

COMBATTING COPYRIGHT OVERREACH: KEEPING 3D REPRESENTATIONS OF CULTURAL HERITAGE IN THE PUBLIC DOMAIN

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Three-dimensional (3D) scanning technology presents cultural organizations with new opportunities to share their collections with a wider audience online, and conserve and archive art objects and antiquities for safekeeping. However, this technology can also present legal challenges when institutions like museums assert ownership, in particular employing copyright notices, over digital copies of public domain art and antiquities in their collections. The public domain comprises the collection of shared works that are free from legal barriers imposed by copyright law. When institutions attach copyright notices to public domain works, the legal language, even if unenforceable in court, chills the public's use of these scans for far-ranging educational, artistic, and commercial purposes. This Note examines the current uses of 3D technology by cultural institutions and analyzes the current doctrine guiding copyright of digital models. It then discusses some of the reasons why, despite the best reading of the caselaw, cultural institutions continue to assert ownership over and restrict access to 3D models of public domain art. This Note proposes an American analogue to Article 14 of the European Union's Directive on Copyright in the Digital Single Market. The proposed amendment to the Copyright Act would provide needed clarity to cultural institutions and the public, affirming that public domain works cannot receive copyright protection when reproduced in a digital format. A clear statement rule would reduce the chilling effect by discouraging copyright notices and restrictive terms of use on digital copies of public domain art and antiquities, in turn encouraging more institutions to provide open access to their digital collections.

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INTRODUCTION

In 2016, news outlets reported that two trench-coat-clad artists had snuck a three-dimensional (3D) scanner into Berlin's Neues Museum and secretly scanned the bust of Queen Nefertiti, the museum's most highly prized artifact, originally created in 1345 B.C.¹ The two artists, Nora Al-Badri and Jan Nikolai Nelles, soon released a highly detailed digital replica online and 3D printed their own version of the bust as its own art piece and political statement.² After this "heist," experts began analyzing the digital copy and determined that it was of too high quality for the inexperienced artists to have created it by hiding inexpensive 3D scanning equipment under their coats during a single museum visit.³ One expert in particular, artist Cosmo Wenman, concluded that the copy must instead be a leak, indicating the artists had somehow obtained the museum's own professional digital scan of the bust, which the Neues Museum refused to make avail-

¹ See, e.g., Claire Voon, *Artists Covertly Scan Bust of Nefertiti and Release the Data for Free Online*, HYPERALLERGIC (Feb. 19, 2016), <https://hyperallergic.com/274635/artists-covertly-scan-bust-of-nefertiti-and-release-the-data-for-free-online>; Charly Wilder, *Swiping a Priceless Antiquity . . . with a Scanner and a 3-D Printer*, N.Y. TIMES (Mar. 1, 2016), <https://www.nytimes.com/2016/03/02/arts/design/other-nefertiti-3d-printer.html>; see also Michael Weinberg, *The Nefertiti Bust Meets the 21st Century*, SLATE (Nov. 15, 2019, 11:40 AM), <https://slate.com/technology/2019/11/nefertiti-bust-neues-museum-3d-printing.html>.

² See Wilder, *supra* note 1 ("The artists' project, 'The Other Nefertiti,' confronts what they see as cultural theft and persisting colonialist notions of national ownership by making the object widely available.").

³ Weinberg, *supra* note 1; see also Claire Voon, *Could the Nefertiti Scan Be a Hoax — and Does that Matter?*, HYPERALLERGIC (Mar. 9, 2016) (quoting artist Fred Kahl), <https://hyperallergic.com/281739/could-the-nefertiti-scan-be-a-hoax-and-does-that-matter> ("The Nefertiti scan shows a much finer resolution of scan than any Kinect setup can ever capture. There is simply no way this resolution is possible with a Kinect, PERIOD.").

able online.⁴ Wenman filed the German equivalent of a Freedom of Information Act (FOIA) request, seeking to make the museum's scan public and obtain his own copy.⁵ A three-year legal crusade followed, ending in November 2019, when the museum finally released its full-color 3D digital model to Wenman, who made it available online "without any institutional support."⁶ The digital version appears to be an exact copy of the original bust, with the exception of a copyright notice digitally carved into its base.⁷

Stories have emerged from U.S. museums and universities, where individuals faced difficulties in obtaining digital copies of art or artifacts,⁸ or where institutions refused access to digitized art objects until approving the applicant's intended use.⁹ Whether using copyright law or contract law,¹⁰ these institutions have used legal language to restrict the public's access to museums' 3D scans. The notice the Neues Museum employed indicated a Creative Commons license,¹¹ which permitted use of the scan to the extent the user attributed the scan to

⁴ Weinberg, *supra* note 1.

⁵ *Id.*

⁶ Josh Jones, *Download Stunning 3D Scans of the Bust of Nefertiti, Now Released by Berlin's Neues Museum*, OPEN CULTURE (Nov. 18, 2019), <http://www.openculture.com/2019/11/download-stunning-3d-scans-of-the-bust-of-nefertiti.html>; *see also* Cosmo Wenman, *Bust of Nefertiti, FOIA Results*, THINGIVERSE (Nov. 13, 2019), <https://www.thingiverse.com/thing:3974391> (displaying the digital model online and providing the underlying data available for download).

⁷ Weinberg, *supra* note 1.

⁸ For example, Cosmo Wenman also requested 3D scans of Rodin's *Thinker*, created by the Baltimore Museum of Art (BMA). The BMA deferred its decision to the Rodin Museum in Paris, which refused to provide Wenman with the scan, despite the French government instructing the Rodin Museum to grant access. *See* Cosmo Wenman, *Rodin Museum FOIA*, COSMO WENMAN, <https://cosmowenman.com/bmamuseerodinthinker3dscan> (last visited May 11, 2020) (documenting Wenman and his lawyer's communications with both museums).

⁹ *See infra* notes 178–79 and accompanying text (discussing how a Stanford professor restricted access to a scan of Michelangelo's *David*). In another curious example, Augustana College, a private liberal arts college in Sioux Falls, requested that a local photographer take down the 3D model he created of a cast of Michelangelo's sixteenth century sculpture of Moses, located on its campus. The college "cit[ed] fuzzy copyright and ownership concerns." Ariel Bogle, *Good News: Replicas of 16th-Century Sculptures Are Not Off-Limits for 3-D Printers*, SLATE (Jan. 26, 2015, 12:51 PM), <https://slate.com/technology/2015/01/3-d-printing-and-copyright-replicas-of-16th-century-sculptures-are-not-off-limits.html>.

¹⁰ *See* Kenneth D. Crews, *Museum Policies and Art Images: Conflicting Objectives and Copyright Overreaching*, 22 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 795, 806 (2012) ("If they are not in fact claiming copyright protection, they are often asserting levels of control over those works through contract or license terms associated with the work.").

¹¹ A Creative Commons license is a type of free, customizable license that permits the public to use copyrighted works for noncommercial purposes, but creators retain their copyright and get credit, or attribution, for their work. *About the Licenses*, CREATIVE COMMONS, <https://creativecommons.org/licenses> (last visited May 16, 2019).

the museum, allowed other people to use their version or creation, and used the scan for noncommercial purposes.¹² If the copyright license were valid, failing to comply with these three requirements would permit the museum to pursue legal action for violations of its copyright. While the Neues Museum used a fairly permissive Creative Commons copyright license, when a museum believes it owns the copyright in a 3D model, “it can exercise a monopoly on use of the digital image by licensing agreements authori[z]ing certain uses.”¹³ However, a copyright license is only enforceable if the scan is legitimately copyrighted. The Copyright Act of 1976, the major federal statute governing copyright law in the United States, grants authors copyright protection for “original works of authorship fixed in any tangible medium.”¹⁴ A work that is not sufficiently original is not copyrightable. Further, copyright protection, while fairly lengthy in the United States,¹⁵ does expire, at which point the work enters the public domain.

The problem with the Neues Museum’s copyright claim is that ancient objects like the 3364-year-old bust of Nefertiti are in the public domain. The public domain comprises the “pool of creative works” which do not have copyright protection, allowing “any member of the public [to] use them without fear of infringing.”¹⁶ An individual need not seek permission to use these works.¹⁷ Works fall into the public domain when the copyright expires or if copyright holders remove these barriers.¹⁸ Antiquities like the bust of Nefertiti are unquestionably within the public domain,¹⁹ and an exact 3D scan

¹² Weinberg, *supra* note 1.

¹³ SIMON TANNER, KING’S DIG. CONSULTANCY SERVS., REPRODUCTION CHARGING MODELS & RIGHTS POLICY FOR DIGITAL IMAGES IN AMERICAN ART MUSEUMS: A MELLON FOUNDATION STUDY 30 (2004) (studying how U.S. art museum policies and practices respond to the changing digital landscape).

¹⁴ 17 U.S.C. § 102(a) (2018).

¹⁵ See Copyright Act of 1976, 17 U.S.C. §§ 301–05 (2018) (detailing that copyright duration generally lasts either for seventy years after the death of the author or, if publication happened before 1978, ninety-five years after the work was published).

¹⁶ Kaitlyn M. Garvin, *Reclaiming Our Domain: Digitization of Museum Collections and Copyright Overreach*, 59 IDEA 455, 456–57 (2019).

¹⁷ See, e.g., *Welcome to the Public Domain*, STAN. U. COPYRIGHT & FAIR USE, <https://fairuse.stanford.edu/overview/public-domain/welcome> (last visited Jan. 9, 2020) (explaining that “anyone can use a public domain work without obtaining permission”).

¹⁸ *Id.*; see also *Public Domain Manifesto*, PUB. DOMAIN MANIFESTO, <https://publicdomainmanifesto.org/manifesto> (last visited Apr. 3, 2020) (providing a detailed, global description of the public domain and recommending principles for preventing encroachment of public domain works).

¹⁹ For statutory provisions establishing limits on copyright duration for works in the United States, see Copyright Act of 1976 §§ 301–05. Generally, in the United States, the vast majority of works created before 1925 have thus entered the public domain. See also

of the bust likely belongs there too because it lacks the requisite creativity to be copyrightable in its own right, rendering the etched Creative Commons license unenforceable. Yet, when creative choices about how to digitally represent a public domain object are layered onto a digital scan, 3D modeling and printing raise difficult legal questions about ownership and control of digital models of public domain art and cultural heritage objects.

Two cases, *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*²⁰ and *Bridgeman Art Library, Limited v. Corel Corporation*,²¹ stand for the general rule that exact reproductions of public domain art cannot themselves garner copyright protection because the copies lack originality, a core requirement for obtaining a valid copyright. However, these cases leave open the possibility that creative expressions made by using scans of non-copyrighted works could meet the originality requirement.²² Despite the caselaw, in practice, many institutions continue to use blanket copyright notices covering all images and models on their websites,²³ guard their digital scans using license restrictions, or dictate detailed terms of use often “couched as if they were binding provisions of law,”²⁴ engaging in copyright overreach or “copyfraud”²⁵ by cloaking their control over digital models in legal language.²⁶ Cultural organizations undertaking the expensive, time-consuming work of creating 3D models may justify engaging in copyright overreach because of seemingly legitimate concerns about reve-

Sonia K. Katyal, *Technoheritage*, 105 CALIF. L. REV. 1111, 1139 (2017) (“Antiquities, by definition, are too old to be copyrightable. Thus, they are in the public domain.”).

²⁰ 528 F.3d 1258, 1260 (10th Cir. 2008) (determining that Meshwerks’s digital models of Toyota’s cars for an advertising campaign were not copyrightable expression).

²¹ 36 F. Supp. 2d 191, 197 (S.D.N.Y. 1999) (holding that photographic reproductions of public domain paintings were “slavish copies,” lacking the originality needed for copyright protection).

²² See, e.g., *Meshwerks*, 528 F.3d at 1264–65 (“[W]e do not doubt for an instant that the digital medium before us, like photography before it, can be employed to create vivid new expressions fully protectable in copyright.”); see also MICHAEL WEINBERG, SHAPEWAYS, 3D SCANNING: A WORLD WITHOUT COPYRIGHT 7–8 (2016) [hereinafter SHAPEWAYS] (analyzing how U.S. copyright law impacts 3D scanning, and categorizing digital scans as either representational or expressive).

