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Comment: 3D Printing

Sarah K. Wiant*

The country, if not the world, is fascinated with the growth of 3D printing, whether regarding printed toys, human tissue, or even pizza in space.¹

NASA is funding a 3D food printer to provide a wider range of foods for astronauts in space and to achieve a loftier goal of preventing food shortages back home on earth.² Could a printer cartridge last as long as thirty years (their supposed lifespan)? Remarkably, NASA scientists have envisioned food first as dough, cooked as printed, followed by tomato powder mixed with water and some protein.³ Other scientists have focused on 3D printers as a means to print replacement body parts using bio-absorbable plastic.⁴

* Sarah K. Wiant is a Professor of Law at Washington and Lee University. These remarks were presented at the 2013 Washington and Lee Law Review Note Awards Colloquium as a Comment to Kyle A. Dolinsky's award-winning Note entitled *CAD's Cradle: Untangling Copyrightability, Derivative Works, and Fair Use in 3D Printing*.

1. See Jason B. Jones, *5 First Impressions of 3D Printing*, CHRON. HIGHER EDUC. (Aug. 27, 2013, 11:00 AM), <http://chronicle.com/blogs/profhacker/5-first-impressions-of-3d-printing/51923> (last visited Jan. 31, 2014) (discussing these and other “fiddly” possibilities with 3D printers) (on file with the Washington and Lee Law Review).

2. See Aaron Souppouris, *NASA Is Funding a 3D Food Printer, and It'll Start with Pizza*, VERGE (May 21, 2013, 7:24 AM), <http://www.theverge.com/2013/5/21/4350948/nasa-funding-3d-food-printer-pizza> (last visited Jan. 31, 2014) (describing a process of automating food production through “building blocks’ of food in powder cartridges” to cut down on waste) (on file with the Washington and Lee Law Review).

3. *Id.*

4. See Sean Gallagher, *Doctors Save Baby's Life with 3D-Printed Tracheal Implant*, ARS TECHNICA (May 23, 2013, 8:25 PM), <http://arstechnica.com/information-technology/2013/05/doctors-save-babys-life-with-3d-printed-tracheal-implant/> (last visited Jan. 31, 2014) (“Printed with bio-absorbable plastic, the [custom-designed 3D-printed] device is holding the child’s airway open and allowing him to breathe normally.”) (on file with the Washington and Lee Law Review).

According to Lux Research, 3D printing will be an \$8.4 billion market in 2025, led by automotive, medical, and aerospace applications.⁵ That will be an increase from \$777 million in 2012.⁶ However, consumer applications will have limited upside, while industrial uses will generate the most value.⁷

Printing in 3D raises many intellectual property issues that could lead to epic legal battles regardless of whether the level of printing requires a high degree of creativity or simply involves downloading some files from a web page and sending them to a printer.⁸ Manufacturers likely will be clamoring for greater protection as hobbyists copy toys and others copy designs and print items such as tables and chairs. These printers offer more than just copying; they offer a new tool for producing the designs of our imaginations. So, how do we begin to address the complicated intellectual property issues among the various copyright holders and users?

Mr. Dolinsky's Note focuses on three potential solutions to claims that undoubtedly will be raised as copyright holders contend that a CAD designer, a website, or an individual using a 3D printer infringed a protected work. First, he offers a test for the copyrightability of CAD files that control the functional interaction between design drawings and computer code components by reviewing each component separately.⁹ Second, he

5. Anthony Vicari, *The 3D Printed Part Market Will Grow to \$8.4 Billion in 2025, but Materials Suppliers Need to See the Small Print*, LUX RES. (June 1, 2013), <http://www.luxresearchinc.com/blog/2013/06/the-3d-printed-part-market-will-grow-to-8-4-billion-in-2025-but-materials-suppliers-need-to-see-the-small-print/> (last visited Jan. 31, 2014) (on file with the Washington and Lee Law Review).

6. *Id.*

7. *See id.* (providing a graph of the projected growth of the 3D-printed parts industry through 2025, which predicts that consumer growth will pale in comparison to growth in various manufacturing industries); *see also id.* ("In the longer term, 3D printing has potential to reshape the manufacturing ecosystem, but it will have the most impact in the near term for products that are made in small volumes, require high customization, and are more cost-tolerant.").

8. *See generally* Kyle A. Dolinsky, Note, *CAD's Cradle: Untangling Copyrightability, Derivative Works, and Fair Use in 3D Printing*, 71 WASH. & LEE L. REV. 591 (2014) (discussing copyright issues involving 3D printing in both the former and the latter scenarios).

