Rethinking Who ‘Keeps’ Heritage: 3D Technology, Repatriation and Copyright

Using 3D scanning and printing technology for cultural heritage creates a new group of opportunities for preservation and access, while also causing a shift in how we view the ownership of this heritage. This article will examine this issue from four angles: how 3D technology plays a role for heritage in danger; how it allows having multiple copies at once in such a way that affects repatriation dynamics; how it creates further copyright questions; and finally how it causes a new layer of ownership over the scans. This article will argue that 3D technology does not solve repatriation issues but might create new ownership in the 3D scans through copyright law.

I. Keeping heritage from disappearing: How can 3D technology help?

First, we need to assess the existing protection for heritage at the risk of destruction and deterioration, then address how 3D technology fits this structure. The legal protection of cultural property is shaped by multiple instruments with different purposes reflecting their historical and political backgrounds and the competing interests of their stakeholders. What they have in common is the ultimate goal of keeping cultural heritage safe by treating it with care and respect.

The earliest concerns for the treatment of cultural heritage were connected to the question of what to do with the property of an enemy in an armed conflict. Historically it was common for the winning party to remove the valuable property of the enemy, as part of the right of conquest. However, there were arguments that some items should be excluded from the enemy’s property. In 164 BC, Polybius expressed his wish that the conquerors should leave certain forms of wealth in their original locations:

‘there were indeed perhaps good reasons for appropriating all the gold and silver: for it was impossible for them to aim at a world empire without weakening the resources of other peoples and strengthening their own. But it was possible for them to leave everything which did not contribute to such strength, together with the envy attached to its possession, in its original place, and to add to the glory of their native city by adorning it not with paintings and reliefs but with dignity and magnanimity.”

In 1863, Francis Lieber established a set of rules for the Union forces in the American Civil War that codified the conduct of war, but this code also allowed the removal of ‘works of art, libraries, collections, or instruments...

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1 Polybius, History of the Roman Republic, Book IX, Ch 3, ‘The Spoils of Syracuse’ as published in Vol IV of the Loeb Classical Library edition (1922).
belonging to a hostile nation’ by the conquering state, with their ownership only decided afterwards. Two conferences were held for the purpose of regulating the conduct of war in 1899 and 1907, with similar rules on sparing certain buildings and objects. The destruction of cultural heritage in the First and Second World Wars showed that these rules were poorly applied, which prompted the drafting of 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict. This instrument’s narrow and clear scope reflects the desire for more effective protection under war conditions.

Over time, risks other than armed conflict were recognised. The 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property was drafted in reaction to the growing interest in archaeological excavations and the collections of samples and artefacts being carried to other countries. The 1972 Convention concerning the Protection of the World Cultural and Natural Heritage was in reaction to increasing tourism and the accessibility of heritage sites following the realisation that there are new challenges to be met, such as ‘increasing urbanisation, industrialisation, social and economic upheaval, pollution and climate change’. The risks faced by intangible cultural heritage were also explicitly addressed through the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage.

The focus then switched to the digital sphere. The importance of digital-borne heritage and the shared goal of digitising existing cultural heritage are repeatedly recognised while cooperation to achieve these goals is encouraged. A recent European Commission recommendation also refers to using 3D technology in the highest level of detail, and sets targets for digitisation, with the goal by 2030 of digitising 100% of cultural heritage that is at risk and 50% of the most physically visited cultural and heritage monuments, buildings and sites.

When used for heritage at risk, 3D copies can both illustrate the level of destruction and help the future reconstruction of these sites in great detail. An important example for such projects is the digitisation of the Syrian heritage destroyed by ISIS in 2015. As part of the cooperation between ICONEM and Syrian Directorate General of Antiquities and Museums, the project involved scanning sites by using drones and relying on photogrammetry to construct accurate models of the old city. Once the models were created, the next step was 3D printing one of the monuments. Palmyra’s Triumphal Arch was chosen as one of the most important monuments in the site, which was then 3D printed and erected in Trafalgar Square in 2016. At the unveiling, Londoners were encouraged to ‘celebrate the shared heritage and stand in solidarity with the people of Syria’. The replica arch was then displayed in New York, Dubai, Florence, Arona, Washington DC, Geneva and Luxembourg, where similar sentiments were expressed. The project aimed for a faithful copy and kept the effects of nature, such as cobwebs and bird nests. But some viewers argued that the project resulted in an altered outcome, because the 3D printed version was smaller in scale and was printed using a uniform yellow material while the original is golden Egyptian marble. Additionally, it was suggested that putting the arch in places such as London’s Trafalgar Square or New York’s City Hall Park removed it from its original surroundings, placing it in an alien context.

Such projects can paint an optimistic picture of what can be achieved with 3D technology and there is clearly a lot to celebrate for the purpose of reviving lost heritage and preserving heritage at risk. But, as this example shows, this does not mean that 3D technology is without shortcomings. First, these projects require time and money. One could argue that, at least for heritage not in the danger of being destroyed, the first step should be improving storage conditions or moving them to somewhere safer instead of investing in copies that might become obsolete. While this is not possible for monuments that have already been destroyed, such as the Triumphal Arch, it can be difficult to assess when to take the leap for the intact objects, regarding the timing and the quality of the 3D scanning and the allocation of resources. The second problem would be where preservation attempts go further than expected and create something else. In the example of the Triumphal Arch, was it correct to keep the effects of the nature or remove them? The technology allows the restoration of the object to its original condition while

