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Reconstructing History:  
The Ethical and Legal Implications of 3D Technologies for Public History,  
Heritage Sites, and Museums

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## **Executive Summary**

This report explores the current applications of 3D technologies as well as their ethical and legal implications for public history, heritage sites and museums. The use of reproductions is not new in history-related professions, however, 3D scanning and printing democratize the process and have been embraced widely throughout Canadian society. While institutions have different purposes, relevant uses, and ethical considerations, there should be policies at the national level on what can be scanned, how it can be displayed, who should be consulted, and how access should be determined. Federal legislative changes in regard to intellectual property rights are not necessary in the near future as the law already encompasses technology. However, legal cases should be decided in a manner that protects the rights of creators and users, promoting innovation and creativity. This project is timely as institutions are interested in what others are doing as they work to implement the technologies and develop best practices.

## **Methodology**

This project had two parts: a literature review and interviews with museum professionals and key stakeholders. The literature review explores current scholarship as well as examples of applications. It points to important uses for education, preserving material, accessibility, and interaction, as well as raising ethical questions around context, preservation, sensitive material, and representation. Legal issues addressed here are mostly related to the American context, but also explore potential instances of intellectual property infringement in

general. Overall, the literature raises a lot of questions, while proposing few solutions. The material is largely theoretical in its discussion of implications, or focused on specific case studies and technical considerations with regards to potential applications.

The interviews conducted with stakeholders and professionals working in this area aimed to develop a more specific understanding of this subject in the Canadian context. As such, they focused on topics such as current uses and priorities, curatorial context, implementation of guidelines, methods of consultation, representation, legislation, and ownership. Interviews were conducted with: Catherine Tamaro, Communications Officer for the Wyandot of Anderdon and Artist; Rhonda Bathurst, Executive Director of the Museum of Ontario Archaeology; Beth Compton, PhD Candidate in the Department of Archaeology at Western University; Tanya Anderson, Intellectual Property Advisor, and Alan Elder, Manager of First Peoples and Early Canada, at the Canadian Museum of History; Erin Secord, Curator, Renee Racicot, Manager of Museum Projects, and Andrew Macdonald, New Media Officer, at the Canadian Science and Technology Museums Corporation; and Peter Choe, Intellectual Property Law Partner at Gowling WLG.

### **Current Applications – International**

3D technologies have a wide range of current uses at institutions around the world, including increased accessibility and preservation. 3D printers work by building reproductions from a blueprint. Typically, the blueprint is in the form of a Computer-Aided Design (CAD) file

that was either scanned from an existing object or created on its own (Weinberg, 2010). The literature review revealed that museum professionals and academics are advocating for the adoption of 3D technologies to enhance public history interpretation at heritage sites and museums. Megan Hancock, Museum Coordinator at Denison University, is positive about the impacts of digital workshops and hack-a-thons in order to teach the public about scanning and printing (2015). Neumuller, Reichinger, Rist, and Kern, curators and computer and architectural science experts, respectively, advocate for increasing the accessibility of education by using 3D-printed models (2014). They assert that through changing the scale or enhancing the features of an artifact, the public can learn through tactile interaction. Guidelines are needed, however, for printed models to ensure accessibility and standardization (2014).

Digital reconstruction has important applications for artifact preservation. Nicolas, Gagne, Tavernier, Petit, Gouranton, and Arnaldi, who come from a variety of disciplines relating to computer science and archaeology, explore three case studies of implementing 3D technologies for reproductions of damaged or small artifacts (2015). University of Florence Professors Pieraccini, Guidi, and Atzeni also argue that 3D technologies should be used to study, restore, and preserve artifacts. They detail a collaboration between the National Research Council of Canada and the University of Padova that created 3D digital images. They also explore the use of digital archives, remote fruition, digital restoration, and monitoring (2001).