9. *See id.* at 642–57 (proposing a test that treats the design drawing

applies the test to a variety of potentially derivative works in 3D printing.¹⁰ Finally, he recommends that courts should adopt Professor Lee's technological fair use standard.¹¹

Take as an example a knee joint for a puppet created by a theater professor who used a CAD program to design the joint and then sent the file to the printer for final reproduction. Although the end product is a 3D object, it seems to me that there is little legal difference between a writer who uses a word processing software package to write an article and a designer who uses a CAD program to create an object. Although parts of the software program have been copied and used in the drafting of the article, the software copyright remains with the copyright holder and a new copyright attaches to the article owner by the author. Here the copyright remains with the CAD program holder, no infringing copies were made, a new copyright attaches to the design of the knee joint, and the object is likely a protected derivative of the design file, presuming other tenets of copyright law are met.¹²

component as a technical drawing, assesses the copyrightability of the computer code through the abstraction–filtration–comparison test, and conducts a merger inquiry between the copyrightable drawing elements and any noncopyrightable code elements).

10. See *id.* at 657–66 (examining CAD files (both user-rendered and scanned) that are derivative of pre-existing 3D works, 3D-printed objects that are derivative of copyrighted CAD files, and 3D-printed objects that are derivative of pre-existing 3D works).

11. See *id.* at 666–81 (discussing how the existing fair use doctrine will yield inconsistent results in 3D printing cases and how Professor Lee's test will both provide consistency and allow the technology to flourish). Professor Lee's technological fair use test supplements the four statutory factors by taking into account the public benefit of the technology at issue and the effects on the marketability of the technology from a finding of no fair use. *Id.* at 673–75.

12. See, e.g., 17 U.S.C. § 101 (2012)

[T]he design of a useful article, shall be considered a[n otherwise copyrightable] pictorial, graphic, or sculptural work only if, and only to the extent that, such design incorporates pictorial, graphic, or sculptural features that can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article.

See also *id.* (defining a “useful article” as “an article having an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information”). A 3D-printed puppet's knee joint would probably be a noncopyrightable useful article, and would likely not be protected as a

Professor Lee proposes that courts, in applying the four-factor fair use test set out in 17 U.S.C. § 107,¹³ consider other factors including whether the copyright work is a new technology and whether there is a perceivable public benefit from the technology.¹⁴ He would add three inquiries to the fourth factor analysis.¹⁵ His test not only focuses on market harm caused by the infringement but also requires a consideration of the possible positive effects on the market.¹⁶ When the VCR was introduced into the market, copyright holders claimed that the market would be dramatically harmed.¹⁷ In fact, the market for movies was revived by the introduction of the sale and rental markets for VHS tapes and then movies on DVDs.¹⁸

derivative work. *See* Nat'l Med. Care, Inc. v. Espiritu, 284 F. Supp. 2d 424, 433–38 (S.D. W. Va. 2003) (concluding that a copyright on technical drawings of cabinets did not extend protection to the physical cabinets themselves).

13. 17 U.S.C. § 107. The four fair use factors are

(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.

Id.

14. Edward Lee, *Technological Fair Use*, 83 S. CAL. L. REV. 797, 835–54 (2010).

15. *See id.* at 854 (suggesting that courts should consider “whether the use supersedes the objects of the original copyrighted work,” “the technology’s possible positive effects on the potential market for the copyrighted work,” and “the effect a finding against fair use would have on the market for the speech technology in question”).

16. *See id.* (“Assuming that a court ‘reasonably perceives’ a public benefit from a technology under factor one, it is appropriate for the court to consider how that public benefit from the technology might be affected by the disposition of the case.”).

17. *See generally* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417 (1984) (concerning whether Sony’s Betamax VCR contributorily infringed on television studios’ and filmmakers’ copyrights).

18. *See* Lee, *supra* note 15, at 799 (“The sale of VCRs . . . facilitated the growth of a vast new and unforeseen market for the movie studios in the rental and sale of videos for home viewing, which, perhaps ironically, became ‘the largest source of revenue for the [U.S.] movie industry,’ even surpassing box office sales.” (footnotes omitted)).

I, too, think Professor Lee's test has some merit. Empirical research shows that courts are inconsistent in their application of the fair use test and that the effect on the market—the fourth factor—in spite of the Supreme Court's pronouncement to the contrary, is still the most important factor.¹⁹ Worse, the courts address the other factors and merge their analyses into the fourth factor.²⁰ The additional problem with placing the emphasis on the fourth factor is that the decision regarding fair use with regard to new technologies resolves not just the legality of the use of the copyrighted works but also the marketability of the technology itself. Just consider the introduction of the iPod, a device that operates by making copies and that was designed purposefully to make copies of copyrighted works. Without the layer of licensing, the introduction of such a technology could have been inhibited. Similarly, the designs of streaming video services of public performances to private viewings or recordings on DVRs raise similar concerns. Congress may need to apply fresh eyes to the next major revision to ensure that the law remains relevant. Unfortunately, given the cycle for significant copyright revisions,²¹ it is highly unlikely that Congress will amend a statute to make it easier for technologies that operate primarily by making copies to come to the market.

One area on which Mr. Dolinsky did not touch is the potential liability of libraries for copyright infringement as a

19. See Barton Beebe, *An Empirical Study of U.S. Copyright Fair Use Opinions, 1978–2005*, 156 U. PA. L. REV. 549, 551 (2008) (“The conventional wisdom is that regardless of what the Supreme Court has said, the fourth factor analysis remains the most influential on the outcome of the overall test.”). However, “we have failed to appreciate the true role of the fourth factor analysis in the section 107 test as applied.” *Id.*

20. See *id.* (“The fourth factor essentially constitutes a metafactor under which courts integrate their analyses of the other three factors and, in doing so, arrive at the outcome not simply of the fourth factor, but of the overall test.”).