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2 Instructions for the Government of Armies of the United States in the Field (Lieber Code) art 36.
3 Convention (II) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land, The Hague, 29 July 1899; Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land, The Hague, 18 October 1907.
4 Craig Forrest, International Law and the Protection of Cultural Heritage (Routledge 2010) 68; Patty Gerstenblith, ‘From Bamiyan to Baghdad: Warfare and the Preservation of Cultural Heritage at the Beginning of 21st Century’ (2006) 37 Georgetown J Int'l L 245, 256.
5 Jiri Toman, The Protection of Cultural Property in the Event of Armed Conflict (Dartmouth Publishing Company 1996) 20; Patty Gerstenblith, ‘Protecting Cultural Heritage in Armed Conflict’ (2009) 7 Cardozo Pub L Pol'y & Ethics J 677, 683.
6 Janet Blake, ‘On Defining Cultural Heritage’ (2000) 49 ICLQ 61, 62.
7 Forrest (n 4) 224.
8 UNESCO Charter on the Preservation of the Digital Heritage 13 October 2003; Commission Recommendation of 27 October 2011 on the digitisation and online accessibility of cultural material and digital preservation (2011) OJ L283, replaced by Commission Recommendation (EU) 2021/970 of 10 November 2021 on a common European data space for cultural heritage C/2021/7953 (2021) OJ L401.
9 ibid.
10 Iconem, ‘Our Mission and Projects’ <http://iconem.com/en> accessed 8 August 2022; Sketchfab <sketchfab.com/iconem> accessed 8 August 2022. A similar project was undertaken by ICONOMOS, CyArk and Google Arts in cooperation for other sites in Syria. CyArk, ‘Projects’ <www.cyark.org/projects/> accessed 24 January 2022.
11 The Institute for Digital Archaeology, ‘Building the Arch’ <digitalarchaeology.org.uk/building-the-arch/> accessed 24 January 2022.
12 Lauren Turner, ‘Palmyra’s Arch of Triumph recreated in London’ BBC (London, 19 April 2016) <www.bbc.co.uk/news/uk-36070721> accessed 24 January 2022.
13 The Institute for Digital Archaeology, ‘Media’ <digitalarchaeology.org.uk/media/> accessed 24 January 2022.
14 Factum Foundation, ‘IDA Palmyra Arch Copy’ (2020) <www.factumfoundation.org/pag/236/ida-palmyra-arch-copy/> accessed 24 January 2022.
15 Sarah Bond, ‘The Ethics of 3D Printing Syria’s Cultural Heritage’ Forbes, 22 September 2016 <www.forbes.com/sites/drasarahbond/2016/09/22/does-nycs-new-3d-printed-palmyra-arch-celebrate-syria-or-just-engage-in-digital-colonialism/> accessed 24 January 2022.
16 Paul Conway, ‘Preservation in the Age of Google: Digitization, Digital Preservation, and Dilemmas’ (2010) 80 The Library Quarterly 61, 69.
creating the 3D model. This could involve getting rid of weather damage, removing natural cracks and scratches, restoring colours to their original shades, and even replacing any broken pieces, such as missing limbs on statues. But it also means that the end result is a distorted version of the reality, and a new, different object might be created in the name of restoring destroyed artefacts. The final problem, which is at the root of the first two, is that any digital model is just a representation of the lost originals and does not actually keep anything from harm. While it is useful for allowing future generations to view and alter these digital copies, the question comes down to what makes cultural heritage ‘cultural heritage’. If the originals are only valuable because of who created them and what they have endured since then and if their value essentially lies in their age, then the 3D models and their printed versions can never restore this value. Building on Walter Benjamin’s ideas about the ‘aura of the original’, that artefacts are valued due to their presence in time and space,17 Cronin argues that we perceive the objects in the same way we perceive ancestors. So, for example, the Parthenon is not just revered for its aesthetic value, but because it is very old and was created and touched by individuals from an ancient civilisation over 2000 years ago.18 If that is the case, any 3D representation would sorely lack the necessary aura and therefore be useless for parties only interested in experiencing the originals.

So, while it is important to recognise the role of 3D technology for evoking feelings of solidarity and cooperation, such scans are not actually ‘keeping’ the originals intact. Even if we accept the positive impact of 3D technology on the preservation of heritage at risk and see it as development that benefits all humankind, the next section will demonstrate that it is less straightforward when there are opposing opinions on where the objects should be kept when the originals are still available.

II. Keeping heritage available for everyone: Can 3D digital repatriation work?

If we turn our attention to heritage that is not disappearing, the key question then changes to who holds it. An easy way to introduce the different perspectives would be to recognise the divide between the source nations (heritage-rich countries) and the market nations (where the demand for heritage exceeds supply).19 The previously mentioned 1970 UNESCO Convention supports restitution claims from source nations and aims to reduce the illicit trafficking of cultural heritage to market nations.20 Due to its heavily negotiated cut-off date of 1970, it does not apply to a major part of collections held in European countries and does not facilitate the return of pieces such as the Elgin Marbles or the Nefertiti bust addressed in this article.21 The existing positions of cultural nationalism and cultural internationalism in relation to where heritage is kept are challenged by 3D technology and the dematerialisation of the debated object.22 Cultural internationalism, echoing in phrases like ‘heritage of every people’ or ‘common heritage of mankind’ in the UNESCO instruments, views cultural heritage as something that does not necessarily belong to any nation, but to all humankind. In this approach where the originals are kept is less of a problem if they receive the best treatment possible. In fact, Merryman warns against ‘destructive retention’ or ‘covetous neglect’, in which the objects are hoarded by their source nations in unfavourable conditions while they would be better preserved in more developed countries.23

In response to the increase in successful repatriation requests, some argue that repatriating cultural heritage does not necessarily enhance national identity and encyclopaedic museums like the British Museum or the Louvre should continue to display the cultural heritage of other nations, to show the rich diversity of all humankind in one place.24 Cultural nationalism, on the other hand, requires the source nations to have complete control over where their heritage is kept and encourages them to ask for their return. These approaches also depend on the purpose. UNESCO exhibits an internationalist approach when the purpose is protecting cultural heritage, and a nationalist approach when the purpose is repatriating the artefacts. While both sides have their own proponents, it is necessary to ask here how 3D technology can affect these distinctions.