²³ For example, Crews found that “[t]he Art Institute of Chicago hosts a website that is rich with images that anyone with an Internet connection may access and enjoy. However, the policy statement on the website explicitly provides, ‘the text, images, data, audio, video, and other content on the site . . . are protected by copyright’” Crews, *supra* note 10, at 808–09.

²⁴ See *id.* at 806 (“Some museums . . . assert levels of control simply through terms of use that purport to be binding on anyone accessing the images from a website or other source.”).

²⁵ “Copyfraud” is a word coined by Professor Jason Mazzone in his 2006 article by the same name. Jason Mazzone, *Copyfraud*, 81 N.Y.U. L. REV. 1026, 1028 (2006).

²⁶ See Crews, *supra* note 10, at 796.

nues from licensing the models or selling giftshop reproductions, fears that releasing the scans will harm the “integrity” of the art objects in their collections, and a lack of legal clarity.²⁷ The resulting restrictions on the public’s access to digitized versions of public domain works runs contrary to U.S. copyright policy,²⁸ and chills would-be users of the digital works.²⁹ To individuals without knowledge of copyright law, a copyright notice acts like “a giant ‘keep out’ sign.”³⁰

To address similar copyright overreach concerns about reproductions of public domain art in European institutions, the European Union (EU) recently passed Article 14 as part of its EU Copyright Directive, approved by the European Council in April 2019.³¹ This provision clearly states that digital reproductions of public domain works cannot be protected by copyright law.³² Article 14 must be implemented by each member state over a two-year period.³³ This Note proposes that the United States amend similar language to the Copyright Act,³⁴ clarifying copyright doctrine for both cultural institutions and the public. While some of the issues Article 14 addresses

²⁷ *Id.* at 833.

²⁸ U.S. copyright law espouses a utilitarian vision, which seeks the creation of more new works to enter the public domain. Amy Adler, *Why Art Does Not Need Copyright*, 86 GEO. WASH. L. REV. 313, 322 (2018). One benefit of digitizing cultural heritage is that it aligns with this ultimate goal of increasing the number of works available to the public. See, e.g., Ann Marie Sullivan, *Cultural Heritage & New Media: A Future for the Past*, 15 J. MARSHALL REV. INTELL. PROP. L. 604, 627 (2016) (describing consistency between the policy goals of copyright and digitization).

²⁹ See, e.g., Heather Saunders, *Paradigm Shift: Open Access at the Cleveland Museum of Art*, MEDIUM (Jan. 25, 2019), <https://medium.com/cma-thinker/paradigm-shift-open-access-at-the-cleveland-museum-of-art-482938442a84> (“I once turned down an offer to write a book chapter largely because it was so difficult to secure permission to reproduce a work of art key to my argument.”).

³⁰ Weinberg, *supra* note 1.

³¹ See EUROPEAN IP HELPDASK, NEW DIRECTIVE ON COPYRIGHT AND RELATED RIGHTS IN THE DIGITAL SINGLE MARKET 2, 7 (2019), http://www.iprhelphdesk.eu/sites/default/files/newsdocuments/European%20IP%20HD_Fact_Sheet_Copyright_final_0.pdf.

³² Article 14 reads: “[W]hen the term of protection of a work of visual art has expired, any material resulting from an act of reproduction of that work is not subject to copyright or related rights, unless the material . . . is original in the sense that it is the author’s own intellectual creation.” Directive 2019/790, of the European Parliament and of the Council of 17 April 2019 on Copyright and Related Rights in the Digital Single Market and Amending Directives 96/9/EC and 2001/29/EC, 2019 O.J. (L 130) 92, 118 [hereinafter EU Copyright Directive].

³³ See Paul Keller, *Implementing the Copyright Directive: Protecting the Public Domain with Article 14*, COMMUNIA (June 25, 2019), <https://www.communia-association.org/2019/06/25/implementing-copyright-directive-protecting-public-domain-article-14> (explaining the potential legal ramifications of Article 14 and stating that EU member states “now have until June 2021 to ensure that their national laws comply with [Article 14]”).

³⁴ Copyright Act of 1976, 17 U.S.C. §§ 101–810 (2018).

differ from U.S. copyright doctrine,³⁵ affirmatively stating that digital reproductions of public domain art are in the public domain would discourage institutions from improperly using copyright notices and hopefully invite more institutions to permit open access³⁶ to digital works in their collections. Achieving open access aligns with key goals of cultural institutions to educate and share their collections with the public.³⁷ Further, access to these works will allow more people to use the works for their own creative endeavors; “[o]nce set free, [3D] data will be copied, transformed, and reverberate in the arts for thousands of years.”³⁸

This Note proceeds in three parts. Part I describes how 3D technology works, and explains how GLAM (galleries, libraries, archives, and museums) institutions and cultural heritage organizations use 3D scanning and printing.

Part II first analyzes current copyright doctrine for 3D models, particularly in light of the Tenth Circuit’s decision in *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*³⁹ It concludes that current doctrine may extend copyright protection only to new creative aspects added to a digital scan, not to the underlying scan of an object itself. Part II then explains why, regardless of the caselaw, cultural institutions

³⁵ Article 14 is intended, in part, to standardize different copyright laws across EU member states. Some member states permit some “related rights” for exact photographs and reproductions of works of art that do not meet the originality standard. Article 14 would force these member states to ensure that photographic and 3D reproductions always enter the public domain. For member states that did not permit “related rights,” this provision ensures no such protection is granted and reaffirms that reproductions of public domain work lack originality. Alexandra Giannopoulou, *The New Copyright Directive: Article 14 or When the Public Domain Enters the New Copyright Directive*, KLUWER COPYRIGHT BLOG (June 27, 2019), <http://copyrightblog.kluweriplaw.com/2019/06/27/the-new-copyright-directive-article-14-or-when-the-public-domain-enters-the-new-copyright-directive>.

³⁶ For a working definition of “open access,” see EFFIE KAPSALIS, *THE IMPACT OF OPEN ACCESS ON GALLERIES, LIBRARIES, MUSEUMS, & ARCHIVES* 4 (2016) (“For public domain and other materials for which an institution has consciously relinquished its copyright (often expressed through a CC0 license), open access generally means full access and use without restriction.”). See also Saunders, *supra* note 29 (“Generally speaking, Open Access (or OA) involves sharing cultural and information resources with a global reach and without limits on use.”).

³⁷ See Anaïs Aguerre & Brendan Cormier, *Introduction to COPY CULTURE: SHARING IN THE AGE OF DIGITAL REPRODUCTION* 19, 21 (Brendan Cormier ed., 2018), <https://vanda-production-assets.s3.amazonaws.com/2018/06/15/11/42/57/e8582248-8878-486e-8a28-ebb8bf74ace8/Copy%20Culture.pdf> (“Museums emerged in the eighteenth and nineteenth centuries with the mission to serve a broad public, to give access to great works of art, for both pleasure and education.”).

³⁸ Naomi Rea, *An Artist Has Won a Three-Year Legal Battle to Force a German Museum to Publicly Release Its 3-D Scan of a Bust of Nefertiti*, ARTNET (Nov. 17, 2019), <https://news.artnet.com/art-world/3d-scans-museums-nefertiti-1706181>.

³⁹ 528 F.3d 1258 (10th Cir. 2008).

continue to use copyright notices to restrict access to digital reproductions. This Part concludes that two common rationales, loss of revenues and loss of the ability to control the “integrity” of the objects in their collections, lack merit, but that legal uncertainty is a real impediment to relinquishing control over digital works.

Part III proposes the United States adopt similar language to Article 14 of the EU’s Copyright Directive. This Note asserts that the new rule is needed to both clarify that no copyright attaches to digitized public domain art and to promote open access policies that would allow for full public use of these works. As Wenman wrote, “[t]he world’s back catalog of art should be set free to run wild in our visual and tactile landscape . . . whether it turns up lit in pixels on our screens, rematerialized in our living rooms, or embedded in our architecture or clothing”⁴⁰

I

3D TECHNOLOGY AND CULTURAL HERITAGE

Copying is not a new phenomenon. The Romans made plaster casts of Greek art, shipping the molds to Roman workshops where artisans created bronze and marble replicas.⁴¹ In the nineteenth century, a group of countries signed onto a “Convention for Promoting Universally Reproductions of Works of Art for the Benefit of Museums of all Countries.”⁴² Under this convention, museums commissioned plaster casts of important works of art, so they might be more easily shipped to and seen in museums around the world.⁴³ Today, cameras make snapping a two-dimensional (2D) “copy” as easy as pressing a button during a museum visit. However, the ability to create accurate digital scans of an object like Nefertiti that can be manipulated and physically “printed” is new, as is our ability to share these models widely over the internet. Section I.A provides a brief overview of 3D technology. With an understanding of the basic functions of 3D scanners and printers, Section I.B explains how GLAM institutions and cultural heritage organizations use this technology.

⁴⁰ Cosmo Wenman, *The Nefertiti 3D Scan Heist Is a Hoax*, COSMO WENMAN (Mar. 8, 2016) <https://cosmowenman.com/2016/03/08/the-nefertiti-3d-scan-heist-is-a-hoax>.

⁴¹ Dep’t of Greek & Roman Art, *Roman Copies of Greek Statues*, METROPOLITAN MUSEUM ART: HEILBRUNN TIMELINE ART HIST. (Oct. 2002), https://www.metmuseum.org/toah/hd/rogr/hd_rogr.htm.

⁴² Aguerre & Cormier, *supra* note 37, at 23.

⁴³ Mari Lending, *Preserved in Plaster*, in COPY CULTURE: SHARING IN THE AGE OF DIGITAL REPRODUCTION, *supra* note 37, at 41, 41–42.

A. An Overview of 3D Technology

To physically print a 3D version of an object like Nefertiti, you first need a digital scan.⁴⁴ Several different types of technology permit creating models of different quality and resolution for different purposes. For recording cultural heritage objects, three main types of 3D scanning processes are used: close-range scanners, long-medium range 3D scanners, and photogrammetry.⁴⁵

The Nefertiti scan was created for the Neues Museum by the Berlin-based company, TrigonArt, using a 3D strip light scanner, a type of close-range scanner that collected minute details about the bust using triangulation.⁴⁶ This sophisticated scanning system is used primarily for measuring art and cultural artifacts because it collects detailed measurements of thousands, sometimes millions, of points on the external surface of an object, creating a 3D point cloud that, once processed, renders a highly accurate and precise scan of the object.⁴⁷ The resulting Nefertiti scan consists of 6.4 million triangulated data points.⁴⁸ More detail collected by sophisticated scanning equipment usually means a more precise 3D model can be rendered. In contrast to the strip light scanner, the Kinect scanner Al-Badri and Nelles claimed to employ could not produce the high-quality scan released by the artists, especially based on data collected from one covert museum visit.⁴⁹

⁴⁴ 3D scanning equipment uses metrology, or “the science of making measurements” to record the details of an object. *3D Scanning for Cultural Heritage Conservation: A Quick Guide*, FACTUM ARTE, <http://www.factum-arte.com/pag/701/3D-Scanning-for-Cultural-Heritage-Conservation> (last visited May 11, 2020) [hereinafter FACTUM ARTE]; see also Melvin J. Wachowiak & Basiliki Vicky Karas, *3D Scanning and Replication for Museum and Cultural Heritage Applications*, 48 J. AM. INST. FOR CONSERVATION 141, 148 (2009) (“Triangulation systems, in which three reference points are used to compute the distance of any point on the surface, provide a good model for describing the basic principles of 3D scanning.”).

⁴⁵ See FACTUM ARTE, *supra* note 44 (“Long-medium range scanners use time-of-flight or laser-pulse based systems where a laser light is bounced off the target at a distance. . . . Close-range scanners use either laser or a structured light system.”); see also Wachowiak & Karas, *supra* note 44, at 148 (“In heritage work, one or more technologies may be used but laser and [structured] white light scanners are the most popular. This is likely resulting from their lower cost (\$100,000 – \$200,000), accuracy, and reliability.”).

⁴⁶ *Büste der Nofretete [Bust of the Nefertiti]*, TRIGONART, <https://www.trigonart.com/3d-scan-buete-der-nofretete-1490> (last visited May 11, 2020) (Ger.).

⁴⁷ See *3D-Scan-Verfahren [3D Scanning Process]*, TRIGONART, <https://www.trigonart.com/3d-scan-verfahren-348> (last visited May 11, 2020) (Ger.); see also FACTUM ARTE, *supra* note 44 (describing the light scanners as cameras that use triangulation to “calculate[] the distance of every point in the field of view”).