Overall, Europe is ahead of North America in the field of 3D technologies for cultural heritage, as Smithsonian Conservators Wachowiak and Karas highlight and as the above cited

teams of researchers reveal (2009). The researchers cited in my literature review also demonstrate the multidisciplinary nature of working with 3D technologies, requiring multiple perspectives and experts from different areas. In particular, the research demonstrates the importance of computer scientists in the growing field of Digital History.

### **Current Applications – Canada**

The use of 3D technologies has entered the mainstream and is relevant to all sectors of society. Applications in science and manufacturing are ground-breaking and personal 3D printers have become increasingly affordable. However, the implications for public history, heritage and museums have not been thoroughly addressed. Institutions in the United States, such as the Smithsonian and the Metropolitan Museum of Art, have incorporated 3D technologies through online databases and scanning activities. Researchers in Europe are actively involved in implementing these technologies. In Canada, institutions have been more restrained, but have also embraced these technologies.

The Museum of Ontario Archaeology (MOA) has two purposes for 3D technologies: education and repatriation/burial. It has a wide array of technologies, including hand-held scanners, a micro-CT scanner, and a 3D printer with colour. One of the applications for this equipment is the creation of a digital database to document its collection of 54 000 boxes of artifacts. Another application of these technologies is the ability to manipulate the size of objects, such as creating enlarged mammoth teeth with which children visiting the museum can

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interact. Micro-CT scanners have also been used to see the inside of objects, such as with cuneiform tablets, without breaking them open. Building upon these technologies, the museum has recently introduced a virtual reality re-creation of an Attawandaron Longhouse. This computer program is more accurate than a physical reconstruction and was implemented in response to public demand for this technology (Bathurst, 2017).

Though under some consideration, 3D printing is not a high priority at The Canadian Museum of History (CMH). This museum uses 3D technologies for internal purposes, but does not make this material available online. It currently has a 3D printer for research and is looking at the possibility of purchasing a new one. Tanya Anderson, the museum's Intellectual Property Advisor, argues that "museums tend to be reactionary," adapting to technology rather than trailblazing. The museum, however, does see some potential for the technology in the sale of models in gift shops, as well as for the creation of artistic representations of artifacts through digital modelling. Anderson hopes that new technologies will be implemented in ways that will ultimately benefit museums, such that their collections will be more sought after, and interacted with, by the public. The Canada History Hall, opening to commemorate 150 years since Confederation, incorporates 3D digital reconstruction through its representation of an Indigenous family. Archaeologists and Curators created the reconstruction based on the remains of a 4,000-year-old Indigenous family from the Shishalh Nation. (Muholland, 2017). Through digital facial reconstruction from this material, the audience can interact face-to-face

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with the past. The museum is creating an identical exhibit for the Shishalh Nation Tems Swiya Museum in British Columbia (Anderson & Elder, 2017).

The Canadian Science and Technology Museums Corporation (CSTM) uses 3D technologies to enhance accessibility and educational experiences. Its board of directors has issued a directive to develop policy to increase the digital availability of its artifacts. However, the museum does not yet have a dedicated 3D team because the technology is too new in the museum world. The main audience for its reproductions is schools and libraries and its guiding principle is that the artifact be functional if printed. Through focusing on enriching the experience of its audience with interactive exhibits, CSTM does not simply produce 'paper weights'. In addition, its focus is on reproducing ideas, rather than specific artifacts. It does not use 3D scanning to track the preservation status of an artifact, nor does it focus on reproducing the characteristics of a specific artifact. Rather, its reproductions are 'based on', or 'inspired by' artifacts. For example, the museum scanned and printed a zoetrope, a hollow drum with slits to produce the effect of moving images, to instruct children on this early form of animation technology. The scan was based on a specific artifact, but was not meant to represent its current condition or specific design details; rather it has acted as an example of zoetrope technology. The museum also uses 3D scans for online games such as ACE Academy and Space Frontiers, which incorporate scans of aircraft from the museum's collection to represent World War II aviation and the hypothetical colonization of Mars. Other applications include potentially printing mounts for displays, photogrammetry to measure and map steam ships, and

incorporating creative new uses for artifacts through technology, such as using a NORAD consul as a head for a robot in an online game (Secord, Racicot & MacDonald, 2017).