An interesting example is the Other Nefertiti Project. The Nefertiti bust was moved out of Egypt in 1912 and held in Germany, where it was first displayed in 1924. Egypt has been working on the bust’s return ever since. In 2015, two artists claimed to have used a hand-held scanner in Berlin’s Neues Museum to scan the bust, and made their scans available online, suggesting that they were ‘returning the heritage’.25 This was meant as a criticism of the appropriation of cultural property by Western countries.26 While the original is still in Germany, in this example the 3D technology helped to highlight the problems associated with where the bust is kept.

As another advantage, being able to print and keep copies of cultural heritage changes how people interact with it. Considering that people may feel more attached to their custom-made 3D printed objects than to other mass-produced artefacts,27 this could also apply to cultural heritage. For example, 3D models of the Nefertiti bust turned into different objects – such as plant pots and accessories – can be found online. Even without the

17 Walter Benjamin, ‘The Work of Art in the Age of Mechanical Reproduction’ (1935) in Walter Benjamin, Hannah Arendt and Harry Zohn (eds), Illuminations (Schocken Books 1968).
18 Charles Cronin, ‘3D Printing: Cultural Property as Intellectual Property’ (2015) 39 The Columbia Journal of Law & the Arts 1.
19 John Henry Merryman, ‘Two Ways of Thinking About Cultural Property’ (1986) 80 AJIL 831, 832.
20 There is also the 1995 UNIDROIT Convention, covering the private law side of controlling illicit export of cultural heritage.
21 Jeanette Greenfield, The Return of Cultural Treasures (2nd edn, CUP 1996); Geoffrey Robertson, Who Owns History? Egypt’s Lost and the Case for Returning Plundered Treasure (Biteback Publishing 2019).
22 Merryman (n 19).
23 ibid 846-47.
24 James Cuno, ‘Culture War: The Case Against Repatriating Museum Artifacts’ (Foreign Affairs, November/December 2014) <https://www.foreignaffairs.com/articles/af rica/culture-war> accessed 16 August 2022.
25 Charly Wilder, ‘Swiping a Priceless Antiquity... With a Scanner and a 3-D Printer’ New York Times (New York, 1 March 2016) <https://www.nytimes.com/2016/03/02/arts/design/other-nefertiti-3d-printer.html> accessed 24 January 2022.
26 Sonia K Katyal, ‘Technoheritage’ (2017) 105 Cal L Rev 1111; Ann Marie Sullivan, ‘Cultural Heritage & New Media: A Future for the Past’ (2016) 15 J Marshall Rev Intell Prop L 604.
27 Esther Keymolen, ‘The Focal Practice of 3D Printing’ in Bibi Van Den Berg, Simone Van Der Hof and Eleni Kosta (eds), 3D Printing: Legal, Philosophical and Economic Dimensions (Asper Press 2016) 99.
‘aura’, one could argue that anyone who prints and uses such objects daily would potentially form a closer relationship with the bust, compared to a tourist who visited the Neues Museum a few times.

Section I showed that 3D copies can draw attention to and even restore the heritage at risk. For example, the original bust of the Neferetiti shows that the existence of 3D copies can (potentially) change the public’s perspective about the original. But in terms of actually solving ownership disputes for the objects that are intact, 3D technology has its limitations. First, an abundance of 3D printed copies might potentially reduce the value of originals in the eyes of the public. Although the popularity of museums of ‘fake’ artefacts shows us that a museum of 3D printed works would be attractive as well, some would argue that such works would ‘dilute’ the value of the originals. Cronin gives the example of ‘Getty’s bronze Athlete standing among a dozen or more visually and haptically identical copies of it’ and asks ‘what does it matter that one of these ten, twenty, or thirty bronzes was created 2000 years ago if I cannot identify it among the copies?’

So by making these objects more accessible, 3D technology can also make them less special. Secondly, the ownership of scans of sensitive or sacred artefacts can cause great discomfort to the source communities, groups, and individuals, especially if the scans are available online for anyone to alter. It could be upsetting for some communities, groups, and individuals to see the scans of their sacred heritage held and edited by third parties. There is also the risk of new works created by 3D modelling not receiving sufficient protection in the future. Parties might hesitate to allow the digitisation of the objects on their territories, but it can be very difficult to point to the exact reason – whether it is a genuine concern about inappropriate use of the replicas or the motivation to monetise their own 3D copies in the future.

Most importantly, in connection to how it would determine where originals are kept, 3D technology cannot feasibly satisfy the repatriation requests and it would not be realistic to assume any country would be satisfied with only receiving 3D printed copies. While the 3D scans received media attention and praise, the Neferetiti bust is still in Berlin. The artists also decided against giving the scan to the Ministry of Culture of Egypt and decided that it should remain public. The same can be argued for the Elgin Marbles, cast copies of which were offered by the British Museum in the past and refused by Greece.