⁴⁸ Wenman, *supra* note 6.

⁴⁹ See Kelsey D. Atherton, *Artists Likely Fake Surreptitious Scan of Nefertiti Bust*, POPULAR SCI. (Mar. 8, 2016), <https://www.popsci.com/artists-likely-faked-scan-nefertiti-bust>; see also Voon, *supra* note 3 (“[T]he conditions . . . were less than ideal for data

The two other types of technology particularly useful for recording cultural heritage are long-medium range scanners and photogrammetry.⁵⁰ Long-medium range scanners use a method that uses light detection and ranging (“LiDAR”) to record measurements.⁵¹ LiDAR is particularly useful for capturing the façade of a building or documenting surface topography.⁵² However, it is less useful for “[r]ecording the subtle detail of surfaces that is required to make an accurate facsimile.”⁵³ Photogrammetry is a software system that produces 3D scans by recording measurements from existing photographs of an object, and is especially useful for recording objects that are vulnerable or inaccessible.⁵⁴ For example, if an object is located in a conflict zone and at risk of destruction, it can be replicated from available photos of the object. Photogrammetry is not as useful for recording an object like Nefertiti if the scanner is seeking the “highest resolution recording of surface[s].”⁵⁵ For that, you need to scan the object.

After capturing the surface of the object using one or more of these methods, the raw data must be processed, which can be very time consuming and may require manipulating some of the data points to achieve the most accurate representation of the object.⁵⁶ Some imperfections in the scanned data can be manually corrected.⁵⁷ While many models are created primarily for use as a digital file, tangible 3D objects can then be printed from the digital model once the data generated from the scan has been processed.⁵⁸

Tangible 3D-printed objects are created through additive manufacturing. Additive manufacturing uses a material (often plastic) to build a scanned object in layers, whereas traditional subtractive manufacturing starts with a block of raw material, like stone or metal, and

collection: the bust is kept in a glass display, which introduces reflections and refractions Other issues include the apparent lack of a power source and the detailed results of the Egyptian queen’s headdress”); Wachowiak & Karas, *supra* note 44, at 152 (“Most objects will require multiple scans from several angles to capture an entire surface.”).

⁵⁰ See *FACTUM ARTE*, *supra* note 44.

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.* (“[R]esolution refers to the level of detail a 3D file holds. We evaluate the resolution not just by a theoretical or mathematical description of the sensor of the scanner but by the correspondence between the scanned data and the original surface.”).

⁵⁶ See *SHAPEWAYS*, *supra* note 22, at 7 (“Processing the data can include a multitude of transformations designed to make the data useful, aesthetically pleasing, or both.”).

⁵⁷ See Wachowiak & Karas, *supra* note 44, at 154 (“Just as physical replication of 3D data is highly desirable for heritage professionals, study of the 3D data allows an unprecedented level of interaction with the final accurate and high-resolution images.”).

⁵⁸ *SHAPEWAYS*, *supra* note 22, at 10.

carves the object from that material using a computer algorithm.⁵⁹ Like 3D scanning equipment, printers vary in price and capability.⁶⁰ At a general level, however, 3D printing provides four main benefits over traditional manufacturing processes: Additive manufacturing reduces waste, provides for the ability to modify design specifications, allows for cost effective “small production runs,” and makes possible creating objects with “high internal complexity.”⁶¹ While 3D scanners do not currently collect the color or reflective properties of an object’s surface, color sampling technology can collect this information.⁶² The result of these innovations is that, technology, expertise, and funding permitted, cultural institutions and individuals can create copies of art objects that are visually identical to the original.

B. Uses by GLAM Institutions and Cultural Heritage Practitioners

3D technology contributes to the work of GLAM institutions and cultural heritage practitioners in varied and essential ways, including aiding restoration, monitoring, research, conservation, documentation, and representation.⁶³ The Neues Museum likely invested in a high-quality 3D scan of Nefertiti to archive and conserve the original bust, as well as make highly accurate copies for sale in its gift shop.⁶⁴ High-resolution 3D scans have become an invaluable tool for archiving collections and preserving fragile cultural heritage objects around the world.⁶⁵ Making a silicone impression or plaster cast of the

⁵⁹ See Charles Cronin, *3D Printing: Cultural Property as Intellectual Property*, 39 COLUM. J.L. & ARTS 1, 29 (2015) [hereinafter Cronin, *3D Printing*].

⁶⁰ See, e.g., *3D Printer Price*, COMPUTER AIDED TECH., <https://www.cati.com/3d-printing/3d-printer-price> (last visited May 11, 2020) (“3D Printers range from 6,000 to 750,000 and have different print quality, materials, build size and functionality.”).

⁶¹ JOHN F. SARGENT JR. & R.X. SCHWARTZ, CONG. RESEARCH SERV., *3D PRINTING: OVERVIEW, IMPACTS, AND THE FEDERAL ROLE* 11 (2019). For an example of the internal complexity possible, TrigonArt used a sophisticated Polyjet printer to print plastic versions of Nefertiti for the museum, with a manufacturing accuracy of 0.02 millimeters to 0.03 millimeters from the digital scan. *Fertigungsverfahren [Manufacturing Process]*, TRIGONART, <https://www.trigonart.com/fertigungsverfahren-567> (last visited May 11, 2020) (Ger.).

⁶² See Cronin, *3D Printing*, *supra* note 59, at 29; see also FACTUM ARTE, *supra* note 44 (“While some systems can obtain colour data as well as 3D information, currently no 3D scanner is able to record colour to the standard required for the production of an exact replica.”).

⁶³ Richy Chacon, *3D Modeling and Cultural Heritage*, MEDIUM (Oct. 29, 2016), <https://medium.com/digital-heritage/3d-modeling-and-cultural-heritage-ef2bffdeec7f> (explaining the contributions 3D modeling offers to cultural heritage institutions and practitioners seeking to preserve and analyze “cultural assets”).

⁶⁴ See *infra* note 168 and accompanying text.

⁶⁵ See, e.g., FACTUM ARTE, *supra* note 44 (“Over recent years 3D scanning has become part of a coherent and non-contact approach to the documentation of cultural heritage and its long term preservation.”).

original Nefertiti would be unthinkable today due to the fragile nature of the piece, its coloring, and its historic importance. Instead, the Neues Museum and the Prussian Cultural Heritage Foundation likely used 3D scanning because the technology allows users to create highly accurate models without touching the object.⁶⁶

A key mission of cultural institutions is to educate the public and share important works of humanity.⁶⁷ While some museums resist open access to their digital collections, many institutions have readily digitized and shared their collections online.⁶⁸ Because works are finite and museums geographically fixed, museums have long relied on reproductions of famous works. In 1867 in Paris, a group of European nations signed onto the “Convention for Promoting Universally Reproductions of Works of Art for the Benefit of Museums of All Countries” with the express intention of sharing their collections with a wider audience.⁶⁹ The convention stated that works could “easily be reproduced by Casts, Electrotypes, Photographs and other processes, without the slightest damage to the originals” and that the “knowledge of such monuments is necessary to the progress of Art.”⁷⁰ After the convention, museums created casting courts, large halls where they displayed high quality copies of famous works alongside their permanent collections of original works.⁷¹ While casting courts fell out of fashion in the twentieth century,⁷² in part because

⁶⁶ See *Büste der Nofretete*, *supra* note 46 (describing the process of presenting the contactless technology to the directors of the Neues Museum and the Prussian Cultural Heritage Foundation); see also *infra* notes 73–74 and accompanying text.

⁶⁷ See *infra* note 67–74, 79 and accompanying text.

⁶⁸ One prominent example is the Rijksmuseum in Amsterdam. See *Making the Rijksstudio: An Interview with Wim Pijbes*, in *COPY CULTURE: SHARING IN THE AGE OF DIGITAL REPRODUCTION*, *supra* note 37, at 159 (“In 2012, the Rijksmuseum in Amsterdam became pioneers in open access when they debuted Rijksstudio, a website that allows users to easily search their collection and download high-resolution images without any restriction.”). Others include the British Museum and the Cleveland Museum of Art. See *infra* notes 75–79 and accompanying text; see also KAPSALIS, *supra* note 36, at 14–29 (documenting national and international case studies of GLAM institutions who are working on open access policies).

⁶⁹ *Convention for Promoting Universally Reproductions of Works of Art for the Benefit of Museums of All Countries*, in *COPY CULTURE: SHARING IN THE AGE OF DIGITAL REPRODUCTION*, *supra* note 37, at 12, 12–14.

⁷⁰ *Id.* at 13.

⁷¹ See Aguerre & Cormier, *supra* note 37, at 21–22 (“The logic behind collecting casts was simple: the museum wanted to show its audience the greatest works of art in the world; architecture and statuary being generally immovable and owned by other nations, the museum’s response was simply to copy them.”).

⁷² *Id.* at 22 (“The trend came to a halt at the beginning of the twentieth century, with many curators and museum directors beginning to view cast courts as vulgar and lacking in value.”).

plaster casts could in fact damage the original objects,⁷³ the same mission to share their collections motivates many cultural institutions to invest in digitization today.⁷⁴

Digitizing pieces from an institution's collection can also increase brand awareness and traffic to a museum's website. For example, the British Museum has made 242 models of its eight-million-object collection available online for free download. As one article acknowledges, it would take "thousands of years" to digitize the entire collection.⁷⁵ This is partly due to the steep price tag and the need for expensive technology and skilled technical labor to complete these projects.⁷⁶ However, the museum's existing models attracted 7,105,000 views in January 2018, indicating the degree of public interest in this endeavor.⁷⁷ In another example, in January 2019, the Cleveland Museum of Art launched its Open Access program, "releas[ing] high-resolution images of all its public-domain artworks" and "metadata[] for more than 61,000 art objects."⁷⁸ Speaking on the anniversary of this project, Jane Alexander, the museum's Chief Digital Information Officer, exclaimed that traffic to the museum's website had increased over the year, and that "[n]ot only are we able to reach more individuals, they are engaging with different areas of our collection through

⁷³ Adam Lowe, *Changing Attitudes to Preservation and Non-Contact Recording*, in COPY CULTURE: SHARING IN THE AGE OF DIGITAL REPRODUCTION, *supra* note 37, at 51, 52 ("Contrary to [the] assertion in the first paragraph of the Convention that these technologies were 'harmless,' moulding techniques caused extensive damage to many fragile objects.").

⁷⁴ See, e.g., HOWARD BESSER, INTRODUCTION TO IMAGING, at v (Sally Hubbard & Deborah Lenert eds., rev. ed. 2003) ("The ability to display and link collections from around the world breaks down physical barriers to access, and the potential of reaching audiences across social and economic boundaries blurs the distinction between the privileged few and the general public.").

⁷⁵ Eugene Ch'ng et al., *Crowdsourcing 3D Cultural Heritage: Best Practice for Mass Photogrammetry*, 9 J. CULTURAL HERITAGE MGMT. & SUSTAINABLE DEV. 24, 28 (2019).

⁷⁶ *Id.* (noting that the relative dearth of digitalization "reflects the large financial, technical and human resources needed for digitiz[ation] work").

⁷⁷ *Id.* One of the digitized pieces the British Museum has uploaded is a 3D model of the Rosetta Stone. People can visit it on Sketchfab, an online platform where users share 3D content. Once there, anyone can download the data, comprised of scans from 228 photographs, and zoom in or rotate the stone 360 degrees to study it from any angle. Sarah Cascone, *You Can Now See the Rosetta Stone in 3-D from the Comfort of Your Own Home*, ARTNET (July 25, 2017), <https://news.artnet.com/art-world/rosetta-stone-3-d-british-museum-1031231>.