### **Ethical Implications**

There are four major ethical implications that need to be addressed when developing policies around 3D technologies: context, preservation, sensitive material, and representation. Ethical guidelines pertaining to these four areas should be implemented at the national level in order to ensure that 3D technologies are integrated into history-related professions in a responsible manner. Organizations should also develop their own best practices according to their relevant uses for these technologies.

With the ability to scan and print models of artifacts, museums need to ensure that their artifacts are not removed from their curatorial context in order to avoid misappropriation and the cultivation of 'fake history'. Catherine Tamaro argues that placing artifacts out of context is a form of cultural erasure. Museums should be "stewards of material", working with communities from the ground-up to ensure effective education (2017). Whether adding accompanying contextual paragraphs to downloads or restricting downloads altogether, museums should be held responsible for safeguarding the context of the artifacts in their collections.

Context about an artifact's history is also important. Artifacts do not exist in a vacuum, but rather tell a story from the time they were created until the present. As such, the

destruction of an artifact is a relevant, though upsetting, piece of its story. Rhonda Bathurst asserts that the reason something is destroyed is part of its history, and it is not always relevant to focus on putting things back together (2017). Though digital reconstruction can determine how an artifact used to look by erasing the effects of human destruction, the object in its current deteriorated state continues to have value.

Addressing context is relevant as the ethics of artifact reconstruction are being debated in relation to recent destructions of cultural heritage in the Middle East. In particular, Western reconstruction of Eastern artifacts, such as the installation of the Palmyra Arch in New York's City Hall Park, raise questions about what Classics Professor Sarah Bond calls "digital colonialism." Bond asserts that though the arch was installed in the park to defy terrorism through proudly displaying cultural heritage, there is no accompanying text on the artifact explaining its history or the war in Syria (2016). Similarly, the horrors of the destruction of cultural heritage have entered the public consciousness with the International Criminal Court's recent War Crime conviction of the leader of an Al Qaeda-linked group for demolishing sites in Timbuktu (The Economist, 2017). With ongoing conflicts in areas with rich cultural heritage, ethical discussions around maintaining the context of artifacts being reconstructed are likely to continue.

In order to ensure that the context of an artifact is maintained, institutions must determine who will have access to scans. For CSTM, public access remains restricted. Museum curators provide context for scans that teachers print off in the classroom and no scans are

publicly posted online. However, the museum is currently “exploring the implications of making [its] models hackable or locking them as-is” (Secord, Racicot & MacDonald, 2017). If the models are posted online without restrictions, the public could manipulate the scans and reproductions. This sort of action is seen as both positive for enhancing creative potential and negative for defacing objects of historical significance. While MOA plans to create a database of its collection, it will be for research purposes and the context of the artifact will be included. Bathurst understands the positive and negative implications of public access to scans, arguing that replication is difficult to govern in a way that does not limit innovation (2017). Access to CMH’s digital reconstructions is limited to visitors physically inside the museum, so the exhibits remain in their curatorial context (Anderson & Elder, 2017). Overall, pertinent information about the context and ethical use of scans should accompany all models given to those granted access.

Technological changes can threaten digital preservation if collections are not carefully monitored. Archaeology and Ancient History Professor Sarah Colley asserts that through the “economics of technology production, organizational constraints, digital illiteracy, lack of political will and costs of compliance with digital archiving standards,” digital models can be lost and the work abandoned. According to Colley, standardization and continuity of digital technologies are important in the short term in order to prepare for longer term advances in technology. In making her point, Colley discusses New South Wales Archaeology Online, a digital database that has faced financial troubles and problems with coordinating relationships.