The 3D models of the Elgin Marbles are available online, but this is not going to make the repatriation requests go away. Another example is the Benin collections kept in European museums and the understandable criticism that the online availability of the digitised collections is being used to distract from the fact that the originals are not being returned. These examples indicate that 3D technology would not resolve where the originals are kept, and it can even be offensive to argue that such long-term grievances over lost heritage can be addressed by making 3D copies.

In a similar way to preservation copies not carrying the same aura as the destroyed originals we looked at in Section I, 3D copies of existing copies will also not be sufficient in determining where the originals should be kept and who can access them. The fact that dematerialised heritage exists in multiple places could potentially mean the line between cultural nationalism and internationalism is not as clear as before. It can even be argued that projects like the Other Nefertiti have the positive effect of attracting wider attention. But in the long run, 3D technology does not change where the physical copies are kept. As for the ownership of 3D copies, it is necessary to turn to intellectual property law.

III. Keeping heritage under copyright protection: What are the legal implications of 3D scanning of heritage?

Given that the subject matter of cultural heritage and intellectual property protection partly overlap (such as with books, paintings, and sculptures), copyright can have an impact right at the start by determining the scope of what can be digitised. As 3D scanning would fit under the definition of reproduction, parties might prefer working with objects that are no longer protected by copyright. Limiting any kind of scanning to works in the public domain would remove the risk of infringement and costs associated with rights clearance.

More importantly for this article, copyright arises automatically and gives a limited but significantly long term for protection that allows the scanners to enjoy the benefits and to prevent others from using their work. It can therefore be an incentive for embarking on costly and time-consuming scanning projects. This section will provide an overview of whether the outcome of 3D scanning will be protected as a new work under copyright laws and what happens if they receive such protection.

28 Cronin (n 18) 24; Neil Asher Silberman, ‘From Cultural Property to Cultural Data: The Multiple Dimensions of “Ownership” in a Global Digital Age’ (2014) 21(3) International Journal of Cultural Property 365.

29 It is not just the artefacts; the technology even allows scanning human remains of past civilisations and rebuilding their facial structures, such as the Lady of Cao. ‘Peru reconstructs face of ancient female leader’ BBC (London, 5 July 2017) <www.bbc.co.uk/news/world-latin-america-40502368> accessed 24 January 2022.

30 Tomruk Ustunkaya, ‘A 3D Printed Master Piece: Considerations for Offences Relating to Cultural Property’ (2018) 40(4) European Intellectual Property Review 213-17.

31 Matthew Rimmer, ‘The Maker Movement: Copyright Law, Remix Culture and 3D Printing’ (2017) 41(2) University of Western Australia Law Review 31; Michael Wernberg, ‘Doubbling Down on Copyfraud: You Don’t Need Permission to 3D Scan 500 Year Old Sculptures’ (2015) <https://www.publicknowledge.org/blog/doubling-down-on-copyfraud-you-dont-need-permission-to-3d-scan-500-year-old-sculptures> accessed 24 January 2022.

32 For the 2017 presentation by Nora Al-Badri and Jan Nikolai Nelles <aksioma.org/the.other.nefertiti/> accessed 24 January 2022.

33 Sullivan (n 26); Geoffrey Robertson, Who Owns History? Elgin’s Loot and the Case for Returning Plundered Treasure (Biteback Publishing 2019).

34 ‘Undoubtedly, technology has advanced considerably since our last virtual visit to the major museums but the fundamental objections of principle we raised about the inadequacy of substituting virtual representation for the physical looted objects still remain. Should technological advances make virtual representation as good as the physical objects, this logic would also apply to arguing that the European museums have no reason for keeping the physical objects which should be returned to the owners.’ Kwame Opoku, ‘From Restitution to Digitalization: Looted Benin Treasures to Go Online’ (2020) <modernghana.com/news998338/from-restitution-to-digitalization-looted-benin.html> accessed 24 January 2022.

35 ‘[C]opying in any manner and form’, Berne Convention art 9(1); ‘fully applies in the digital environment’, WIPO Copyright Treaty Agreement Statement concerning art 1(4).
Firstly, the approach to copyright’s subject matter is not uniform.36 There is an illustrative list in the Berne Convention Art. 2(1), that is protected in all contracting countries. Some countries, like France and Germany, have an open list approach to what is protected and others, such as the UK, keep a closed list. If we must categorise the models, the literature on 3D models usually suggests protecting them either as literary works (if they are computer programs or instructions) or artistic works (if they are scans of existing artistic works or the fact that they carry instructions to create a new artistic work).37

Secondly, and more importantly, to receive copyright protection the scans should be original. The Berne Convention allows contracting countries to embrace different levels of originality. Case law shows that the originality is interpreted as the work being the ‘author’s own intellectual creation’ which can only be present when the author can make ‘free and creative choices’ that are not dictated by their technical function (EU),38 or it possesses at least some minimal degree of creativity (US).39 The new EU Directive on Copyright in Digital Single Market also clarifies that only the original function (EU),38 or it possesses at least some minimal degree and creative choices’ that are not dictated by their technical function (US).39 The new EU Directive on Copyright in Digital Single Market also clarifies that only the original reproductions of public domain works of visual art can be protected, putting the originality requirement at the heart of the copyright discussions on 3D heritage.40 But (i) determining the originality is the hard part in the first place, and (ii) it limits itself to works of visual art, whereas heritage can actually include a variety of objects.

In many ways, the 3D scanning process is most like photography, in which an automatic process is controlled by a human participant, usually with the aim of capturing the scene/object/human frozen in time in front of the device.41 While having some overlaps with originality debates for photographs, this part will argue that 3D models of public domain works have more potential for further uncertainties than photographs.

