

3D printing - The merits for research, conservation and presentation

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INTRODUCTION

The development of technology and the augmenting digitization of global culture have resulted in a changing society: we deal with lots of fragmented and incoherent information, with various cultures, different social perceptions and with more replicas, reproductions and converted representations of original artworks than ever. Moreover, more reproduction techniques have entered contemporary culture, cultural institutions and the art world: we have the possibility to three-dimensionally (3D) print objects, preserving their visual and material qualities.

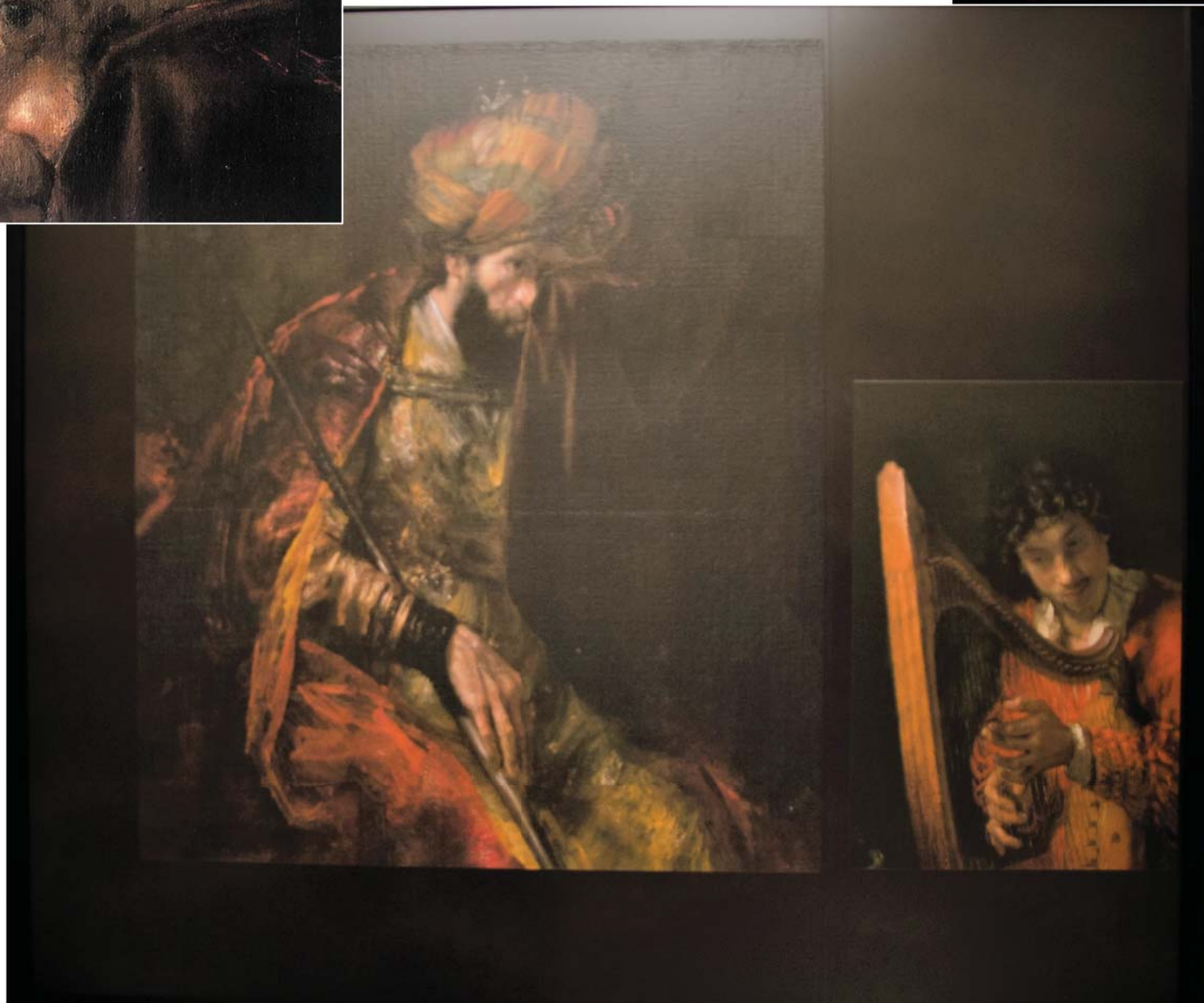
The introduction of 3D reproduction and its rapid development play an increasing role in discourses in the conservation field and in museum practices. Although we are used to seeing reproductions of artworks everywhere (in books and catalogues, via mobile devices, on posters or tourist miscellanea, and from canvas sneakers to coasters) 3D printing provides a totally new dimension to artworks. The ease to reproduce countless highly detailed one-to-one size copies of artworks and the way it discloses original artworks —both in physical and digital form— profoundly disrupts the modernist idea of the unique artwork, the idea that authenticity can only be attributed to the one and only original.