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Overall, Colley asserts that the focus of using 3D technologies going forward should be on preventing the loss of information (2015). CMH understands the challenge of keeping up-to-date with technology and maintaining older technologies. They have one of the few machines in the world that can read wax cylinders, a technology that used to be widespread at the beginning of the twentieth century (Anderson & Elder, 2017). As technologies are improved and replaced, old file types and storage mechanisms can become unreadable. However, there is usually a transition time and, as long as digitized records are updated, they will be preserved.

On an international scale, digital history preservation has been addressed through the 2003 UNESCO Charter on the Preservation of Digital Heritage. This declaration advocates for public access to digital heritage that is “free of unreasonable restrictions,” while also protecting personal information. The Charter emphasizes the need to develop strategies and policies for the preservation of digital heritage as well as guidelines to determine what to preserve for future generations. Another important piece of international law to consider when establishing preservation guidelines is the International Council for Monuments and Sites’ 1996 Sofia Principles for the Recording of Monuments, Groups of Buildings and Sites. As cited in Archaeology Professor Minna Silver’s *Conservation Techniques in Cultural Heritage*, these principles convey guidelines for recording digital heritage with “consistency, integration and transparency” (2016). While both of these documents are non-binding, they set out important recommendations and factors to consider in developing policies.

To establish ethical criteria for 3D scanning and reproduction of artifacts, it is important to consider the nature of each object and any inherent emotional or spiritual associations that the artifact may convey. The challenge is that emotional associations can depend on the individual, so criteria must be established that takes into consideration the best interests of those involved. For CSTM, common sense and compassion are used when determining which objects to reproduce. For example, the curators would not print a child's iron lung because it invokes strong emotional reactions, but they would print a sundial to demonstrate how it works (Secord, Racicot & MacDonald, 2017). Sensitive material should not be reproduced without consultation with relevant communities and, in many cases, it should not be reproduced at all.

When working with Indigenous peoples' artifacts, consultation and community involvement are essential in considering whether to reproduce an artifact. CMH argues that there should be no blanket approach, but rather projects and decisions should be "relationship-based" with "active involvement" from the community that does not cease once permission has been granted for reproduction, or once the exhibit has been installed. MOA takes a similar approach with their consultation process. To oversee their projects, their advisory board consists of Indigenous representatives and professional archaeologists from the government, research, and commercial sectors to ensure that multiple perspectives are considered. Compton's work has determined that each community has a different response, so decisions should be made at the local level on a case-by-case basis. Long-term partnerships are essential as opinions regarding reproductions have often changed through conversations with

community partners (2017). Elders should be consulted first on reproduction of sacred objects, says Catherine Tamaro, as technology can be useful when objects are too fragile to display. While she describes herself as pro-technology, she does not think it is appropriate to use synthetic reproductions to recreate spiritual artifacts and would prefer if Elders would bring real artifacts into classrooms to teach value and reverence. When this is not possible, digital reconstruction is the most appropriate, but for educational contexts only (2017).

It is important to remember that 3D reproductions are representations of artifacts and do not replace the actual artifact. In a world saturated with technology, the debate around digital representation as a replacement for the original is prevalent. Journalist Andrew Cohen argues that museums should not unreservedly embrace technology, especially in a world full of virtual representations. He asserts that museums should focus on including real artifacts, emphasizing “the need to understand the authentic. Not virtual, real” (2016). CMH was an important part of this debate. When the museum opened in 1989 they were criticized for using replicas and have since moved away from reproductions (Anderson & Elder, 2017). While reproductions can be useful for public interaction, they do not embody all of the meaning that authentic artifacts can convey. Tamaro asserts that models do not effectively represent the “liveliness of artifacts”. In addition, objects made from nature are imbued with nature’s vital energies and models do not capture the richness of cultural experiences as a “picture of a painting is not a painting” (2017). Models can be used to represent ideas, but not artifacts themselves.