21. Since 1900, Congress has enacted three major revisions to copyright law: the Copyright Act of 1909, the Copyright Act of 1976, and the Digital Millennium Copyright Act in 1998. Digital Millennium Copyright Act, Pub. L. No. 105-304, 112 Stat. 2860 (1998) (codified as amended at 17 U.S.C. §§ 512, 1201–1205, 1301–1332, 1401 (2012)); Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541–98 (codified as amended at 17 U.S.C. §§ 101–810); Copyright Act of 1909, Pub. L. No. 60-349, 35 Stat. 1075, *repealed by* Pub. L. No. 94-553, § 101, 90 Stat. 2541 (1976).

result of the unsupervised use of 3D printers to print both public domain files and copyrighted works. Many libraries, particularly public libraries, have already added 3D printers to the wide array of services offered.²² Libraries should ask themselves whether or not a 3D printing service should be subject to the same copyright regulations as photocopying a book or printing an online article, or if it should be subject to a whole new set of regulations. Under the current Copyright Act, § 108(f)(1)²³ frees a library from liability for unsupervised photocopy machine use by patrons “[p]rovided, [t]hat such equipment displays a notice that the making of a copy may be subject to the copyright law.”²⁴ Many libraries display a sign that says “Notice: Making a Copy May Be Subject to the Copyright Law.” It seems to me that most uses of 3D printers in libraries are analogous to printing in a more traditional manner. However, when photocopiers became widespread and relatively inexpensive to operate, copyright holders made arguments similar to those now raised by the various holders of the works copied by 3D printers.²⁵ Now, as then, libraries should not be held responsible for patron copying that exceeds the law; patrons themselves should be liable for any excessive copying. This should be true regardless of whether the copying in excess of fair use (whether we adopt Professor Lee’s modified technological fair use test) is done on an unsupervised

22. See Hector Tobar, *3-D Printing: Public Libraries’ Latest Step into the Digital World*, L.A. TIMES (Aug. 9, 2013), <http://articles.latimes.com/2013/aug/09/entertainment/la-et-jc-3d-printing-public-libraries-latest-step-into-the-digital-world-20130808> (last visited Jan. 31, 2014) (noting that libraries in Washington, D.C. and Cleveland, Ohio offer 3D printing to the public) (on file with the Washington and Lee Law Review); Andrea Peterson, *Need to Use a 3-D Printer? Try Your Local Library*, WASH. POST (Aug. 1, 2013, 8:15 AM), <http://www.washingtonpost.com/blogs/the-switch/wp/2013/08/01/need-to-use-a-3-d-printer-try-your-local-library/> (last visited Jan. 31, 2014) (noting, in addition to the Washington D.C. and Cleveland libraries, libraries in Connecticut, Wisconsin, and Kansas City) (on file with the Washington and Lee Law Review).

23. 17 U.S.C. § 108(f)(1) (2012).

24. *Id.*

25. See Laurie C. Tepper, *Copyright Law and Library Photocopying: An Historical Survey*, 84 LAW LIBR. J. 341, 348 (1992) (discussing how by the 1960s, publishers lost faith in their “Gentleman’s Agreement” with libraries from the 1930s regarding fair use because the Xerox photocopier enabled users to make cheap, fast photocopies).

3D printer by the user himself or under § 108(d) when the library reproduces a work at the request of the user.²⁶ In other words, a user may misrepresent herself to the library employee about the nature of a request for a 3D print. The user would be liable for infringement but the library would not if the unsupervised reproduction equipment contained some type of sign or notice concerning copyright compliance.

Although there is little consensus on what good legal scholarship ought to be, Eugene Volokh suggests that student articles must be on a topic broad enough to be useful.²⁷ An article is useful, I think, if readers can find something professionally valuable in it. I think Mr. Dolinsky's Note meets this test. An article ought to be narrow enough to be adequately covered and be persuasive.²⁸ The piece, in my thinking, falls into the category of law reform; the Note argues for changing or implementing a new test for copyrightability and encourages courts to adopt a new test for fair use. Here again, I think Mr. Dolinsky has risen to the challenge. Finally, I enjoy an article that is fun to read. This Note fits that criterion hands down.

26. See 17 U.S.C. § 108(d) (providing that a library shall not be liable for infringement when providing copies if the library provides a warning notice and "the library or archives has had no notice that the copy or phonorecord would be used for any purpose other than private study, scholarship, or research").

27. See EUGENE VOLOKH, *ACADEMIC LEGAL WRITING* 9 (3d ed. 2010) ("Good legal scholarship should make . . . a claim that is . . . useful . . . [and] seen by the reader to be . . . useful . . .").

28. See *id.* at 9, 23–31 (arguing that good legal scholarship should make a "sound" claim and explaining the possible pitfalls of prescriptive legal scholarship).