In its earlier stages, photography was merely seen as a way of recording the reality, instead of an artistic endeavour.42 It took nearly half of a century for photographs to be included under the scope of copyright protection in France, the United Kingdom and the United States (in the 1860s).43 Through cases such as Graves44 and Burrow-Giles v Sarony45 courts recognised the potential for originality but were mostly reluctant to protect slavish copies.46 Different viewpoints were argued on whether the photograph’s originality came from setting the background and chasing the opportunities for interesting scenes, or whether aiming for accuracy can also involve creative choices.47 It is also worth noting the different protection for non-original photographs in somejurisdictions to illustrate that the originality threshold for photographs is not a uniform standard.48

If there is room for free and creative choices in the process of 2D photography, then there is even more room for such choices in 3D scans. As there is no single determining point during the 3D project for originality, there could be potential in the decisions while choosing and applying the right method (such as laser-scanning or photogrammetry), the right positioning and angle,49 and the subsequent processing for restoration or expressive scans.50 Multiple factors therefore need to be assessed on a case-by-case basis.

For photographs, it is not only about the selection of the background, but the right tools.51 For 3D scanning, the processes chosen for the creation of scans (such as laser scanning or photogrammetry) might have different outcomes for originality. Laser scanning involves choosing the right type of scanner and positioning, while a photogrammetry process could involve the selection of the images of the object to obtain the measurements between the points on the surface and so create a realistic model.52

More importantly, the purpose of the scans will have a great role in determining originality. This is less connected to the nature of the 3D models and more to the nature of cultural heritage. If the aim is creating faithful

36 JAL Sterling, Sterling on World Copyright Law (5th edn; Sweet & Maxwell 2018); Sam Rickenson and Jane C Ginsburg, International Copyright and Neighbouring Rights: The Berne Convention and Beyond Vol 1 (2nd edn, OUP 2006).
37 Dinusha Mendis, ‘In Pursuit of Clarity: The Comundrum of CAD Software and Copyright – Seeking Direction Through Case Law’ (2018) 40(11) EIPR 694; Dinusha Mattendris, Mark Lemley and Matthew Rummer (eds), 3D Printing and Beyond: Intellectual Property and Regulation (Edward Elgar 2019); Mikko Antikainen and Daniel Jongsma, ‘The Art of CAD: Copyrightability of Digital Design Files’ in Rosa Maria Ballardini, Marcus Norgård and Jouni Partanen (eds), 3D Printing, Intellectual Property and Innovation: Insights from Law and Technology (Wolters Kluwer 2017) 264; Simon Bradshaw, Adrian Bowyer and Patrick Haute, ‘The Intellectual Property Implications of Low-Cost 3D Printing’ (2010) 7 SCRIP Texted 1; Kyle Dolsnky, ‘CAD’s Cradle: Untangling Copyrightability, Derivative Works, and Fair Use in 3D Printing’ (2014) 71 Wash. & Lee L. Rev. 591; Lucas S Osborn, 3D Printing and Intellectual Property (CUP 2019).
38 Case C-508 Infopay International A/S v Danske Dagbladet Forening FCLEU:2009:465; Case C-145/10 Eva-Maria Painer v Standard VerlagsGmbH and Ora FCLEU:2013:138. It is also harmonized for some types of works: Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs, art 1(3) for computer programs, Directive 96/9/EC of the European Parliament and of the Council of 23 April 1999 on the legal protection of databases, art 5(1) for databases and Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights, art 6 for photographs.
39 Feist Publications, Inc v Rural Telephone Service Co 499 US 340 (1991).
40 Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market, art 14.
41 Kogan focuses on the two main features of photographs as ‘the camera’s automation and the photograph’s verisimilitude’: Terry S Kogan, ‘The Enigma of Photography, Depiction and Copyright Originality’ (2015) 25 Fordham Intell Prop Medie & Ent LJ 869.
42 Justin Hughes, ‘The Photographer’s Copyright – Photograph as Art, Photograph as Database’ (2012) 25 Harv J L & Tech 339, 351.
43 ibid.
44 Graves Case (1869) LP 4 QB 715.
45 Burrow-Giles Lithographic Co v Sarony 111 US 53 (1884).
46 Bridgeman Art Library v Corel Corp 36 F Supp 2d 191 (SDNY 1999).
47 Hughes (n 42), Kogan (n 41) 921.
48 Thomas Margoni, ‘The Digitisation of Cultural Heritage: Originality, Derivative Works and (Non) Original Photographs’ (2014) Institute for Information Law (IViR).
49 ibid, Painer [91].
50 Michael Weinberg, 3D Scanning: A World without Copyright! (2016) <https://michaelweinberg.org/docs/white-paper-3d-scanning-world-without-copyright.pdf> accessed 8 August 2022.
51 US case law refers to the selections in decisions regarding appropriate camera equipment and lens, provided that these effects are visible in the work itself and not just preparation. Mannion v Coors Brewing Co. 377 F Supp 2d 444, 453 (S.D.N.Y. 2005); Hughes (n 42) 408.
52 For a more detailed analysis of originality for laser scanning and photogrammetry, see: Pınar Oruç, ‘3D Digitisation of Cultural Heritage: Copyright Implications of the Methods, Purposes and Collaboration’ (2020) 11(2) JIPITEC 149.
copies, there is less room for any originality other than choices for accuracy.\textsuperscript{53} But if it involves some restoration or improvement, then there is room for further input, such as removing weather damage or completing missing limbs.\textsuperscript{54}

If a restored copy is to be created, someone will have to edit these scans – leading to two different 3D models to be considered: the (possibly) non-original reproduction of the artefact and the subsequently edited model showing free and creative choices. There is also the possibility that completely new and expressive scans will be created for purposes such as interactive exhibitions that do not even resemble the original object.\textsuperscript{55} In connection to the originality question, who performs the 3D digitisation is important in such projects, as they would be the ones controlling the digital copy and holding the economic and moral rights. While some institutions have in-house digitisation teams, others rely on contractors.\textsuperscript{56} Whoever holds the copyright will then be able to control which scans will be provided to subsequent users and whether they want to share them freely or find ways to monetise them for the duration of the copyright term. For the 3D scanning process, the level of collaboration can determine how many people are providing an original enough contribution to be considered as the authors – which can be significantly more complex than with the photography process.