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When implementing reproductions, heritage sites and museums need to be transparent about their practices. Bathurst asserts that people do not want to be fooled. There is an expectation when visiting a museum that the real artifact will be there. While reproductions are useful for objects that cannot be displayed, that needs to be clearly indicated to the public. Technology can enhance that experience, but should not substitute for it. Bathurst also raised the question of what to do with replicas that have not turned out as expected. She feels that they are not simply garbage despite being poor representations of the artifacts themselves (2017). They are not quite art either, however. As Compton argues, there is something about the accuracy of a computer that eliminates the artistic component of models (2017). How to classify reproductions remains an unanswered question.

Dr. George Nicholas at Simon Fraser University has been a leading voice in discussions about ethics, intellectual property and cultural heritage. From 2008-2016, Nicholas led a project called Intellectual Property Issues in Cultural Heritage (IPinCH, 2016). Established through a SSHRC Partnership Award, the project's goal was "to explore and facilitate fair and equitable exchanges of knowledge relating to heritage" while addressing the "larger issues of the nature of knowledge and rights based on culture" (IPinCH, 2016). Their discussion of the use of technology included video recording, but the fact sheets did not address 3D technologies (IPinCH, 2016). The researchers created fact sheets on issues such as appropriation and commodification, and traditional knowledge. The researchers asserted that appropriation and commodification can be avoided through relationship-building as the MOA and CMH

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emphasized. For traditional knowledge, they argued that the sources for determining ethical practices should include legal frameworks, the researcher's ethical guidelines, and specific research contexts (IPinCH, 2016). This point illustrates one of the great challenges of creating ethics policies; there are multiple perspectives to incorporate and sources upon which to draw. Through respectful consultation, national policies should be developed to govern the use of 3D technologies in history-related professions, addressing ethical concerns around context, preservation, sensitive material, and representation.

### **Legal Implications**

Under Canadian law, Intellectual Property and Contract law are significant to the discussion of the legal implications for 3D technologies as the ownership of artifacts, scans, and models needs to be determined. Immediate legislative changes are not needed as the law already encompasses this type of technology. However, in deciding cases, an appropriate balance between the rights of the creator and the rights of the user should be upheld, so that innovation and creativity will be promoted.

Canadian Intellectual property legislation already accounts for technological innovations. Anderson instructed that the law is “technology neutral”, meaning that it will be applicable to new technologies in the same way as old ones (2017). According to Peter Choe, the current language is “forward-looking” and the necessary framework is in place to ensure that rights are protected no matter the type of technology involved. Instead, if necessary in the

future, any changes could be made by “tweaking current legislation”, such as including a new term in the Canadian Copyright Act to encompass a new type of protection (2017). For example, American lawyer Sarah Swanson argues that digital blueprints should be their own category in the Act to make them an explicitly protected ground, such as a novel or musical work, and Canada could follow suit (2008). Before making any potential tweaks, it is important to wait to see the impact that 3D technologies will have on intellectual property rights.

While new legislation is not immediately required, it is important to consider how cases involving 3D technologies will be adjudicated under the current laws, something that has not yet been determined through case law in Canada. Distinctions between CAD files, 3D printed models, and original artifacts are important to consider when investigating the copyright implications. Copyright protection is automatically granted when an original work is created (Weinberg, 2010). Intellectual Property Lawyer Haritha Dasari asserts that 3D objects printed from CAD files without permission constitute infringement, but 3D digital models created from physical objects are likely not copyrightable. According to Dasari, however, if the underlying physical object is copyrighted, then the owner can gain protection for printed models as derivative works (2013).