⁷⁸ Jane Alexander, *The First Anniversary of CMA Open Access: Benefiting People Now and Forever*, MEDIUM (Jan. 23, 2020), <https://medium.com/cma-thinker/the-first-anniversary-of-cma-open-access-benefiting-people-now-and-forever-9f3b70893534>.

our partner platforms.”⁷⁹ Projects like these can benefit museums by increasing awareness of and engagement with museum collections.⁸⁰

Institutions are also motivated to use 3D technology for monitoring and conservation purposes. Specific threats to art and cultural property around the world are increasing, and include war, climate change, tourism, agriculture, “rapid urban or tourist development projects,” changes in land ownership, and weather events like earthquakes and floods.⁸¹ Although entire open air cultural institutions like the ancient Syrian city of Palmyra—a UNESCO World Heritage Site bombed twice by the Islamic State (ISIS)⁸²—are more vulnerable to environmental harms, objects in enclosed institutions may fare no better during a war or flood.⁸³ One need look no further than Paris’s Notre Dame Cathedral, whose roof and spire were destroyed by an accidental fire in April 2019, to understand how unpredictable causes can threaten cultural heritage anywhere.⁸⁴ These pressing concerns

⁷⁹ *Id.*

⁸⁰ See KAPSALIS, *supra* note 36, at 11 (“Elevated brand recognition/reputation and increased use and dissemination of collections were the top two benefits associated with open access initiatives”); see also Wachowiak & Karas, *supra* note 44, at 144 (“Replicas . . . can enhance the general public’s appreciation of the museum or heritage site.”).

⁸¹ See, e.g., General Conference of the United Nations Educational, Scientific, and Cultural Organization, *Convention Concerning the Protection of the World Cultural and Natural Heritage* art. 11, § 4 (Nov. 16, 1972), <https://whc.unesco.org/en/conventiontext/#Article11.4> (listing threats to cultural objects and sites); see also Chacon, *supra* note 63 (“Many if not all cultural assets are susceptible to deterioration or damage through time, usually caused by external factors such as environmental conditions, different light exposure, material degradation, continuous exposure to rain, wind and sun, inadequate storage, inappropriate management, human interaction, insects, etc.”); Henri Neuendorf, *Climate Change Is Threatening Dozens of Cultural Treasures Around the Mediterranean, UNESCO Warns*, ARTNET (Oct. 18, 2018), <https://news.artnet.com/art-world/unesco-world-heritage-climate-change-1375174> (noting that “only a handful . . . can be relocated, but not without compromising the surroundings that contribute to their appeal”).

⁸² See Alyssa Buffenstein, *A Monumental Loss: Here Are the Most Significant Cultural Heritage Sites that ISIS Has Destroyed to Date*, ARTNET (May 30, 2017), <https://news.artnet.com/art-world/isis-cultural-heritage-sites-destroyed-950060> (describing ISIS’s bombing of Palmyra monuments during their two occupations of the city from 2015 through 2017).

⁸³ See, e.g., Amah-Rose Abrams, *As Iraqi Troops Reclaim Mosul Museum, Its Destruction by ISIS Is Revealed*, ARTNET (Mar. 13, 2017), <https://news.artnet.com/art-world/iraqi-troops-reclaim-mosul-museum-destruction-isis-revealed-889124> (detailing ISIS’s destruction of many of the statues and antiquities in a museum in Mosul, Iraq). *But see* Tony McMahon, *Mosul Museum, Wrecked by ISIS, Is Brought Back to Life with 3D Tech*, WIRED (Jan. 27, 2019), <https://www.wired.co.uk/article/mosul-museum-3d-tech-isis-art> (describing efforts to use photogrammetry to build 3D models of many of the destroyed objects).

⁸⁴ Natalie Coleman, *Fortunately, There Are Incredible 3D Scans of Notre Dame*, FUTURISM (Apr. 16, 2019), <https://futurism.com/fortunately-incredible-3d-scans-notre-dame> (“As fire consumed the roof and toppled its iconic central spire, it seemed as though the historic church could be lost forever”); Sudip Kar-Gupta, *Paris Prosecutor –*

have motivated many organizations to take preemptive measures to “proactively laser scan heritage and cultural properties that *may* someday be destroyed”⁸⁵ or monitor changes in an object to slow and prevent further degradation.⁸⁶

The Notre Dame Cathedral offers a particularly germane example of how digital models can aid in conservation and reconstruction. After flames engulfed the thirteenth-century gothic cathedral, largely destroying its spire and complex roof, known as “the forest,”⁸⁷ news articles began to circulate about how such models could help rebuild the structure.⁸⁸ The articles focused on a particularly detailed model built by the late Dr. Andrew Tallon, an art professor at Vassar College, who scanned the Notre Dame from fifty different locations over a five-day period using a laser 3D scanner.⁸⁹ He combined the measurements collected from these scans with numerous high-resolution panoramic photographs to create a detailed 3D model.⁹⁰ Professor Tallon’s scans offer a precision that architectural drawings or digital models built solely from photographs cannot. He stated that “[i]f you’ve done your job properly, [the scan is] accurate to within five millimeters.”⁹¹ For a building like the Notre Dame that has stood

Accident Seen as Likely Cause of Notre Dame Fire, REUTERS (Apr. 16, 2019, 6:14 AM), <https://www.reuters.com/article/us-france-notredame-prosecutor/paris-prosecutor-accident-seen-as-likely-cause-of-notre-dame-fire-idUSKCN1RS0UM> (quoting public prosecutor Remy Heitz, establishing that the fire was likely accidental).

⁸⁵ Neil Asher Silberman, *From Cultural Property to Cultural Data: The Multiple Dimensions of “Ownership” in a Global Digital Age*, 21 INT’L J. CULTURAL PROP. 365, 367 (2014).

⁸⁶ See Chacon, *supra* note 63 (“[A]ccurate 3D models can help to determine changes or alterations in morphology and disposition of objects and structures, which provides the possibility of foreseeing and taking action on time when they are getting some kind of harm.”).

⁸⁷ Martin Goillandeau, *Notre Dame’s Roof Structure—Known as “The Forest”—Has Been Lost*, CNN (Apr. 15, 2019, 6:48 PM), https://www.cnn.com/world/live-news/notre-dame-fire/h_f15ba521f928da7aca3871c7647108ca (“The framework from the 13th century is called a forest, because it required a forest of trees to build it” (quoting the cathedral’s rector, Msgr. Patrick Chauvet)).

⁸⁸ See, e.g., Coleman, *supra* note 84 (“[E]very exquisite detail and mysterious clue to the building’s 13th-century construction was recorded in a digital archive in 2015 using laser imaging. These records have revolutionized our understanding of how the spectacular building was built—and could provide a template for how Paris could rebuild.”); see also Nicole Martin, *Digital Scans and Data Could Help Restore Notre Dame After Fire*, FORBES (Apr. 16, 2019), <https://www.forbes.com/sites/nicolemartin1/2019/04/16/digital-scans-and-data-could-help-restore-notre-dame-after-fire> (“The benefit of using this imaging is that original sketches and photographs of the building are not accurate enough to recreate the structure exactly. Laser scanning is the most accurate and precise way to rebuild a structure”).

⁸⁹ Martin, *supra* note 88.

⁹⁰ *Id.*

⁹¹ Wallace Ludel, *An Art Historian’s 3D Scans of Notre Dame Cathedral Could Be Invaluable Tools in Its Restoration*, ARTSY (Apr. 17, 2019, 1:14 PM), <https://www.artsy.net/>

in Paris for hundreds of years, laser-scanning data may be the only way to capture the imperfections and places of structural weakness, which can be used by preservationists and architectural historians to rebuild the Christian icon.⁹²

Three-dimensional printing technology has in fact already been used to replicate destroyed objects and repair damaged ones. When ISIS detonated explosives along the ancient Arch of Triumph in Palmyra, Syria, destroying much of the ancient arch, one of Palmyra's most recognizable structures, a team of cultural organizations commissioned a twenty-foot tall 3D reproduction, reduced from the fifty-foot original.⁹³ While efforts to recreate destroyed heritage raise ethical questions,⁹⁴ these projects demonstrate the potential of technology to represent lost artifacts in digital and physical formats. In another example, Italian restorers used a 3D printer to restore two partially destroyed busts from Palmyra.⁹⁵ They printed the parts of the busts that were destroyed using a synthetic nylon powder fed into the printer.⁹⁶ Strong magnets then attached the printed portions to the original busts.⁹⁷ One of the restorers commented that “[w]hat the Islamic State has destroyed, we have rebuilt. Through culture, we also wage an ideological battle.”⁹⁸ This same sentiment was expressed by the founder of the Institute for Digital Archaeology (IDA), who helped replicate the arch, stating “[i]f they knock it down, . . . we will rebuild it. If they knock it down again, we will rebuild it again.”⁹⁹

news/artsy-editorial-art-historians-3d-scans-notre-dame-cathedral-invaluable-tools-restoration.

⁹² See Alexis C. Madrigal, *The Images That Could Help Rebuild Notre-Dame Cathedral*, ATLANTIC (Apr. 16, 2019), <https://www.theatlantic.com/technology/archive/2019/04/laser-scans-could-help-rebuild-notre-dame-cathedral/587230> (quoting Megan Rispoli, who specializes in restoring religious buildings, on the value of laser-scanning data).

⁹³ Erin L. Thompson, *Legal and Ethical Considerations for Digital Recreations of Cultural Heritage*, 20 CHAP. L. REV. 153, 160 (2017); *The History of the Triumphal Arch of Palmyra*, INST. FOR DIGITAL ARCHAEOLOGY, <http://digitalarchaeology.org.uk/history-of-the-arch> (last visited Apr. 5, 2020).

⁹⁴ See, e.g., Thompson, *supra* note 93, at 160 (“[T]he arch in London is a simplistic gesture since ‘[t]his is about histories, [and] about institutional relationships. We have to talk about power structures—how it’s different when westerners or tech companies save cultural things compared to someone else who actually comes from the culture.’” (quoting artist Morehshin Allahyari)).

⁹⁵ Amah-Rose Abrams, *Two Busts Destroyed by ISIS Return to Syria After Restoration in Italy*, ARTNET (Mar. 2, 2017), <https://news.artnet.com/art-world/two-busts-palmyra-3-d-printing-isis-return-syria-876767>.

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ See Katyal, *supra* note 19, at 1114 (citing Stephen Farrell, *If All Else Fails, 3D Models and Robots Might Rebuild Palmyra*, N.Y. TIMES (Mar. 28, 2016), <https://>

Both of these examples required expert craftsman, time, and considerable expense to rebuild complex and large objects. However, as 3D technology improves and requires less time and money, the potential for these uses will grow.

Another use of 3D printing may be to help settle heated debates around repatriation or restitution of cultural objects to the countries where they were discovered, excavated, and often exported to western museums. While this Note does not engage the extensive literature on the repatriation debate,¹⁰⁰ it seeks to highlight a few examples of where 3D printing might offer novel solutions to an impassioned discussion. For example, the two artists, Badri and Nelles, used their copy of the Nefertiti scan to 3D print a version they dubbed “The Other Nefertiti,” which they symbolically repatriated to Egypt.¹⁰¹ In another example, indigenous artists in Canada have created replicas of tribal objects to give to museums instead of the originals.¹⁰² A recent report, commissioned by the French government urging permanent restitution of objects in French museums acquired from its colonies, noted the potential for sophisticated 3D replicas to “fill the void left by these objects.”¹⁰³ While 3D printing cannot resolve the complex politics, economics, and history surrounding the repatriation or restitution debate, it does add something new to a long, weary conversation. To quote Maxwell Anderson, a former director of the Whitney Museum of American Art, “[w]herever originals end up, it’s essential

www.nytimes.com/2016/03/29/world/middleeast/3d-models-robots-rebuild-syrian-sites.html).

¹⁰⁰ See generally Lubna S. El-Gendi, *Illusory Borders: The Myth of the Modern Nation-State and Its Impact on the Repatriation of Cultural Artifacts*, 15 J. MARSHALL REV. INTELL. PROP. L. 486, 505 (2016) (“[T]he current legal framework concerning repatriation is premised on the idea that the nation-state is the germane entity.”); John Henry Merryman, *Thinking About the Elgin Marbles*, 83 MICH. L. REV. 1881, 1881 (1985) (discussing the repatriation arguments around the Elgin Marbles, establishing a dichotomy of cultural property “nationalists” and “internationalists,” and further arguing that three criteria—preservation, integrity, and access—inform global heritage policy).

¹⁰¹ See Sarah Cascone, *Artists Return Nefertiti Bust to Egypt Thanks to Covert 3-D Scanning*, ARTNET (Feb. 25, 2016), <https://news.artnet.com/exhibitions/nefertiti-bust-3d-scan-434609> (noting that the Egyptian government has called for the return of Nefertiti to Egypt ever since the queen was first publicly exhibited in Germany in 1924, after German archeologists discovered it in Egypt in 1912).

