 16. The results seen in these experiments resonate with the vision in the last chapter where I state that designing with ai becomes more about how you talk to it and what the designer has to say. Therefore, I choose a design direction; I choose jewelry and especially a ring and bracelet. I choose this because the Ai still has a lot of freedom and will not be distracted with too much functional requirements, next to that I think it will be a suitable object for 3d printing.

Now I started giving the AI comments, this turned out to be way more complement. I of course

have a personal style and finding something that I thought looked good and was realistic was quite complex. There was one consistent factor in the commands I gave to the Ai, being generating a render. This was because this would be most appropriate for 3d printing. On page 17 you can see some of the renders created. Especially the bracelet took a lot of iterations to create something I was satisfied with. Eventually I choose one ring and one bracelet, then I put these images in the AI again and generated variations see page 18. These renders where taken to fusion 360 to create 3d objects see page 19. I tried to find AI that could do this for me I found nerf this is a program that helps you create 3D renders off images using coding, but it was to difficult, not completely what I was looking for and I wanted to work together with the AI and machines instead of them doing all the work for me.

Design from scratch.



3d render of a product

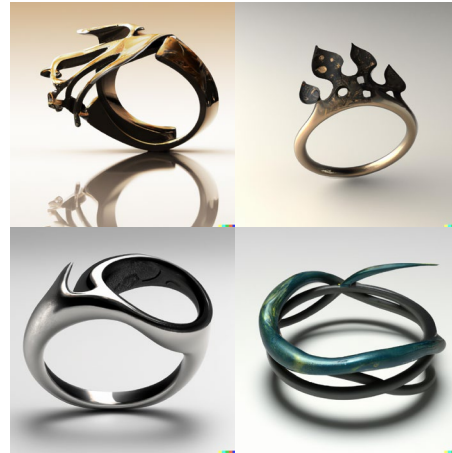
Post-human design

New kind of product

Ai designed jewelry.



3D render of a futuristic jewelry ring



3D render of an organic jewelry ring



Render of a silver organic futuristic bracelet



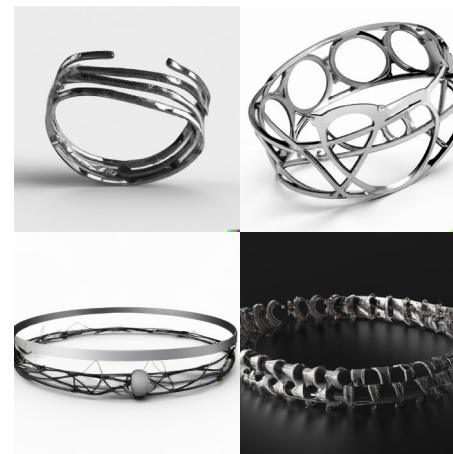
Full Render of silver bracelet



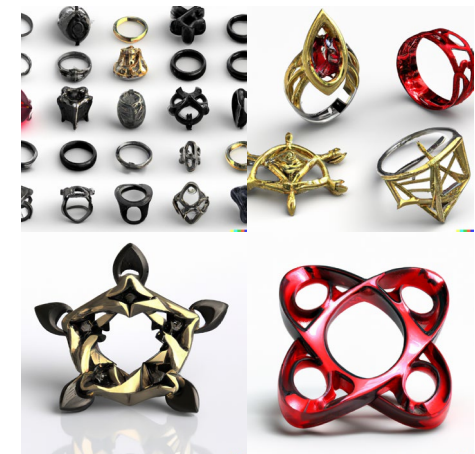
Render of an organic bracelet



Render of a futuristic bracelet

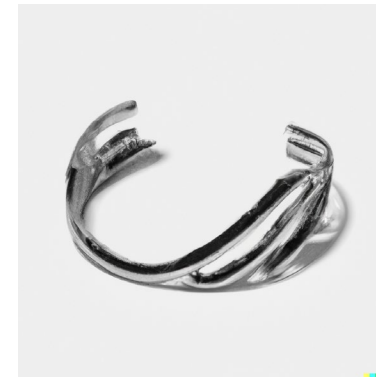


Full Render of organic silver bracelet



Render of jewelry made for 3d printing with white background

Chosen Designs with variations.