There is also debate about whether CAD files can constitute a creative work and therefore whether they can be copyrighted. In the United Kingdom, a study commissioned by the Intellectual Property Office recommended establishing a Working Group to clarify the status of CAD files (2015). Ahrens, the Director of Copyright & Fair Use at the Center for

Internet & Society, Stanford Law School, highlights that “copyright applies to those artistic features we can separate (either physically or conceptually) from the useful object,” but not for objects that have a solely useful function” (2013). This distinction is important for the debate around the status of CAD files as creative works. Weinberg highlights a distinction between whether the creative object on the CAD file was created by scan or created in CAD. If created by scan, it is a derivative work owned by the object creator and if created in CAD, it has independent copyright (2013). Cornell law professor James Grimmelman asserts that “a CAD file is quite possibly protected against unauthorized 3D printing, even where the resulting object is not copyrightable” (2014). Dasari also argues that digital models originally created as CAD files and not based on an existing object are copyrightable (2013). While legal scholar Angela Daly, argues that CAD files do not constitute artistic works, she appears to be an outlier voice (2016). Ultimately, copyright protection depends on the contents and the origin of the work in the CAD file. While these sources are international, Canadian laws are often influenced by American legislation and it is likely that similar debates exist in the Canadian context.

The fair dealing exemption under IP law is also relevant in the museum context. This exception to copyright infringement enables museums, as well as other public interest stakeholders such as educators and satirists, to use protected material in certain circumstances such as education and conservation. Secord, from CSTM, believes that under this exemption, the museum should be allowed to make physical representations of any artifact that could benefit from increased accessibility for public interaction and education (2017). CMH also

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supports this exemption for conservation and managing its collection (Anderson & Elder, 2017). Although IP rights are pertinent to discussions of replication, in Compton's interviews, they did not come up as a concern in communities unless prompted, revealing that ethical concerns are more in the forefront in the minds of the public (2017).

While artistic and educational exemptions for infringement are important, the intellectual property rights of inventors and businesses also need to be upheld. An analogy to the music industry's Napster incident is relevant to this point. While free online music file sharing was popular, it was eventually ruled to be illegal because it infringed the rights of musicians and record labels. CMH argues that the music industry lost by fighting back, rather than embracing public interest (Anderson & Elder, 2017). When asked about whether he foresees a Napster incident in the future for 3D artifact file-sharing, Choe argued that there was already a large existing market for music as there has always been "an appetite to consume music." By contrast, it is not clear how prevalent public adoption of 3D artifact printing will be (2017). There have, however, already been international legal battles over the sharing of 3D models of artifacts online, including a lawsuit from the estate of famous chess player Marcel Duchamp over an American reproduction of his chess set (Norton, 2017). Public interest and engagement are important factors to consider when determining legislation, however, there still needs to be an effective balance between the rights of the individual and the collective interest.

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Patent law is also relevant, but is not subject to the same distinctions and exemptions as copyright law. While works do not have to be unique to be protected by copyright, patents “have a novelty requirement” (Weinberg, 2010). Simply put, a patent has been infringed if the model does what the patent protects. In other words, a model of a patented clock does not infringe unless it performs the same task as said clock. As a result, CSTM’s biggest concern when it comes to 3D modelling is getting sued by companies for patent infringement as some of the objects in its collection were invented by companies still in existence. In particular, the curators at CSTM do not want the artifacts that they make available online to get people in trouble. For example, if they distribute a model of an appliance online that, when printed, performs the same function as the artifact that it is based on, the users could be sued. Therefore, they consult with lawyers for advice on choosing which artifacts to replicate (Secord, Racicot, & MacDonald, 2017). Professor Lipson and Microsoft Industry Analyst Kurman propose granting micropatents to protect utilitarian objects that are commercially sold. As an alternative to patents in an age of 3D printing, micropatents have shorter timeframes (2013). This potential legislative change could prevent frivolous lawsuits against educators and artists, however, it is important to wait to make changes until the impact of 3D technologies is more apparent.

Contract law is also relevant, particularly in the museum context. As Choe instructs, museums usually own objects in their possession, but not the underlying IP rights as any such rights are typically extinguished. However, “museums can control rights contractually, by allowing access to objects if viewers agree not to take photos, make 3D models, etc.” (2017).

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Contractual relationships between the public and museums are also important to the earlier ethical discussion of context because it allows museums to restrict access.