¹⁰² Kate Brown & Naomi Rea, *As the Restitution Debate Rages on in Europe, Could the Solution Lie in the Art of the High-Tech Copy?*, ARTNET (Dec. 19, 2018), <https://news.artnet.com/art-world/restitution-and-technology-2018-1420246>.

¹⁰³ FELWINE SARR & BÉNÉDICTE SAVOY, *THE RESTITUTION OF AFRICAN CULTURAL HERITAGE: TOWARD A NEW RELATIONAL ETHICS* 1, 39 (2018), <http://restitutionreport2018.com>.

to harness digital emulation for the mediation of moral contests”¹⁰⁴

While these uses vary substantially, the overwhelming evidence indicates that digitizing museum collections and at-risk cultural heritage objects benefits both the cultural institutions undertaking this work and the digital public that may view and interact with art online. This is true of all three situations described above, namely, whether the 3D model created is of a public domain work in a museum’s existing collection, a work that has been destroyed by war or environmental degradation, or a work whose original is sought returned to another country or people. The larger concern is who can access and own these scans once created.

II

U.S. COPYRIGHT PROTECTION FOR DIGITAL MODELS

This Part first analyzes the current copyright doctrine as it pertains to digital models and reproductions of public domain work. It concludes that scans of public domain works which seek to exactly reproduce the object in digital format are not copyrightable. However, new creative expression layered onto a scan likely could receive thin copyright protection, limited to the added creative aspects.¹⁰⁵ Section II.B then discusses why organizations invoke copyright and restrictive terms of use to resist releasing 3D reproductions of public domain works, despite caselaw suggesting that copyright law does not apply to them. It analyzes the merits of the concerns museums advance in support of restricting access to their digitized public domain works, and concludes that while two of these arguments lack merit, the third—legal uncertainty—does pose a real hurdle.

¹⁰⁴ Maxwell L. Anderson, *Should We Relinquish Our Insistence on Privileging Original Works of Art?*, ART NEWSPAPER (Dec. 3, 2018, 16:39 GMT), <https://www.theartnewspaper.com/comment/should-we-relinquish-our-insistence-on-privileging-original-works-of-art>.

¹⁰⁵ The new creative expression might be protected as a derivative work, or one based on preexisting works that “recast[s], transform[s], or adapt[s]” the original work. 17 U.S.C. § 101 (2018). A derivative work based on public domain material may be eligible for copyright, but only where it contains an original contribution not present in the underlying expression. *See, e.g.,* L. Batlin & Son, Inc. v. Snyder, 536 F.2d 486, 492 (2d Cir. 1976) (holding that a plastic Uncle Sam bank derived from a public domain iron version did not satisfy the originality requirement and highlighting the policy concern that too low an originality standard for derivative works would allow small variations to usurp the public domain). While there may be additional questions about creative expressions layered onto the scans, this Note focuses on GLAM institutions intentionally replicating objects true to their form.

A. Copyright Doctrine

U.S. copyright law offers a “market-based, utilitarian vision” for how to incentivize the creation of more new works for the public’s benefit.¹⁰⁶ It aims to optimize the amount of art created by granting authors “economic incentives to create culturally valuable works.”¹⁰⁷ Copyright law does this by striking a compromise between encouraging competition and protecting the original author. In particular, it provides a limited right of exclusion to give authors economic incentives to create new work. The public permits this temporary restriction with the belief that, in the long run, more works will end up in the shared public domain once the limited exclusive period expires.¹⁰⁸ In the United States, copyright duration is very long. Authors of new works receive protection for the duration of their life plus an additional seventy years.¹⁰⁹ After this period, works usually enter the public domain, where they are intended to stay for public use.

The Copyright Act of 1976, the major federal statute governing copyright law in the United States, grants authors copyright protection for “original works of authorship fixed in any tangible medium.”¹¹⁰ Section 102(a) of the Copyright Act lists the different types of works that are eligible for protection, including “literary works,” the category where software uneasily sits, and “pictorial, graphic, and sculptural works” (PGS works).¹¹¹ The statute does not extend protection “to any idea, procedure, process, system, method of operation, concept, principle or discovery.”¹¹² Although the process of creating a digital model is not the subject matter of copyright law, the product is. The Copyright Act may protect 3D copies, both in digital and printed form, under § 102(a)(5) as a sculptural work, a type of

¹⁰⁶ Adler, *supra* note 28, at 367.

¹⁰⁷ *Id.* at 322 (citing Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 558 (1985) (“By establishing a marketable right to the use of one’s expression, copyright supplies the economic incentive to create and disseminate ideas.”)).

¹⁰⁸ *See id.* at 326 (“The economic philosophy behind the clause . . . is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors.” (quoting Mazer v. Stein, 347 U.S. 201, 219 (1954))).

¹⁰⁹ 17 U.S.C. § 302(a) (2018) (“Copyright in a work created on or after January 1, 1978, subsists from its creation and . . . endures for a term consisting of the life of the author and 70 years after the author’s death.”).

¹¹⁰ *Id.* § 102(a).

¹¹¹ *Id.* § 102(a)(1)–(8); *see also id.* § 101 (defining PGS works as “two-dimensional and three-dimensional works of fine, graphic, and applied art, photographs, prints and art reproductions, maps, globes, charts, diagrams, models, and technical drawings, including architectural plans”).

¹¹² *Id.* § 102(b).

PGS work.¹¹³ The difficult question is whether 3D models are sufficiently original to garner copyright protection.

In *Feist Publications, Inc. v. Rural Telephone Service Co.*, a seminal copyright case, the Supreme Court stressed that the originality requirement is “[t]he *sine qua non* of copyright” and a constitutional mandate stemming from the U.S. Constitution’s Intellectual Property Clause,¹¹⁴ as well as a statutory requirement under § 102(a) of the Copyright Act.¹¹⁵ To meet this requirement, a work must be (1) independently created and (2) contain a modicum of creativity.¹¹⁶ Hard work and effort are insufficient to warrant protection.¹¹⁷ Most scholars argue that representational 3D scans do not meet this originality threshold,¹¹⁸ largely due to the Tenth Circuit’s 2008 decision in *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*¹¹⁹

In *Meshwerks*, the Tenth Circuit held that the plaintiff-appellant, Meshwerks, did not hold a valid copyright in their digital models of defendant Toyota’s cars because the models were exact copies of the

¹¹³ See *id.* § 102(a)(5). While a digital model may seem at first like a software program and thus properly analyzed as a literary work, 3D scans exist as a file that is opened and manipulated by software, rather than as the software itself. There has been some confusion about this in the literature, but Professor Lucas Osborn clarifies that “[d]igital manufacturing files are not a separate category of work. Rather, they are copies of works. Thus, the question is not whether the files are copyrightable; the question is whether the work (or works) embodied in the files are copyrightable.” Lucas S. Osborn, *The Limits of Creativity in Copyright: Digital Manufacturing Files and Lockout Codes*, 4 TEX. A&M J. PROP. L. 25, 36 (2017). In a conversation with Michael Weinberg, Director of NYU Law’s Engelberg Center on Innovation Law & Policy, he analogized 3D scans to a single Excel spreadsheet versus the Excel program itself. Interview with Michael Weinberg, Dir., Engelberg Ctr. on Innovation Law & Policy at N.Y. Univ. Sch. of Law, in N.Y.C. (Jan. 23, 2020).

¹¹⁴ U.S. CONST. art. I, § 8, cl. 8 (“To Promote the Progress of Science and the useful Arts, by securing for limited Times, to Authors and Inventors, the exclusive Right to their respective Writings and Discoveries.”).

¹¹⁵ 499 U.S. 340, 345–46, 360 (1991).

¹¹⁶ *Id.* at 345.

¹¹⁷ See *Int’l News Serv. v. Associated Press*, 248 U.S. 215, 250 (1918) (Brandeis, J., dissenting) (“[T]he fact that a product of the mind has cost its producer money and labor, and has a value for which others are willing to pay, is not sufficient to ensure to it this legal attribute of property.”).

¹¹⁸ See, e.g., Charles Cronin, *Possession Is 99% of the Law: 3D Printing, Public Domain Cultural Artifacts and Copyright*, 17 MINN. J.L. SCI. & TECH. 709, 715–23 (2016) [hereinafter Cronin, *Possession Is 99% of the Law*] (discussing failed attempts to establish copyright protection for 3D copies of artworks and vehicles); Katyal, *supra* note 19, at 1146 (“[T]here is a general sense that copyright does not automatically protect 3-D scans.”); Thompson, *supra* note 93, at 174 (“Exact photographic reproductions of public domain works of art are not copyrightable.”). See generally Osborn, *supra* note 113 (analyzing how U.S. copyright law applies to digital technologies both from a doctrinal and theoretical perspective, and correcting a few “misunderstandings” in the current literature).

¹¹⁹ 528 F.3d 1258 (10th Cir. 2008).

cars and therefore lacked originality.¹²⁰ In this case, Toyota, working with its advertising agency, Saatchi & Saatchi, hired Grace & Wild to create digital models of eight of its cars.¹²¹ Grace & Wild then subcontracted the digitization and modeling of Toyota's cars to Meshwerks, who undertook the laborious and time-intensive process of creating digital wire-frames of the cars.¹²² First, Meshwerks measured the vehicles with "an articulated arm tethered to a computer," which generated a digital wire-frame image of the cars.¹²³ From this wire-frame, Meshwerks's digital sculptors manually "sculpted" nearly ninety percent of the data points in the final model, a process consuming an estimated eighty to one hundred hours of labor for each car model.¹²⁴ Meshwerks then sent the digital wire-frame models, depicted on a plain grey background, to Grace & Wild to add "color, texture, lighting, and animation" for Toyota's final use in advertisements.¹²⁵

This lawsuit arose out of a licensing dispute. Meshwerks sued Toyota for copyright infringement, alleging that Meshwerks had contracted with Grace & Wild for a single use of its model, which they claimed Toyota improperly reused and redistributed.¹²⁶ On the defendant's motion for summary judgment, the district court stated that Meshwerks's models lacked the originality needed for copyright protection, emphasizing that Meshwerks's "intent was to replicate, as exactly as possible, the image of certain Toyota vehicles."¹²⁷ Meshwerks appealed the district court's decision.

Judge Neil Gorsuch, writing for the Tenth Circuit, affirmed the district court's decision, concluding that Meshwerks's models lacked originality because their subjective intent was to do no more than replicate the physical car as perfectly as possible in a digital format.¹²⁸ Gorsuch reasoned that Toyota created the original appearance and design of the car,¹²⁹ and that Meshwerks depicted these models without any "individualizing features."¹³⁰ Meshwerks did not make

¹²⁰ *Id.* at 1269–70.

¹²¹ *Id.* at 1260.

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.* at 1260–61.

¹²⁵ *Id.* at 1261.

¹²⁶ *Id.*

¹²⁷ *Id.* (quoting *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, No. 2:06 CV 97, 2006 U.S. Dist. LEXIS 65641, at *13 (D. Utah Sept. 12, 2006)).

¹²⁸ *Id.* at 1269.

¹²⁹ *See id.* at 1264 ("Meshwerks' models are not so much independent creations as (very good) copies of Toyota's vehicles.").

¹³⁰ *Id.* at 1265.

choices about color or place the car in front of an elaborate scene.¹³¹ The Tenth Circuit viewed Meshwerks's models as a simple transfer from one medium to another. Although Gorsuch emphasized the independent creation prong, he implied that the models lacked even the modicum of creativity required by *Feist*, blurring *Feist*'s two separate lines of inquiry.¹³²

Despite the court's holding as to these specific facts, *Meshwerks* did not foreclose copyright protection for all digital models, asserting that "we do not doubt for an instant that the digital medium before us, like photography before it, can be employed to create vivid new expressions fully protectable in copyright."¹³³ As other circuits have not weighed in on the question of originality in digital models, *Meshwerks* remains the prevailing appellate decision. It seems to foreclose copyright protection for 3D modeling efforts like the bust of Nefertiti, where the museum intended to exactly replicate the object in a digital format. However, the opinion creates uncertainty for the copyrightability of digital models by relying on the creator's intent and analogizing 3D models to photography as seen in subsequent caselaw and museum practice.