AIMS

The fragmentation of artworks and the increasing importance of scientific proof that is found in the materiality of artworks asks for more unification and cooperation between multiple fields. The aim is to show how 3D printing and future reproduction technologies can be implemented as useful and durable tools in overcoming conflicting perceptions of authenticity and to unify the fields of cultural heritage research, conservation, presentation and creation. It will provide various directly adaptable and sustainable 'hands-on' techniques - derived from case studies - of implementing technology and reproduction, facilitating engagement between visitor and cultural heritage in a way that is in line with institutional goals and the needs of society now and in the future.



Left:
Fig. 3. Detail of the 3D printed reproduction of Saul & David with raking light from the left.



Right:
Fig 2. 3D printed reconstruction of the fragmented painting before restoration.

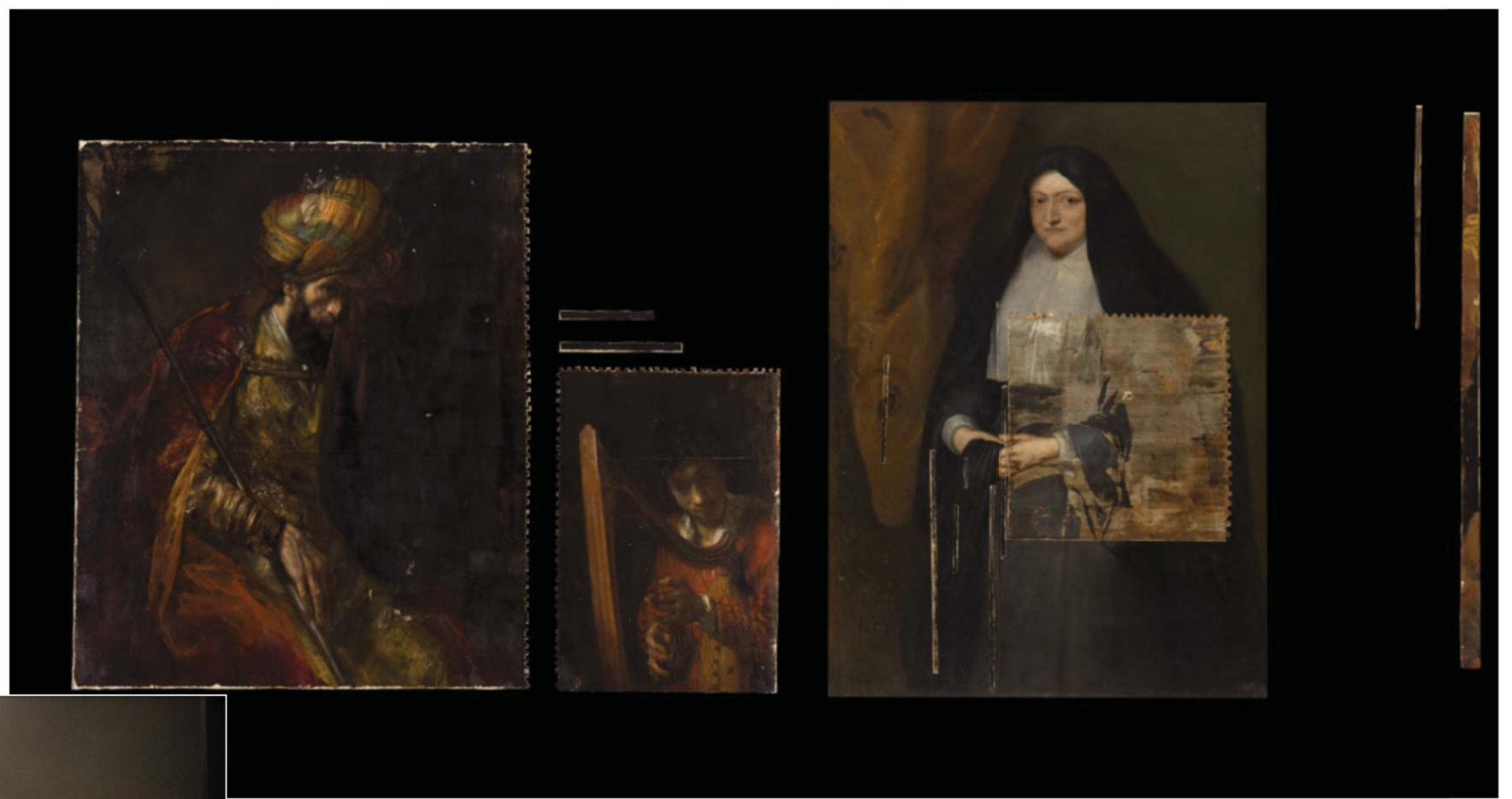


Fig. 1. Deconstruction of the canvas of *Saul & David* (c. 1651 - 1654 en c. 1655 – 1658) by Rembrandt van Rijn

METHOD

Over the course of this investigation, there will be a constant fine-tuning between theory and practice, as this research will both be executed through literature research as well as by practice based testing and co-operation with museums and cultural institutes.

The paintings that will be used as case studies will be scanned by using topographic scanning developed by Delft University of Technology; physical copies will be made by Océ Technologies.

As there is no literature about 3D printing and its consequences for the arts, this research examines 3D printing within the context of art history, conservation studies and museum studies. 3D printing will be the factor that ties these studies together to present one coherent 'tool box' to deal with the potentialities of this technology.

By working closely with the conservation professionals of the Netherlands Institute for Conservation+Art+Science and Stichting Restauratie Atelier Limburg, museums throughout the Netherlands and by using the paintings in their collections as case studies (e.g. *Saul & David*) theory is put into practice.