Final render.



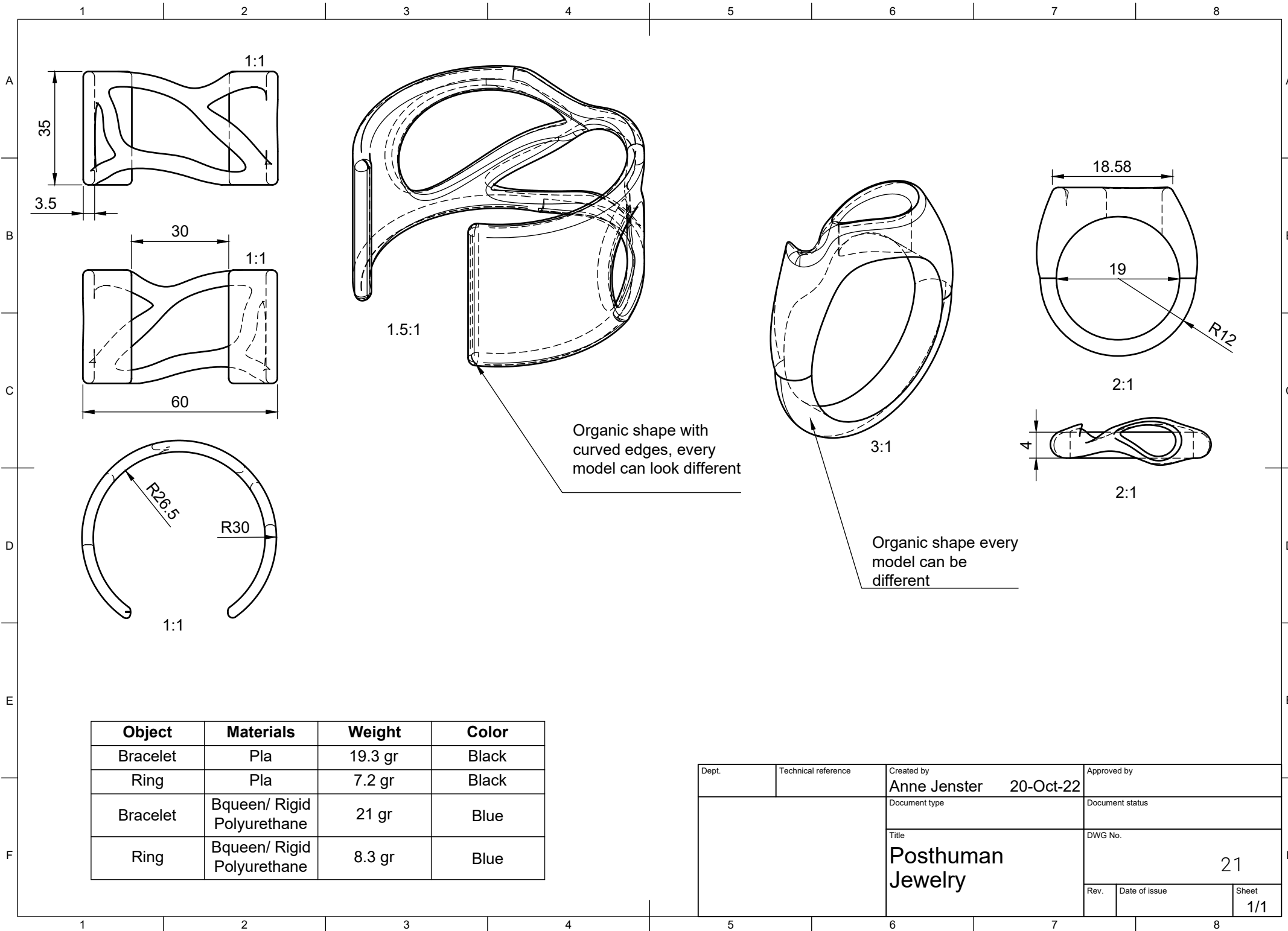
Job spec sheet.

