

3D printed jewellery design process based on sculpture inspiration

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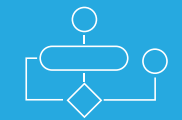
Introduction



Additive manufacturing is increasingly used in the development of fashion products such as clothing, accessories and jewellery. From a design perspective, the new technology offers designers the freedom to create and manufacture things that were otherwise very difficult to produce using traditional techniques.

Master Course at the Fashion and Textile Design includes the subject which course curriculum involves teaching the advanced design process of fashion accessories objects, including 3D technologies such as 3D modelling and 3D printing. The assignment given to the students was to select the wooden sculpture from the Forma Viva outdoor gallery Kostanjevica na Krki and translate it into a 3D printed jewellery collection.

Design Process



The design process began with the excursion to Forma Viva in Kostanjevica na Krki, where the students created a photographic documentation of the sculptures. Looking at the whole statue from different angles was as important as observing details and special features of statue making, so they had to take a whole series of photos to capture all views of the sculptures.

Students thoroughly analysed chosen sculptures from a visual, conceptual and production perspective, and the investigation of possible interpretations in a jewellery collection has begun. It was important that the student really understood the intention of the author of the sculpture. The process continued with the sketching of various pieces of jewellery and their rough visualisation on a body. Sometimes it was also necessary to implement the ideas in paper or any other material to test the idea in 3D objects.



Figure 1

Photos of the sculpture "En rez" (A cut), author Primož Pugelj, photo Ajda Rep

Students were guided through a process in which selected visual and conceptual content, presented with initial sketches, was transformed into fine jewellery that can be created using various 3D printing technologies. They used a 3D programme Blender. One student also used a 3D model originally created with photogrammetry and remodelled it and redesigned it into a piece of jewellery.