If the 3D models satisfy the copyright subsistence requirements, the next copyright issue is what these new authors will do with their 3D heritage. Similar to the discussions following Bridgeman,\textsuperscript{57} the proponents of protecting these copies rely on the complexity of the process and the role of copyright as incentive. The opponents of this view argue that we should not stretch the scope of what is protected and leave the existing works in the public domain for everyone to enjoy. So, it is not surprising that the same sides emerge when the copies are 3D instead of 2D.

\begin{itemize}
\item \textsuperscript{53} In cases where there is no complete record of the antecedent work intact … such as when an impurity-obscured painting is restored to its former glory or when a scholar tries to accurately recreate an obscure ancient work for which no complete records have survived the passage of time, the conclusions reached and decisions made by the recreative author may well be different from those of another person engaged in the same task’: Burton Ong, ‘Originality from Copying: Fitting Recreative Works into the Copyright Universe’ (2010) 2 IPQ 165, 184.
\item \textsuperscript{54} Andreas Rahmatian, ‘Copyright protection for the restoration, reconstruction and digitization of public domain works’ in Estelle derClaye (ed), Copyright and Cultural Heritage: Preservation and Access to the Works in a Digital World (Edward Elgar 2010) 51-77; Paul Torremans, ‘Legal issues pertaining to the restoration and reconstitution of manuscripts, sheet music, paintings and films for marketing purposes’ in Paul Torremans (ed), Copyright Law: A Handbook of Contemporary Research (Edward Elgar 2007) 28-48.
\item \textsuperscript{55} For examples of expressive projects see Weenberg, ‘3D Scanning: A World without Copyright’ (n 50) 10.
\item \textsuperscript{56} Most civil law countries have rules that assume the employee as the author unless there is a contractual provision, whereas common law countries usually have the assumption that the works created during employment belong to the employee. There are no international or regional instruments clarifying the ownership of commissioned works, it depends on national laws. Sterling (n 36) 206-10.
\item \textsuperscript{57} Terry S Kogan, ‘Photographic Reproductions, Copyright and the Slavish Copy’ (2012) 35 Colum. J.L. & Arts 445; Mary Campbell einberg, ‘3D Scanning: A World without Copyright’ (n 50) 10.
\end{itemize}

In the unlikely event that the 3D scans meet the originality threshold, then a new copyright term begins, allowing the scans to be controlled for the life of their author and another 70 years in most jurisdictions.\textsuperscript{58} This means that for the entirety of this duration, the author will hold (a) the exclusive economic rights for the reproduction, distribution, communication, performance or display of the work, and (b) also enjoy the moral rights such the right to be attributed as the author and the right to object to the derogatory treatment of the works, depending on the jurisdiction.

Unless they want to keep them hidden indefinitely, the scanners – as the new authors – would have two main options: (i) limiting the use of the scans and monetising them with licensing so that they can recover the costs; or (ii) sharing them, as the open GLAM movement do. The first option means that future users of the scans will need to the authorisation of the author, but they can potentially rely on copyright exceptions or fair use without being completely sure if these defences will be successful in court. Such defences could include purposes such as education, research or text and data mining in the EU, while US fair use would allow even more room for engaging with digitised heritage as long as it fits the fair use criteria.\textsuperscript{59} The digitiser’s second option is to make them freely available online, usually under Creative Commons licenses, an option that being increasingly embraced by actors within the GLAM sector.\textsuperscript{60} Releasing such works in the digital environment without any restrictions leads to more users discovering and enjoying the scanned heritage online. However, there is also the risk that institutions wrongly asserting Creative Commons for things that should be in the public domain, requiring attribution or only allowing non-commercial uses.\textsuperscript{61}

Going back to a previous example, once the scans of the Other Nefertiti Project were made available online, some parties noticed that that their quality was suspiciously high and argued that they were actually the copy commissioned by the museum to a third-party digitiser in 2008.\textsuperscript{62} The institution also said they would sue the artists...
for releasing the scans. Furthermore, the institution also wrongly inserted a Creative Commons license on their scans, restricting any commercial use afterwards.63 If we review this project for the copyright implications introduced above, the original bust is already in the public domain, so the museum scanning the bust would not be infringing. These scans would fit under the subject matter of copyright but might not necessarily meet the originality threshold. If the scans were sufficiently original, then the Neues Museum (or their contractors) would hold the copyright. So, any copying, altering, and reprinting without their permission would be copyright infringement and would require relying on a copyright defence or the museum’s permission.

As for the subsequent users who alter 3D scans, they would hold the copyright in their derivative works provided that they also create something original. For example, a Nefertiti toy based on the existing non-original scan can still involve decisions such as changing the dimensions and adding additional corners so that it stands upright and could therefore be partially treated as a new work depending on their contribution. As it can be seen from this example, 3D scanning and printing of cultural heritage has various phases and possibilities that lead to different ownership outcomes for the 3D scans.