After the render where finished the ring and bracelet where send to the 3d printer some extras were printed to make sure experimentation with finishing. The prints had quite some support material, so it took some time to get the model visible see page 22. I also wanted a hand to display to put the jewelry on. I made the measurement of the jewelry in al way it would fit my hand so Ideally the hand I was making was the same size. I used a 3d scanner to make a model of my hand, it needed a couple of tries and eventually it worked with putting some marks on my hand see page 22. The scan than needed some meshing and finishing in fusion. I initially wanted to CNC this hand, but the people of the workshop advised me to 3d print this one as well because of the amount of time it would cost. I finished both the hand and jewelry with primer filler, spray paint and a lot of sanding see page 23. I had some time left over and really wanted to explore casting. I first made a malt out of the bracelet and ring with pinky silk after that was dried, I used bqueen and blue pigment to cast the jewelry see page 24. I needed some tries to get the result I wanted; the casting was fun but

costed a lot of time. I worked 3 days on it and did 3 tries and still don't think it is perfect. All the jewelry was coated with a glossy varnish see page 25. To finish of the display I made a stand for the hand, for this I laser cutted acrylic see page 26. For the job spec sheet of the ring and bracelet see page 21.

Posthuman way of working

While I was working with these machines and materials, I tried to take a posthuman approach, I tried working with the machines and understanding the materials. I explored the abilities of the machines and looked in how they worked. To understand the materials, I had discussions with the technicians in the workshops and learned material properties. Working like this was a real eye opener normally I make and learn by just doing and finding out on the way. But doing it this way I felt more connected and attached to the things I was making and the machines and materials I was making with. This made the pieces I made more valuable and I believe you can also see it in the results.



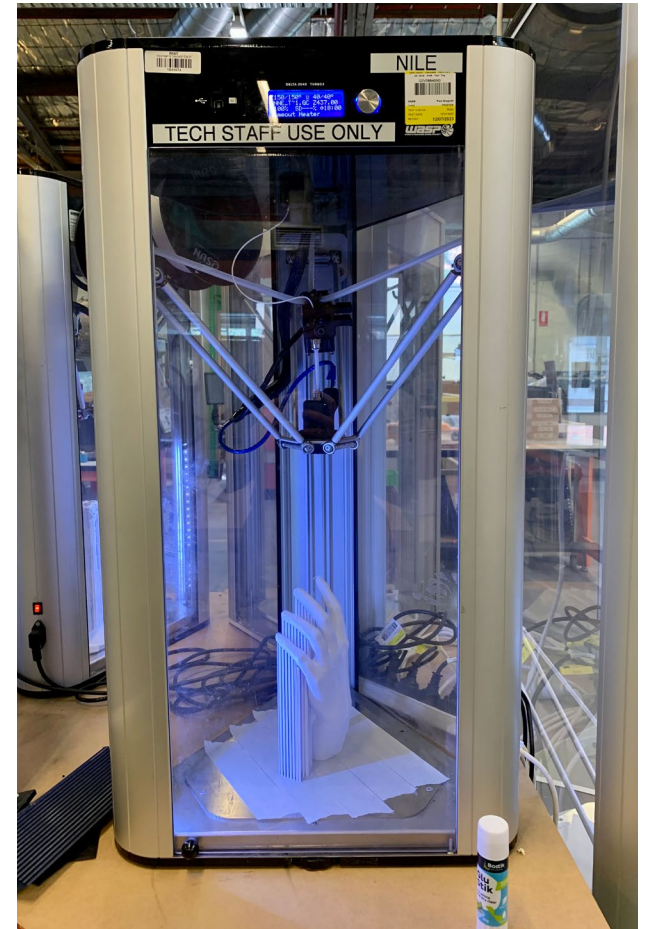
Organic shape with curved edges, every model can look different

Organic shape every model can be different

Object	Materials	Weight	Color
Bracelet	Pla	19.3 gr	Black
Ring	Pla	7.2 gr	Black
Bracelet	Bqueen/ Rigid Polyurethane	21 gr	Blue
Ring	Bqueen/ Rigid Polyurethane	8.3 gr	Blue

Dept.	Technical reference	Created by Anne Jenster	20-Oct-22	Approved by
		Document type	Document status	
		Title Posthuman Jewelry	DWG No. 21	
		Rev.	Date of issue	Sheet 1/1

3D Printing.



Final 3D print.



Casting.



Final Casts.





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