1. *Reliance on Intent*

Gorsuch's opinion relies heavily on Meshwerks's intent to make a perfect representational copy. He looks to the fact that Grace & Wild hired Meshwerks to carry out a specific task and that Meshwerks built and returned the mesh wire-frame cars to Grace & Wild to add finishing touches like color. However, intent is a particularly unreliable factor for judges to rely on. In one of the Supreme Court's early cases examining how to define copyrightable works, Justice Holmes stated that "[i]t would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges on the worth of picto-

¹³¹ See *id.* ("Meshwerks' digital wire-frame computer models depict Toyota's vehicles without any individualizing features: they are untouched by a digital paintbrush; they are not depicted in front of a palm tree, whizzing down the open road, or climbing up a mountainside.").

¹³² See Osborn, *supra* note 113, at 46–47 (arguing that *Meshwerks* "stands for the proposition that representing an object exactly true-to-form will not involve a modicum of creativity, even if it requires extensive effort"). U.S. copyright law does not reward the effort or "sweat of the brow" needed to create a work, *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 359–60 (1991), so the court did not weigh the considerable time and effort that building the digital models required. *Meshwerks*, 528 F.3d at 1268 ("[I]n assessing the originality of a work for which copyright protection is sought, we look only at the final *product*, not the process, and the fact that intensive, skillful, and even creative labor is invested in the process of creating a product does not guarantee its copyrightability.").

¹³³ *Meshwerks*, 528 F.3d at 1264–65.

rial illustrations, outside of the narrowest and most obvious limits.”¹³⁴ Holmes worried that judges were not well-suited to objectively determine artistic merit or the intent of the author in creating a particular work.¹³⁵ However, the Tenth Circuit determined that Meshwerks’s intent in creating the models heavily favored its holding that the models lacked even a modicum of originality.¹³⁶ While Holmes would caution against the analysis employed by Gorsuch in *Meshwerks*, the opinion indicates part of the reason GLAM institutions’ 3D scans lack originality is because those organizations seek to exactly replicate art objects and antiquities in digital form.¹³⁷

2. *Analogy to Photography*

The court’s reasoning in *Meshwerks* relies heavily on a long line of cases analyzing photography. This Section briefly discusses copyright for photography, but seeks mainly to problematize equating digital modeling with photography, because many 3D models require reworking and processing the raw data collected. Unlike a photographer, digital sculptors cannot just “point and shoot.”¹³⁸ Gorsuch reasoned that Meshwerks’s models “reflect none of the decisions that can make depictions of things or facts in the world, whether Oscar Wilde or a Toyota Camry, new expressions subject to copyright protection” because the company did not make creative choices about aspects like “lighting, shading, the background in front of which a vehicle would be posed, [or] the angle at which to pose it.”¹³⁹ However, many creators have argued that making an object appear three-dimensional actually “requires considerable creativity and human thought.”¹⁴⁰ Contrary to Gorsuch’s assertion, Meshwerks’s sculptors likely made creative choices about the angle of the car, the shading of the mesh

¹³⁴ *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 251 (1903) (holding that chromolithographic advertisements of a circus were eligible for copyright protection even though they were created for a commercial, rather than artistic, purpose).

¹³⁵ *See id.*

¹³⁶ *Meshwerks*, 528 F.3d at 1268–69.

¹³⁷ *See id.* at 1268 (“Meshwerks’ intent in making its wire-frame models provides additional support for our conclusion.”). *Meshwerks* cites to two cases to support its reliance on intent. *See id.* at 1269 (“[The court] emphasize[d] that ‘[t]he illustrations were intended to be as accurate as possible in reproducing the parts shown in the photographs on which they were based’” (quoting *ATC Distrib. Grp., Inc. v. Whatever It Takes Transmissions & Parts, Inc.*, 402 F.3d 700, 712 (6th Cir. 2005))). The second case, *Bridgeman Art Library, Ltd. v. Corel Corp.* (*Bridgeman II*), 36 F. Supp. 2d 191 (S.D.N.Y. 1999), is discussed *infra* at notes 150–55 and accompanying text.

¹³⁸ Edward Lee, *Digital Originality*, 14 VAND. J. ENT. & TECH. L. 919, 931, 935–36 (2012) (examining the originality doctrine and proposing a new three-part test for analyzing works created using digital technologies).

¹³⁹ *Meshwerks*, 528 F.3d at 1265.

¹⁴⁰ Lee, *supra* note 138, at 931.

wire, and the background color. The computer-aided design (CAD) software does not make or remove these choices.¹⁴¹ The grey background, while plain, could have been black, white, or another color altogether. Gorsuch seems to require more than the “minimal degree of creativity” the Supreme Court demanded under the *Feist* test.¹⁴²

The caselaw analyzing copyright protection for photography demonstrates how new technologies expose latent ambiguities in existing copyright doctrines and particularly complicate the originality analysis. The Supreme Court began grappling with copyright protection for photographs, which were not originally protected under copyright law, in *Burrow-Giles Lithographic Co. v. Sarony*.¹⁴³ Several courts had worried that “the photographer was merely using a machine to record the world as it existed, not interpreting that world through a creative filter.”¹⁴⁴ They reasoned that a photo represented no more than a mechanical reproduction of the world as it appears, a product unworthy of copyright protection.¹⁴⁵ But, the Court in *Burrow-Giles* upheld Congress’s power to extend copyright protection to photography. The Court concluded that the plaintiff photographer had infused his photo of Oscar Wilde with enough creativity that it was “the product of plaintiff’s intellectual invention.”¹⁴⁶ However, the Court hinted that the more exactly a photograph depicted an object or captured a scene with no creative arranging or input, the less likely it could receive copyright protection.¹⁴⁷ In subsequent caselaw, courts have almost always found that photographs meet this low threshold for originality,¹⁴⁸ which can be found in the photographer’s choices about a photograph’s “rendition, timing, and creation of the subject.”¹⁴⁹

Gorsuch cites one case that has been an exception to this rule, *Bridgeman Art Library, Limited v. Corel Corporation*, where a New

¹⁴¹ *Id.* at 931–32.

¹⁴² See *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 345 (1991).

¹⁴³ *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53 (1884); see also SHAPEWAYS, *supra* note 22, at 3–4 (briefly tracing the history of copyright and photography).

¹⁴⁴ SHAPEWAYS, *supra* note 22, at 4.

¹⁴⁵ See *Burrow-Giles Lithographic Co.*, 111 U.S. at 56 (“It is insisted in argument, that a photograph being a reproduction on paper of the exact features of some natural object or of some person, is not a writing of which the producer is the author.”).

¹⁴⁶ *Id.* at 60 (“[H]e . . . pos[ed] . . . Wilde . . . , selecting and arranging the costume, draperies, and other various accessories in said photograph, arranging the subject . . . , arranging and disposing the light and shade, suggesting and evoking the desired expression, and from such disposition, arrangement, or representation, made entirely by plaintiff, he produced the picture in suit.”).

¹⁴⁷ See *id.* at 59–60.

¹⁴⁸ See Lee, *supra* note 138, at 930 & n.66 (discussing cases).

¹⁴⁹ *Mannion v. Coors Brewing Co.*, 377 F. Supp. 2d 444, 458 (S.D.N.Y. 2005).

York federal district court held that photographic reproductions of public domain paintings were “slavish copies,” lacking the originality needed for copyright protection.¹⁵⁰ The case has been widely cited with approval not just by the Tenth Circuit in *Meshwerks*, but also by the Seventh and Eleventh Circuits, as well as numerous commentators.¹⁵¹ In *Bridgeman*, plaintiff Bridgeman Art Library sued defendant Corel Corporation for marketing compact discs (CDs) which Bridgeman claimed contained some copies of their digital images of famous artworks.¹⁵² The court concluded that Bridgeman’s photographs were not copyrightable because the photographers meant to capture as exactly as possible the image of the original work.¹⁵³ They determined that the photographs contained no extra elements of protectable original expression and that the images served simply to shift the medium of the underlying work by copying “the underlying works without any avoidable addition.”¹⁵⁴ Gorsuch’s opinion in *Meshwerks* echoes *Bridgeman* on this point. He states that “the point of the exercise was to reproduce the underlying works with absolute fidelity,” and thus there was no “spark of originality.”¹⁵⁵

3. *Subsequent Caselaw*

Before considering how a court might analyze originality in 3D models of public domain cultural heritage objects, one more case is instructive. In 2010, two years after *Meshwerks*, a federal district court in Missouri held in *Osment Models, Inc. v. Mike’s Train House, Inc.* that the plaintiff, a model railroad producer, had imbued his digital models of non-copyrightable railway and filling stations with enough original features to meet the threshold for a “‘spark’ of original expression.”¹⁵⁶ Unlike *Meshwerks*, *Osment* was not intent on creating exact replicas of the original objects. Although his models closely resembled the original objects, he altered some colors and selectively compressed the objects from their lifelike size to miniature versions.

¹⁵⁰ *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, 528 F.3d 1258, 1267 (10th Cir. 2008) (quoting *Bridgeman II*, 36 F. Supp. 2d 191, 197 (S.D.N.Y. 1999)).

¹⁵¹ See Terry S. Kogan, *Photographic Reproductions, Copyright and the Slavish Copy*, 35 COLUM. J.L. & ARTS 445, 460–61, 461 n.99 (citing *Schrock v. Learning Curve Int’l, Inc.*, 586 F.3d 513, 519 (7th Cir. 2009) and *Latimer v. Roaring Toyz, Inc.*, 601 F.3d 1224, 1233 (11th Cir. 2010)).

¹⁵² *Bridgeman Art Library, Ltd. v. Corel Corp. (Bridgeman I)*, 25 F. Supp. 2d 421, 426 (S.D.N.Y. 1998).

¹⁵³ *Id.* at 426.

¹⁵⁴ *Id.* at 426–27.

¹⁵⁵ *Meshwerks*, 528 F.3d at 1269 (quoting *Bridgeman II*, 36 F. Supp. 2d at 197).

¹⁵⁶ See Cronin, *3D Printing*, *supra* note 59, at 33 (citing *Osment Models, Inc. v. Mike’s Train House, Inc.*, No. 2:09:CV-04189-NKL, 2010 WL 5423740, at *6 (W.D. Mo. Dec. 27, 2010)).

The court determined that these choices demonstrated that Osment avoided “slavishly” replicating the original public domain buildings and objects.¹⁵⁷ This case hints that the author of a digital model who has added creative expressive elements that do not purely represent the original will have an easier time obtaining copyright protection. However, even then, only the expressive content added to the underlying scan would be copyrightable.¹⁵⁸

4. *Analyzing Copyright Protection for Cultural Heritage Models*

Taken together, *Meshwerks*, *Bridgeman*, and *Osment Models* indicate that exactly reproducing a public domain object into a digital format will not result in copyright protection for the digital model. Where creative new elements are layered onto a digital model and the author creates something besides an exact representation, copyright protection for the new creative elements is much more likely. However, it is unclear how much creativity is needed to meet the originality threshold. As one scholar writes, “[I]ike obscenity, originality is a doctrine perhaps best described by the (non)principle of ‘I know it when I see it.’”¹⁵⁹ But, the cases do give us some factors judges may look to in determining whether a digital model has been imbued with the author’s own creative expression. Courts will likely examine how much the digital technology used is responsible for the end product and gauge how much creative human choice was employed in determining how to display the final image. They also indicate that courts may look to representational aesthetics and analyze the author’s intent to see whether the model is intended to and in fact does exactly represent the original work.

The answer to these inquiries for GLAM institutions digitizing their collections appears to be fairly clear. Museums seek to exactly replicate their collections to preserve them in a digital format, an action that intends to transfer the object from one medium into another.¹⁶⁰ Brian Wassom, the lawyer for defendants Toyota, Saatchi & Saatchi, and Grace & Wild, has weighed in on digital 3D models of cultural heritage objects, stating that while they are often “incredibly labor-intensive, highly detailed, and skillful,” they are not copyright-

¹⁵⁷ *Id.*

¹⁵⁸ *See supra* note 105.

¹⁵⁹ *See Lee, supra* note 138, at 920 (quoting *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring)).