IV. Keeping the copies, returning the rest: Is there a new layer of concerns after the originals are repatriated?

Bringing together the first three issues, the final question is what happens to the 3D scans after the repatriation of the original physical objects. If the artefact (at risk or otherwise) is 3D scanned, if the artefact’s ownership is disputed, and if copyright does emerge, then what happens to the scans after the ownership of the original is handled?

This can be seen almost as the reverse of ‘digital repatriation’, a term for sharing the photographs and recordings of heritage with the community they originate from.64 While receiving copies of things held in other countries can still be useful, there are also concerns about whether it is alright to use the term ‘repatriation’ and such practices could be more useful to parties trying to avoid actually repatriating the originals.65

But what happens when a tangible work is repatriated but the scans remain behind? It is usually assumed that the digitising institution will keep digital copies. One example is the Killer Whale Hat digitised by the Smithsonian. Five years after the original was repatriated, Tlingit clan members participated in a digitisation project at the Smithsonian and they controlled how it was 3D scanned (such as removing the accidental damages from the replica), how the scans were later shared (not appearing online without permission) and how the replica would always be displayed with a disclaimer.66 This is a positive example, where the institution does not hold the original object, but also treats the 3D copies carefully and in line with the community’s needs. The Smithsonian also shared a large amount of 3D scans as public domain (CC0) in 2020 but excluded some culturally sensitive material (including another Tlingit object) from this licensing decision and did not make them downloadable.67

Another example is the 2018 report prepared by Felwine Sarr and Bénédicte Savoy on the restitution of African cultural heritage,68 commissioned after Emmanuel Macron’s 2017 speech promising the restitution of objects held in French museums to be achieved within five years. The report made recommendations on the importance of restitution and the treatment of objects in different categories (seized by military, scientific expeditions, gifts from private collectors, obtained after 1960) and recommended a three-phase plan for the return of objects. The second phase (which was foreseen between Spring 2019 and November 2022) included ‘sharing of digital content’, where digital copies were to be shared on an open-access platform and the ‘rights of reproduction’ to be object of revision regarding requests from African countries from where the objects originated.69 In this example, any copies created by French museums would have stayed in the French museums even after the restitution, with the possibility of sharing copies with the origin countries afterwards. The report’s approach to digitised heritage was also criticised by scholars regarding the uncertainties surrounding the ownership of intellectual property rights, the conditions of the open-access, a free portal (which also affects the sharing of sensitive

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63 Cosmo Wenman, ‘A German Museum Tried to Hide This Stunning 3D Scan of an Iconic Egyptian Artifact. Today You Can See It for the First Time’ <reason.com/2019/11/13/a-german-museum-tried-to-hide-this-stunning-3d-scan-of-an-iconic-egyptian-artifact-today-you-can-see-it-for-the-first-time/> accessed 24 January 2022; Michael Wenberg, ‘The Bust of Nefertiti is Free (With One Strange Caveat)’ (13 November 2019) <michaelwenberg.org/blog/2019/11/13/nefertiti-scan-nc-license/> accessed 24 January 2022.

64 It should also be noted that if the requested photographs or recordings are created by a donor, they can also prevent digital repatriation by relying on copyright on rare instances. For example, when a delegation of senior Pitjantjatjara men requested the recordings of a secret and restricted ceremony (Red Ochre Ceremony) from the museum, the family of the anthropologist refused this request by relying on the copyright in the recording. (Jane Anderson, ‘Access and Control of Indigenous Knowledge in Libraries and Archives: Ownership and Future Use’ (2003) American Library Association and The MacArthur Foundation).

65 Supriya Singh, Meredith Blake, and Jonathan O’Donnell, ‘Digitizing Pacific Cultural Collections: The Australian Experience’ (2013) 20(1) International Journal of Cultural Property 77; Robin Boast and Jim Enote, ‘Virtual Repatriation: It Is Neither Virtual nor Repatriation’ in Peter F Biehl and Christopher Prescott (eds), Heritage in the Context of Globalization (Springer 2013).

66 R Eric Hollinger and others, ‘Tlingit-Smithsonian Collaborations with 3D Digitization of Cultural Objects’ (2013) 7(1-2) Museum Anthropology Review 201; Katyal (n 27). The model can be reached from Smithsonian’s 3D Digitization webpage <https://3d.si.edu/object/3d/killer-whale-hat-a&c6d34a-4ebc-11ea-b77f-27227e088f25> accessed 24 January 2022.

67 Wenberg, ‘The Smithsonian Goes Open Access’ (n 60).

68 Felwine Sarr and Bénédicte Savoy, ‘The Restitution of African Cultural Heritage Toward a New Relational Ethics’ English version (2018) <restitutionreport2018.com/sarr_savoy_en.pdf> accessed 24 March 2022.

69 ibid 66-67.
heritage) and the concerns around rapid systematic digitisation. It is argued that digitising the artefacts should not be a precondition to restitutions and that it should be up the African cultural institutions and communities to decide whether to digitise the objects. As Lixinski suggests, it is possible that this will have negative effects on the aura while significantly widening access to secret and sacred objects, and therefore should be planned as a co-production with the community.

Following the Sarr-Savoy report, culture ministers from 16 German states also came together to discuss the restitution of artefacts from the colonial era. They too recommended digitisation, but the short report did not mention the ownership of digitised versions. The Statement on the handling of Benin Bronzes in German museums and institutions also refers to online portals for collections from colonial contexts.