EXAMPLE: THE CASE OF SAUL & DAVID

In 2015, the Mauritshuis in The Hague hosted the research project and exhibition *Rembrandt? The Case of Saul & David*. Rembrandt van Rijn's *Saul & David* (1651–1655 & 1655–1658) was sawn into pieces and its original material became fragmented (Fig 1.). It was in need of thorough restoration and it was unclear whether or not this painting really was made by Rembrandt. 3D printing was used to scan the surface of the painting and to discover the original composition and size of the painting (Fig. 2 & 3).

- Technical art historic research: the topographic scanning and the reconstruction were useful in determining that this painting can be attributed to Rembrandt van Rijn;
- Painting conservation: 3D printing helped in conserving the painting in its complete composition;
- Presentation: the 3D print was on display before the original's restoration was completed and the 3D print allowed visitors to touch and feel Rembrandt's technique and brushstrokes, adding a new dimension. Later both were displayed next to each other.

FUTURE OPPORTUNITIES

- In this case, the conservators chose to keep the painting intact and in its complete composition. The 3D print could provide a way to display the painting in fragments as shown in Fig 1. This could attribute to knowledge about the painting's turbulent history and in terms of presentation, this could provide an interesting narrative.
- Color and texture reconstruction can be implemented and visualized with 3D printing, which could potentially provide interesting knowledge about the painting, the materials and the artist, without having to interfere with or damage the original's materiality. The use of topographic scanning and 3D printing can result in a better understanding of the artwork and consequently, in a better conservation or restoration treatment.

REFERENCES

Tissen, L.N.M., "Authenticity vs. 3D reproduction: Never the twain shall meet?", *Arts in Society: Academic Rhapsodies*, Leiden: Leiden University Libraries, 2019.

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