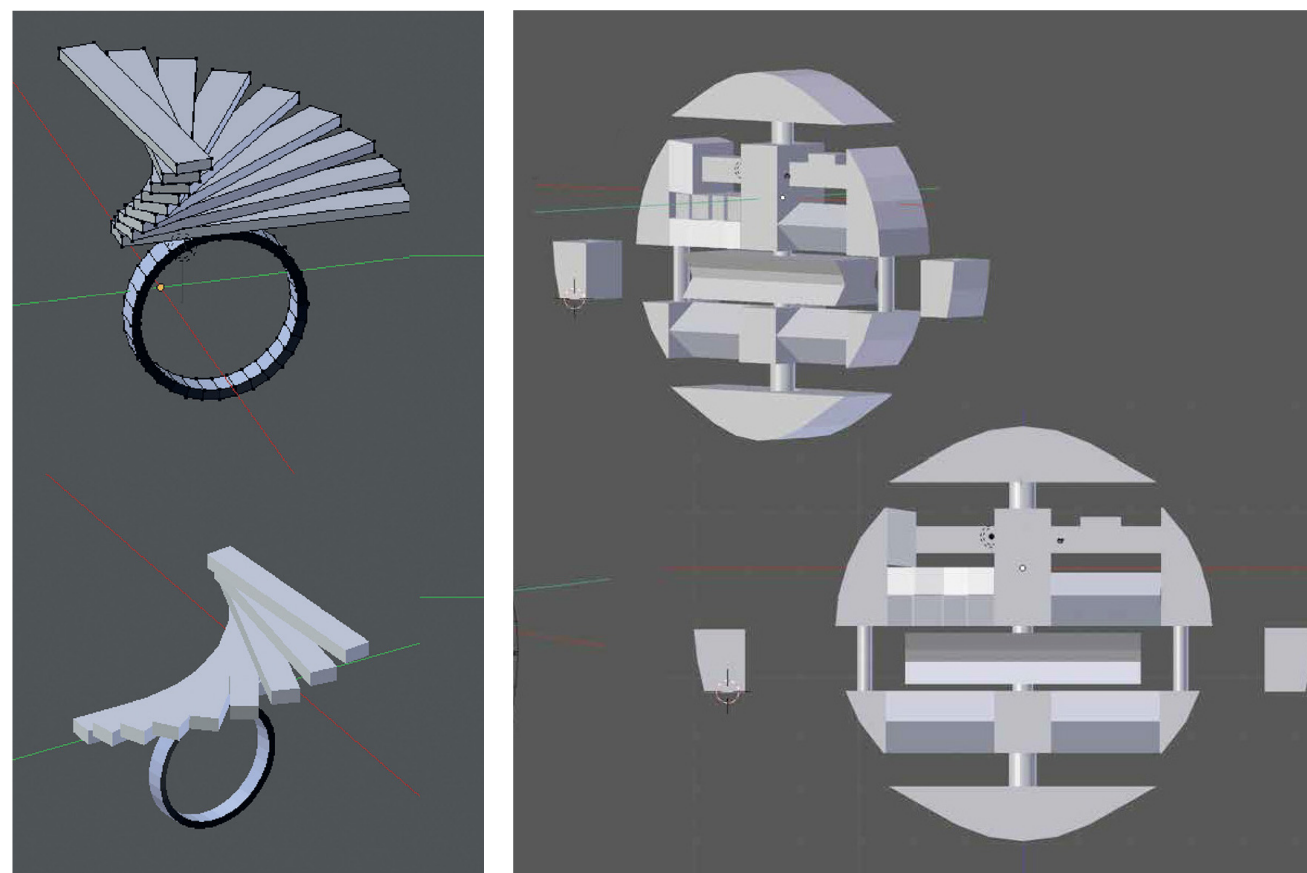


Figure 2

On the left: 3D model of the ring, author: Katrin Večerina, on the right: 3D model of the pendant with movable parts, author: Ela Vehovec

Results



When 3D models of designed jewellery were created, it was necessary to prepare them for 3D printing. The jewellery was printed with different 3D printing technologies. Most of the jewellery was printed with fused deposition modeling technology (FDM), using printer 3D Jozko and multitool ZMorph 2.0 SX printer. For pieces with very smooth surfaces the stereolithography (SLA) was used and printed with Form 2 printer. At the end some special jewellery pieces were chosen for printing with selective laser melting technology, SLM. For this reason we cooperated with company Dentas.



Figure 3

The pendant printed with FDM technology, author Ela Vehovec



Figure 4

Bracelet printed with SLA technology on the right and assembled and spray painted on the left, author: Uroš Topić



Figure 5

Earring (author Hana Tavčar) and ring (author Tina Dovjak) printed with SLM technology

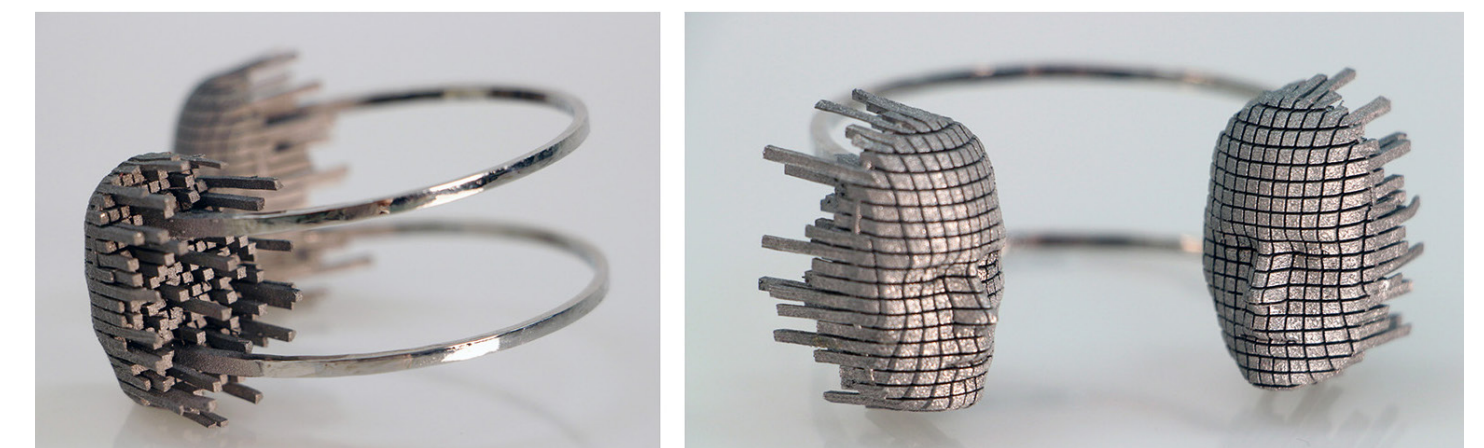


Figure 6

Bracelet printed with SLM technology, author: Ajda Rep

Conclusion



During the course students tested themselves in two new areas that allowed them to expand their design experience, in the field of 3D modeling and in the field of jewellery design. They learned how to interpret a concept and the aesthetics of a piece of a wooden sculpture into a wearable piece of jewellery. They also learned how to transform hand-drawn sketches or images into 3D models. They broaden their knowledge on wooden cultural heritage, jewellery design and various 3D printing technologies. We have proven that 3D printing technologies are extremely useful for jewellery manufacturing. The production of conceptual and functional prototypes is now possible for almost anyone. The prices of printers that allow printing with thermoplastic materials have already fallen below 300 Euros. However, if we want to print jewellery with full functionality, we have to use technologies that allow printing with metal powder. The prices of metal powder materials for 3D printing have dropped dramatically recently. As a result, printing individual pieces of jewellery is slowly becoming available to every user.

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