These examples show that the 3D copies’ status can be overlooked by the parties concerned about physical repatriation, without the museums considering venues for giving the source community the choice to digitise or not digitise or the venues for co-production. Since the copies can be shared an indefinite number of times, and since the 3D technology allows printing them out with great accuracy, it would mean that whoever keeps the copyright of the digitised object would still hold a strong control over how the heritage will be viewed and shared. While the Killer Whale Hat example included here showed that the digitising institutions can leave it to the communities to decide on how digital copies will be treated, the way the copyright will be used in practice is not always guaranteed. So, it can be said that not only does 3D technology fail in addressing repatriation concerns, it also produces a new problem by creating something new to be owned by different parties.

Conclusion

While 3D technology creates amazing opportunities for preserving and experiencing cultural heritage, it cannot reduce the importance of where the originals are kept, and it will even create an additional layer of ownership to be concerned about.

The examples in Section I showed that 3D technology can help with preserving and evoking feelings of solidarity, they will have difficulty in addressing the demand of preserving the original object, especially if it involves restoration beyond what was destroyed. The examples in Section II showed that 3D copies will blur the distinction between cultural nationalism and internationalism but cannot solve any repatriation claims for the objects that are still around.

The copyright analysis in Section III showed that originality will be the key to determining the emergence of new protection (and new problems). In addition to having the room for free and creative choices in the selection of methods, positioning and other elements, the purpose is the main issue.

Going back the discussion in Sections I and II, if a project aims for preservation, should it involve restoring weather-damaged artefacts to their original glory? If so, there could be originality. But if they decide to keep the lost parts and cobwebs, then it will be a slavish copy less likely to be protected. If a project aims for repatriation, is it going to repatriated as it is? It would then not include any original contribution other than the choices made for accuracy. But what happens if there is editing involved to ensure that the object is repatriated in the state that it was when it first left its origin? While the option of pre-repatriation restoration is not likely for physical artefacts, the ability to improve digital copies can potentially mean that digital versions can be sufficiently different. For example, when the Elgin Marbles are repatriated, should the 3D copies left behind include the surface damage from the British Museum’s unfortunate wire brush cleaning from 1930s?

The overarching concerns on cultural heritage’s deterioration, and the clashing interests in where the objects should be, lead to multiple parties making decisions on behalf of heritage. There are decisions to be made, and this demonstrates that originality needs to be determined case by case depending on the purpose of the scanning, especially considering the ways to engage with heritage.

Finally, the examples in Section IV have illustrated that when the main priority is the repatriation of cultural heritage, copyright concerns are delayed or not addressed. In the discussion of repatriation, digitising the works is treated almost like an afterthought and Underestimates the benefits it will bring to whoever controls the digital copies.

It is worth noting a new project called Looty. Launched in May 2022, this involves a team led by a Nigerian designer 3D scanning the artefacts held by British and French museums, converting them to 3D and releasing them as non-fungible tokens (NFTs). The project aims to digitally repatriate the work, use the funds to support the African artists and build their own metaverse for these objects. While NFTs and metaverse is not part of the

70 Mathilde Pavis and Andrea Wallace, ‘Response to the 2018 Sarr-Savoy Report: Statement on Intellectual Property Rights and Open Access relevant to the digitization and restitution of African Cultural Heritage and associated materials’ (2019) 10 Journal of Intellectual Property, Information Technology and E-Commerce Law 115.

71 ibid, Lucas Lixinski, ‘Digital Heritage Surrogates, Decolonization, and International Law: Restitution, Control, and the Creation of Value as Reparations and Emancipation’ (2020) Santander Art & Culture Rev 65.

72 Lixinski (n 71).

73 See further: Catherine Hickley, ‘Cultural Ministers from 16 German states agree to repatriate artefacts looted in colonial era’ (The Art Newspaper, 2019) <https://www.theartnewspaper.com/news/culture-ministers-from-16-german-states-agree-to-repatriate-artefacts-looted-in-colonial-era> accessed 15 March 2022; Framework Principles for dealing with collections from colonial contexts (2019) <https://www. auswaertiges-amt.de/blob/2210152/b2731f8b59210c77c68177cd-cd3d03de/190412-stm-nsammelungs-gut-kolonial-kontext-en-data.pdf> accessed 15 March 2022; Database of Benin Bronzes held in German museums <https://www.cwp3.org/benin-bronzes/> accessed 15 March 2022.

74 Statement on the handling of the Benin Bronzes in German museums and institutions (29 April 2021) <https://www.bundesregierung.de/resource/blob/997532/1902356/bb1f9db1719124d00a3bc3-dcb2e70a80/2021-04-30-bkm-statement-benin-data.pdf> accessed 15 March 2022.

75 Helena Smith, ‘British damage to Elgin marbles ‘irreparable’ The Guardian (London, 12 November 1999) <https://www.theguardian.com/uk/1999/nov/12/helenasmith> accessed 8 August 2022.

76 ‘Nigeria’s Looty seeks to reclaim African art in digital form’ BBC (London, 9 May 2022) <https://www.bbc.co.uk/news/world-africa-61318785> accessed 23 June 2022.
scope of this research, this project illustrates the importance of and the new venues available for owning digital copies in the future.

Overall, despite its potential, 3D technology does not fully keep the heritage safe and accessible but creates surrogates, whose copyright status is heavily determined by their originality and purpose. In the unlikely (but not impossible) event that new copyright emerges, there is now a new owner that controls the digital models. Given the push to digitise before repatriation and repeating recommendations on digitising heritage at risk, the ownership concerns need to be reassessed before rushing to digitise everything. Ultimately, 3D technology does not solve the questions of who ‘keeps’ the heritage, but it can create a new set of concerns over who ‘keeps’ the copies.