¹⁶⁰ *See supra* Section II.B (examining the uses for which institutions employ representational 3D scans).

able if they attempt to create a perfect representational copy.¹⁶¹ A central value of the Neues Museum's digital bust of Nefertiti is that it precisely mirrors the original work. If the Neues Museum's copyright notice was challenged in a U.S. court applying U.S. copyright law, a court would likely look to *Meshwerks* and *Bridgeman* to hold that the 3D bust, while expensive and laborious to create, lacks the originality needed for copyright protection.

However, when the cultural heritage object being reproduced is large and complex, like an entire building or scene, the originality analysis is more difficult. One scholar has indicated that "it is likely that as the subject being scanned becomes more complex and less purely utilitarian, actual creative decisions will be made by the person making the scan."¹⁶² For example, replicating the bust of Nefertiti, already appearing in a sanitized museum display, almost certainly requires fewer creative choices than modeling the entire city of Palmyra. Creating an entire city that has existed for thousands of years would require numerous choices. What point in history should this model reflect? Should the model include locals who have inhabited the city for centuries? What about tourists? Local trees? Litter? Or does the model scrub Palmyra of these contextualizing features, sanitizing it in a way that it must rarely have appeared in real life? These are creative choices, and ones that can shift meaning and representation enormously.¹⁶³ Given the many creative choices that creators must make to digitize a complex ancient city, courts may find originality more easily in those cases than where a single object has been digitized and displayed on a plain background. It also indicates that creators could strategically add features to their models to attempt to imbue them with sufficient originality.¹⁶⁴

In sum, while *Meshwerks*'s muddled originality analysis leaves the status of digital models under copyright law unclear, a careful

¹⁶¹ See Thompson, *supra* note 93, at 174 (quoting Brian Wassom, *VR Modeling Has a Lot of Benefits, but Copyright Isn't One of Them*, WASSOM (Aug. 21, 2015), <http://www.wassom.com/vr-modeling-has-a-lot-of-benefits-but-copyright-isnt-one-of-them.html> [<https://perma.cc/95MW-26SH>]).

¹⁶² SHAPEWAYS, *supra* note 22, at 14.

¹⁶³ See Thompson, *supra* note 93, at 155. Professor Thompson argues that best practices are needed for digitizing cultural heritage, because human choices about what goes into the model and what creators omit can change a digital model's meaning in drastic ways. Digital models of Palmyra could perpetuate colonial narratives by displaying the ancient city from a western perspective, much like early oil paintings depicting western explorers "discovering" Palmyra in the eighteenth century. See *id.* at 162–65.

¹⁶⁴ See *id.* at 174 ("But, as Wassom also points out, there are multiple strategies the creators of digital models of cultural heritage can use 'for protecting their content, such as making sure to weave fictional imagery into their real-world recreations.'" (quoting Wassom, *supra* note 161)).

reading of Gorsuch's opinion, *Bridgeman*, and *Osment Models* indicates that exact 3D replicas of public domain works in GLAM institutions likely receive no copyright protection. However, more complex 3D renderings of at-risk heritage sites like Palmyra might be eligible for copyright protection if they include original expression. Further, artistic expressions layered onto an accurate, representational scan could receive protection for the new expression they create using the underlying 3D replica.¹⁶⁵

B. Copyright Overreach

Regardless of what the caselaw dictates, cultural organizations continue to restrict access to copies of public domain works. This Section provides examples of copyright overreach, explaining three concerns that motivate this behavior: the giftshop defense, concern for the "integrity" of the art object, and the lack of legal clarity. This Section further addresses why these concerns do not justify employing copyright language to restrict access to public domain works. Whatever the rationale, blanket copyright notices, takedown requests cloaked in copyright language, and restrictive terms of use, act "as a giant 'keep out' sign" to individuals who might wish to make legitimate use of public domain images.¹⁶⁶

1. The Giftshop Defense

Some institutions fear that releasing 3D scans to the public (especially without a copyright notice restricting use to non-commercial purposes) will threaten their ability to profit from high quality reproductions of objects in their collection, a rationale sometimes dubbed the "gift shop defense."¹⁶⁷ For example, miniature replicas of Nefertiti are available for sale on the Neues Museum Webshop for €8900.¹⁶⁸ While the Neues Museum's reluctance to provide its scan of Nefertiti seems particularly unreasonable given the object's "controversial

¹⁶⁵ See SHAPEWAYS, *supra* note 22, at 10 ("If the scanner's goal is to create a creative impact or to make an expressive statement, reproducibility and verifiability become much less important. That scan is no longer a reference – it is a creative work that is justifiably protected by copyright.").

¹⁶⁶ Weinberg, *supra* note 1.

¹⁶⁷ 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 (Nov. 13, 2019) <https://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>.

¹⁶⁸ *Replikat Bemalt: Büste der Nofretete GF 539* [Painted Replica: Bust of Nefertiti GF 539], STAATLICHE MUSEEN ZU BERLIN WEBSHOP, <https://www.smb-webshop.de/museen-und-sammlungen/museumsgebaeude/neues-museum/2502/replikat-bemalt-bueste-der-nofretete-gf-539?c=1031> (last visited Apr. 29, 2020) (Ger.).

provenance,” having been discovered by German explorers in Egypt in 1912, and demanded back by the Egyptian government “ever since it first went on display” in Germany,¹⁶⁹ GLAM institutions’ concerns about finite revenues do not at first glance seem inherently unreasonable. Beyond gift shop sales, many organizations collect fees from licensing art images and believe that “restricted uses can drive researchers and others back to the museum for consent to subsequent uses, with additional fees payable to the museum.”¹⁷⁰

However, this defense lacks both theoretical and empirical merit. Following the release of Nefertiti with a Creative Commons license stamped on her base, Creative Commons released a statement criticizing the use of one of their licenses to assert rights over works in the public domain. They wrote “we understand the concerns over revenue and profit that some cultural heritage institutions express when evaluating open access policies. However, claiming copyright over public domain works and successful revenue strategies are different conversations that don’t belong in the same space.”¹⁷¹ Creative Commons’s message is simple: Institutions should not use copyright notices to restrict access to the public domain due to revenue concerns. Yet, many museums routinely sell high-quality reproductions, whether through licensing agreements to use digital images, or in museum gift-shops as posters or 3D miniatures.¹⁷² Removing copyright notices and providing open access would seem directly tied to the continued viability of this revenue source. However, a recent study analyzing the impact of open access policies on GLAM institutions found that in fact open access policies did not yield losses in institutional revenue.¹⁷³ In fact, open access cut costs associated with managing image licensing and provided new opportunities for brand licensing and fundraising. The organizations in the study also found that open access “result[ed] in more efficient and less costly image management and digitization functions” and “create[d] a strengthened and more relevant brand.”¹⁷⁴ Creative Commons echoes the findings in this study, admonishing that “[i]f anything, there is a growing amount of evi-

¹⁶⁹ Jones, *supra* note 6.

¹⁷⁰ Crews, *supra* note 10, at 813.

¹⁷¹ Claudio Ruiz & Scann, *Reproductions of Public Domain Works Should Remain in the Public Domain*, CREATIVE COMMONS (Nov. 30, 2019), <https://creativecommons.org/2019/11/20/reproductions-of-public-domain-works>.

¹⁷² Mazzone, *supra* note 25, at 1042 (“Museum gift shops are among the worst offenders: Postcards of works in their collections often carry copyright notices even though physical possession of art does not equal copyright ownership.”).

¹⁷³ See KAPSALIS, *supra* note 36.

¹⁷⁴ *Id.* at 3.

dence that shows that the associated costs for licensing images dwarf the potential benefits or revenue streams for licensing images.”¹⁷⁵

2. *Preserving the Integrity of Art Objects and Antiquities*

Another source of resistance is cultural institutions’ sense of responsibility for the “integrity”¹⁷⁶ of the art object, should the scan be released free of use restrictions. This is largely because “most museums will define their purpose in terms of acquiring, preserving, and protecting the integrity of original art, while also facilitating the ability of the public to enjoy and learn from the cultural objects.”¹⁷⁷ Many cultural institutions feel a sense of stewardship for their collections and thus seek to avoid distasteful or disfavored uses. In pursuit of this goal, they may require an explanation of how a potential user seeks to employ the 3D image. For example, a group of Stanford University faculty and students built a 3D scan of Michelangelo’s David. The scan was built by a large group of students and faculty, but a single Stanford professor “assumed total responsibility over responding to permission requests to access the model.”¹⁷⁸ Especially problematic was the fact that to access the model, requestors were required to have academic credentials and “promise to ‘keep renderings and use of the data in good taste’ because the artifacts ‘are the proud artistic patrimony of Italy.’”¹⁷⁹

However, concern for the integrity of the art object is outweighed by the benefits of making high quality copies available free of copyright restrictions. While museums’ impulse to act as a gatekeeper to their collections seems both reasonable and natural, the costs outweigh the benefits.¹⁸⁰ The integrity defense does not account for the idea that it is preferable that the public have access to a high-quality version of the art they seek to use over a poor approximation. People seeking to create new art using a 3D scan of a public domain work, or seeking to use such a scan for research, education, or commerce, will

¹⁷⁵ Ruiz & Scann, *supra* note 171.

¹⁷⁶ Crews, *supra* note 10, at 833 (“More philosophically, many museums see themselves as responsible for the integrity and reputation of the art and the artist.”).

¹⁷⁷ *Id.* at 808.

¹⁷⁸ Katyal, *supra* note 19, at 1148; *see also* Cronin, *Possession Is 99% of the Law*, *supra* note 118, at 726–27 (using Stanford’s digital David as an example of how stakeholders like Italian authorities who possess the original David sculpture, and a Stanford University professor who possesses the digital copy, seek to control uses of digital copies of public domain art).

¹⁷⁹ Katyal, *supra* note 19, at 1148 (quoting Cronin, *3D Printing*, *supra* note 59, at 37–38).

¹⁸⁰ *See* Crews, *supra* note 10, at 833–34 (“[S]ometimes creative exploration, comprehension, and advancement of art comes from alteration, manipulation, and mashup. Museums that set limits on innovative pursuits risk setting limits on experimentation and promotion of art itself.”).

search for an approximation on the internet if they cannot acquire a high-quality version from the institution. GLAM institutions are erecting barriers to good actors just to potentially avoid disfavored uses, a steep cost for a minor, theoretical benefit. Professor Kenneth Crews writes that placing restrictions on the public domain might “fulfill[] a mission of preserving the integrity of existing art, but it is not serving the public interest in the advancement of either art or the law.”¹⁸¹

3. *Lack of Legal Clarity*

A final concern is “legal inertia.”¹⁸² Institutions may rationally find the legal landscape unclear and prefer to broadly claim copyright or promulgate restrictive terms of use. On a technical note, because *Meshwerks* and *Bridgeman* are not the law in every jurisdiction, institutions outside of the jurisdictions in which those cases apply may continue to assert copyright in digital reproductions because the status of public domain art replicas has not been confirmed.¹⁸³ However, even within those jurisdictions, lack of legal clarity may make museum lawyers wary to label something as public domain, and lead them to adopt instead a more protective blanket policy. In a recent study of museum policies, Professor Kenneth Crews concludes that:

For a museum to take a position that works are actually in the public domain or otherwise available for use is to take a public legal position, and with it go responsibilities for errors and misconstructions. Museums are themselves burdened by restrictions that they sometimes are obliged to pass along. A collection may come to the institutions with conditions and limits imposed by the donor or artist. If the museum accepts those terms, it may have no choice but to further impose them on subsequent users.¹⁸⁴

Further, there are very few consequences for mislabeling something in the public domain,¹⁸⁵ so beyond public backlash, museum lawyers may find engaging in copyright overreach preferable to the risk of taking a firm legal position or angering a wealthy donor.

Copyright law does in fact offer an easy way to protect perceived interests of stakeholders like donors, because unlike contract law, it can be marshalled against anyone who uses or creates reproductions

¹⁸¹ *Id.* at 820.

¹⁸² *Id.* at 833.

¹⁸³ *See id.* at 809.

¹⁸⁴ *Id.* at 833.