While promoting creativity and catering to public interest are beneficial, there also need to be restrictions to protect intellectual property rights. The debate around creative and innovative potential stemming from public access to scans and models is controversial. Harvard Law professor Lawrence Lessig, in his work on adapting copyright laws for the Information Age, argues that “what is needed is a way to say something in the middle – neither ‘all rights reserved’ nor ‘no rights reserved’ but ‘some rights reserved’ – and thus a way to respect copyrights but enable creators to free content as they see fit” (2004). Creative Commons has a range of copyright licenses available that allow the creators to decide what rights to grant to users, while still retaining credit for their work. As Michael Weinberg, lawyer for the public interest organization Public Knowledge argues, “the ability to copy and replicate is the ability to infringe... but the ability to copy and replicate is also the ability to create, expand upon, and innovate” (2010). In order to promote innovation and creativity, there needs to be an effective balance between the rights of the creators and the rights of the users.

### **Conclusion**

Each institution can develop best practices and set priorities, but there should be professional guidelines at the national level. These guidelines should address issues of context, preservation, sensitive material, and representation. Education on the value of history and

historical artifacts needs to begin at an early age, particularly in the Digital Age in which information is easily accessed and can be so easily abused. While it is important to appeal to audiences through increased interaction with artifacts, museums should be cautious and draw clear lines to prevent the simplification and commodification of history. Intellectual Property and Contract law are both relevant. 3D technologies, however, do not necessitate legislative changes in the near future as their impact on the legal system has yet to be determined. Case law should determine the appropriate balance between the rights of the creators and the rights of the users. Society should engage in a public debate on the subject of 3D technology to determine the values it wishes to promote through its adoption.

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## Appendix A – Interview Questions

*These interviews were recorded and are stored with Prof. Thomas Peace at Huron University College.*

Ethical:

1. How has your organization incorporated 3D technologies? What level of priority is this for you?
2. What kinds of ethical issues are you taking into account in formulating your policies and plans (ex. for Canada Hall)?
3. 3D digital models or printed replicas of artifacts are often removed from their curated archival or museum contexts when they are uploaded online or placed in public locations. Without their archival or museological context, they risk being subject to manipulation or false representation. How can we ensure that the public remains informed about the original and curatorial contexts of these artifacts?
4. Should there be guidelines about 3D technology practices at a local, federal, or international level to ensure cooperation and consistency?
5. 3D technologies have the potential to make public history more interactive. How can this interaction be governed in an ethical way?

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6. Technology changes quickly. How can we ensure that digital history is preserved and accessible for future generations?
7. How can sensitive materials, such as human burial sites and religious relics be handled in an ethical way? Who should be consulted and how can you ensure that local communities remain involved?
8. As 3D technologies become more widespread and readily available, users can potentially steal, market, sell, and falsify objects through obtaining scans or replicas. How can this issue be addressed?

Legal:

1. As the internet is an international service, how will laws governing 3D intellectual property rights cooperate internationally (ie. should there be international conventions or resolutions)?
2. Should lawmakers take proactive approaches to 3D technologies by passing legislation now to avoid playing a game of catch-up? Or should they wait to see the actual impact and uses before making decisions?
3. Who owns the rights to original digital models? And the copies they produce? What about copies of copyrighted or patented objects?
4. Do museums have the right to ownership over 3D models made of objects in their collections? Even if museum representatives did not make the copies?

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5. How can intellectual property rights be enforced regarding digital models and file sharing? Do you anticipate another 'Napster' incident?
6. Has the issue of 3D technologies relating to IP rights come up in your education/practice/experience? Do you anticipate it being a large concern in the future? Should lawmakers take a proactive approach to prevent future controversies?
7. How will/should the fair dealing exemption be applied in this context? Should museums and teaching institutions have free reign to use copyrighted digital material for educational purposes?
8. Which intellectual property protections (ie. patent, copyright, trademark, design rights) are relevant in this context and how?

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