¹⁸⁵ *See infra* notes 190–92.

of the copyrighted image.¹⁸⁶ For example, in 2014, Jerry Fisher, a local photographer in Sioux Falls, South Dakota, created a 3D version of a cast of Michelangelo's sixteenth century sculpture of Moses, which was located on Augustana College's campus, a private liberal arts college in Sioux Falls.¹⁸⁷ Fisher constructed his model by taking photos of the sculpture from all angles and using photogrammetry to construct a digital 3D model and then shared a downloadable file of his model on Thingiverse, the same website where Wenman shared the Nefertiti scan. A few days later, Augustana College requested he take it down "citing fuzzy copyright and ownership concerns," forcing Fisher to remove the file.¹⁸⁸ After receiving swift criticism for its assertion of copyright infringement of its bronze cast of Michelangelo's public domain work, the school released a statement that seemed concerned in large part with protecting the wishes of the family that donated the statue to the school.¹⁸⁹ Rather than analyzing the nuances of its legal position, the college took the easier road by asserting copyright law to manage its stakeholders.

Unlike the first two rationales, legal uncertainty does present a valid challenge to affirmatively offering scans without copyright notices and potentially taking the further step of adopting open access policies. While there can be harsh financial and sometimes criminal consequences for violating a valid copyright, there appear to be relatively few legal consequences for institutions that maintain restrictive policies over public domain images, although museums are coming under increasing public scrutiny for such choices. In his seminal law review article, *Copyfraud*, Professor Jason Mazzone asserted that copyright law contained a major flaw, namely that "[t]he law's strong protections for copyrights are not balanced by explicit protections for the public domain."¹⁹⁰ He further argued that this lack of protection creates incentives for people to engage in "copyfraud," claiming to own the intellectual property rights to a public domain work.¹⁹¹ Copyright law offers an array of remedies to address copyright infringement, but

¹⁸⁶ See SHAPEWAYS, *supra* note 22, at 1 ("[C]opyright can make patrolling ownership easier. . . . [C]ontracts can only be enforced against people who have agreed to be bound by the contract. Copyright infringement does not suffer from the same limitation. That makes copyright a powerful right . . .").

¹⁸⁷ Bogle, *supra* note 9.

¹⁸⁸ *Id.*

¹⁸⁹ *Id.* ("In October 2014, we reached out to Mr. Fisher to express our concern over his actions in light of the fact that he did not seek permission from the College, the City of Sioux Falls or the families of the artist and/or the Fawicks [the donor family]." (quoting Peggy Kapusta, director of online communications at Augustana College)).

¹⁹⁰ Mazzone, *supra* note 25, at 1029.

¹⁹¹ *Id.*

few to rectify incursions into the public domain. For example, “[t]he Copyright Act provides no civil remedy against publishers who improperly claim copyright over materials that are part of the public domain.”¹⁹²

Because the copyright doctrine currently lacks a clear articulation of when digital models of public domain works meet the originality threshold, it is often easier for institutions to broadly claim copyrights to everything on their website. This way, they avoid angering donors and risking revenues, and do not have to take a firm position on copyright law as it pertains to digital models. This is a particularly easy choice for many cultural institutions because there are essentially no legal ramifications outside of the court of public opinion for doing so.¹⁹³ This Note seeks to provide a clear statement rule to combat these issues and articulate a policy statement expressing a renewed investment in protecting the digital public domain.

III

ADOPTING A U.S. ANALOGUE TO ARTICLE 14

Part II analyzed how both copyright doctrine and current GLAM institution practices are complicating access to the public domain. Museums engage in practices that, because these 3D scans are not copyrightable, come close to copyfraud and copyright overreach. To begin to rectify this imbalance, Part III proposes amending a similar provision to Article 14 into existing U.S. Copyright Law. Congress must clarify that no copyrights are created during digitization of public domain works, and thus the use of copyright notices is improper.

In April 2019, the European Council approved the *New Directive on Copyright and Related Rights in the Digital Single Market*.¹⁹⁴ Each member state has two years to implement the Directive into its national legislation.¹⁹⁵ The aim of this new legislation was to modernize EU copyright laws in the digital era.¹⁹⁶ Article 14, in particular, serves to harmonize copyright law across European member states

¹⁹² *Id.* at 1035–36.

¹⁹³ *See supra* notes 190–92 and accompanying text.

¹⁹⁴ EUROPEAN IP HELPDISK, *supra* note 31, at 2.

¹⁹⁵ *Id.* at 13.

¹⁹⁶ *See id.* at 2 (acknowledging that “[c]urrent copyright rules are not adapted to the growing digital landscape” and commenting that the revisions “offer an appropriate regulatory framework that encourages creative work and innovation while striking the balance with freedom of expression and the need to promote research, education, access to information and cultural heritage”).

and “prevents the expansion of copyright to ‘faithful’ reproductions” of public domain art.¹⁹⁷ Article 14 of the directive states:

Member States shall provide that, when the term of protection of a work of visual art has expired, any material resulting from an act of reproduction of that work is not subject to copyright or related rights, unless the material resulting from the act of reproduction is original in the sense that it is the author’s own intellectual creation.¹⁹⁸

The provision applies to both 2D photos and 3D digital models of public domain works, and has been described as “one of the very few unambiguously good provisions of the new EU copyright directive.”¹⁹⁹ Weinberg writes that “[o]nce implemented, th[e] rule would mean that the Neues Museum does not have the ability to use a copyright license to prevent commercial uses of the scan in the EU.”²⁰⁰ In other words, the law would confirm that the Creative Commons license on the base of the digital Nefertiti, requiring attribution to the museum and barring commercial uses of the scan, is unenforceable.

Despite significant differences between EU and U.S. copyright regimes,²⁰¹ a U.S. analogue to Article 14 would provide much needed legal clarity. A lack of clarity and precision in U.S. copyright doctrine currently allows and encourages institutions to engage in copyright overreach.²⁰² A clear statement rule, amended to the Copyright Act, that digital reproductions of public domain works do not grant GLAM institutions copyrights in digital reproductions, would represent a first step to advancing greater protection for the public domain. The clear statement would solidify the principle in *Bridgeman* and *Meshwerks* that transforming a non-copyrighted art object from one medium into another does not create a copyrightable expression and would discourage organizations from placing copyright notices on these digital models as it would remove the legal uncertainty that often justifies these decisions by institutions.

Opponents may argue that a clear statement rule is unnecessary because it would reiterate the holdings of *Bridgeman* and *Meshwerks*. They may assert that the hassle of amending the Copyright Act is

¹⁹⁷ Giannopoulou, *supra* note 35.

¹⁹⁸ EU Copyright Directive, *supra* note 32.

¹⁹⁹ Keller, *supra* note 33.

²⁰⁰ Weinberg, *supra* note 1.

²⁰¹ See THOMAS MARGONI, UNIV. OF AMSTERDAM INST. FOR INFO. LAW, THE DIGITISATION OF CULTURAL HERITAGE: ORIGINALITY, DERIVATIVE WORKS AND (NON) ORIGINAL PHOTOGRAPHS 26–28 (2014), <http://www.ivir.nl/publicaties/download/1507.pdf> (discussing the issue of related-rights for non-original photographs in many EU member states).

²⁰² See *supra* Part II.

simply unwarranted. This argument fails to recognize that museum practice continues to defy the caselaw and, as this Note has demonstrated, 3D technology complicates the originality analysis, leaving museum lawyers with a complex legal analysis and numerous stakeholders to balance. The proposed rule is a first step towards a clearer originality rule, starting with the baseline that creating exact digital replicas of existing public domain art objects lacks the requisite modicum of creativity. As technology advances, developing a clear policy aim is necessary to demonstrate the United States's dedication to maintaining the public domain in the digital age. The mechanics of digitization may change, but this principle can guide the law. For these reasons, concerns of redundancy do not outweigh the benefits of this rule.

Cultural institutions may present another challenge to the proposed amendment, claiming they need to be able to at least have attribution for the scans that they commission or create. However, there are other ways to achieve that goal, besides improper copyright notices. For example, Creative Commons, writing in response to the Neues Museum's actions, states that “[w]e acknowledge that in some cases cultural heritage institutions use CC licenses in order to get credit for their work or to indicate the provenance of the digital surrogates.”²⁰³ However, “[t]here are better, more appropriate technical tools to achieve that goal, including metadata and machine readability standards.”²⁰⁴ Museums can use less inhibitive methods to promote their work and may in fact find that removing copyright notices draws greater appreciation to the digitized works in the museum's collection.²⁰⁵

Clarifying the law would also encourage museums to transition to open access policies. A lack of copyright does not equate to open access. However, without intellectual property rights to protect,

²⁰³ Ruiz & Scann, *supra* note 171.

²⁰⁴ *Id.* While Creative Commons does not describe these technical tools, the Smithsonian, a leading resource on digitizing cultural heritage in the United States, has been working to develop metadata models, which “describe the ‘raw’ source data from which 3D models are derived and should document the technical processes going into data collection and model creation.” Digitization Program Office, *Smithsonian 3D Metadata Model*, SMITHSONIAN (Nov. 1, 2018), <https://dpo.si.edu/blog/smithsonian-3d-metadata-model>. In this way, GLAM institutions could receive credit for building or commissioning the models without asserting any legal ownership. *See also* Engelberg Ctr. on Innovation Law & Policy at N.Y.U. Sch. of Law, 6. *Digitize*, GLAM 3D, <https://glam3d.org/digitize.html> (last visited Aug. 6, 2020) (“A simple approach to connecting metadata to a 3D model is to publish it separately from the model and/or provide links to it. . . . [in such forms as]: [a] text file within the downloadable 3D data archive [or] . . . [a] link on the same page as the 3D model [or] . . . [m]achine-readable tags . . .”).

²⁰⁵ *See supra* note 68.

GLAM institutions may be more willing to take the additional steps to open their collections, by making them more easily viewable and downloadable online. A clear statement rule allows museum lawyers to forgo an analysis as to whether these scans might be protected by copyright and a long conversation about potential revenues from licensing the scans. Clarifying that cultural organizations do not own a copyright in digitized public domain works lessens the “legal inertia” problem discussed in Section II.B, and by doing so, makes it much easier to discuss full open access, because these organizations are not giving up any intellectual property rights they may have thought they possessed. This proposal would advance “[a] robust public domain . . . by respecting and enforcing the copyright limits Congress has already set” and courts have interpreted through caselaw.²⁰⁶

As more people experience art for the first time online and as cultural heritage objects face greater threats around the world, providing access to high quality 3D versions of public domain cultural heritage without fear of use restrictions or legal action is increasingly important. Not only would it lead to copyright law’s utilitarian goal of the creation of new works and the shared enjoyment of public works, it would reduce duplication of scanning efforts and ease the way for institutions to engage in diverse scanning projects. For example, this Note briefly discussed some of the scanning projects in the wake of ISIS’s bombing of Palmyra.²⁰⁷ In fact, “there has been something like seven major scanning initiatives of Palmyra since the initial bombing, all by different organizations, many of whom don’t communicate with each other.”²⁰⁸ Open access would help avoid this redundancy in what is being scanned and permit organizations to deploy their resources where they are needed elsewhere.²⁰⁹

CONCLUSION

3D technology offers both new opportunities and new challenges for cultural institutions. 3D models are being used for diverse purposes in the cultural heritage space; from archiving and digitizing collections to make them more accessible, to recording at-risk heritage, allowing museums and cultural heritage organizations to conserve and monitor its condition, to repairing and recreating destroyed objects and changing the tenor of repatriation debates. While many institutions maintain progressive open access policies, some are still reticent

²⁰⁶ Mazzone, *supra* note 25, at 1031.

²⁰⁷ See *supra* notes 93–99 and accompanying text.

²⁰⁸ *Connecting Cultures: An Interview with Laura Jones and Vernon Rapley*, in *COPY CULTURE: SHARING IN THE AGE OF DIGITAL REPRODUCTION*, *supra* note 37, at 79, 83.

²⁰⁹ See *id.*

to release scans of public domains works to the public or to allow the public to make their own digital replicas of objects within an institution's physical control. While the giftshop defense and maintaining the integrity of the art objects are not strong rationales for restricting access, legal uncertainty can raise legitimate concerns preventing institutions from readily granting open access. While the law is fairly clear that an exact scan of a public domain work belongs in the public domain, it is unclear how much creative expression is needed to obtain copyright protection. Further, museum practice does not always accord with the best reading of the law. To provide legal clarity and foster open access and continued sharing of public domain works, the United States should adopt a provision like Article 14. Restricting access to cultural heritage prevents scholars, artists, archeologists, and the public from reaping the benefits of the information these digital models provide. While better guidelines are needed to provide clarity on how much creative expression is required to meet the originality threshold, a clear policy statement would signal the importance of a robust digital public domain.