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# THE LAW AND 3D PRINTING

JASPER L. TRAN\*

## ABSTRACT

Recent years have seen extraordinary growth in the amount of legal scholarship and practice at the intersection of law and 3D printing. To help navigate this emerging field of 3D printing law, I created the accompanying Law and 3D Printing Bibliography. The published bibliography presented herein contains over 100 entries. The brief introductory comments to the published piece discuss the creation and contents of the bibliography, and provide suggestions for where one should begin their research in the area. The comments focus on (1) 3D printing's background, (2) historical growth pattern of law and 3D printing scholarship, (3) identification of law and 3D printing scholarship, (4) closing thoughts on the future of law and 3D printing scholarship. Appendix A provides a list of recommended starting places with publications and selected court cases through 2015.

## INTRODUCTION

In the past three years, we have witnessed extraordinary growth in the amount of legal scholarship and legal practice at the intersection of law and 3D printing.<sup>1</sup> For instance, since the 1990s the National Aeronautics and Space Administration (NASA) has been investing in 3D

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1. Terms used interchangeably with “3D printing law” or “3DP law” or “law and additive manufacturing” or “additive manufacturing law.” 3D printing also includes “3D-printed food” and “bioprinting.” See generally Jasper L. Tran, *To Bioprint or Not to Bioprint*, 17 N.C. J.L. & Tech. \_\_\_ (forthcoming 2015) [hereinafter Jasper L. Tran, *To Bioprint*] available at <http://ssrn.com/abstract=2562952>.

printing,<sup>2</sup> and the military has recently jumped on the bandwagon to fund projects for 3D-printed food, skin, weaponry, and equipment.<sup>3</sup> In 2012 the Department of Defense established the first additive manufacturing (i.e., 3D printing) research institute.<sup>4</sup>

Paven Mohatra, a partner at Kecker & Van Nest, observes “a gold rush underway as applicants sprint to the U.S. Patent and Trademark Office to stake claims on 3-D printing techniques and systems.”<sup>5</sup> The USPTO has granted 3,500 patents relating to 3D printing since 2003.<sup>6</sup> Since 2002, 500-700 applications have been filed per year.<sup>7</sup> Mohatra concludes, “[a]s these applications are processed—and approved—the number of patent lawsuits is likely to rise.”<sup>8</sup>

In 2014 the Federal Circuit decided its first 3D printing case.<sup>9</sup> In 2015, the Food and Drug Administration (FDA) has been busy thinking through how to regulate 3D-printed medical devices.<sup>10</sup> The Gartner analyst group speculates a global debate in 2016 for whether to regulate bioprinting or ban it altogether,<sup>11</sup> and an annual global intellectual property (IP) loss of at least \$100 billion from 3D printing by 2018.<sup>12</sup> Academics, too, have taken notice, with a number of symposia being of-

2. *3-D Printing*, NASA, <http://www.nasa.gov/3Dprinting/> (last visited Mar. 20, 2015). NASA is mostly interested in 3D-printed food to feed its astronauts when they are in space. *3D Printing: Food in Space*, NASA (May 23, 2013), [http://www.nasa.gov/directorates/spacetech/home/feature\\_3d\\_food.html#.VVYTi5NViko](http://www.nasa.gov/directorates/spacetech/home/feature_3d_food.html#.VVYTi5NViko)

3. See, e.g., Dr. Thomas Russell: *Research Vision*, 2 Army Tech. 4–5 (July–Aug. 2014), available at <http://usarmy.vo.llnwd.net/e2/c/downloads/352196.pdf>.

4. Its name is the National Additive Manufacturing Innovation Institute (NAMII). John F. Sargent Jr., *The Obama Administration’s Proposal to Establish a National Network for Manufacturing Innovation*, Cong. Res. Serv. (Jan. 29, 2014).

5. Paven Mohatra, *Trendy 3-D Printing Sure to Produce More IP Fights*, 138 Recorder, Feb. 17, 2014, at 1, available at [http://www.kvn.com/Templates/media/files/Articles/IP\\_Trendy%203-D%20Printing%20Sure%20To%20Produce%20More%20IP%20Fights\\_PVM\\_Recorder\\_2014.pdf](http://www.kvn.com/Templates/media/files/Articles/IP_Trendy%203-D%20Printing%20Sure%20To%20Produce%20More%20IP%20Fights_PVM_Recorder_2014.pdf).

6. *Id.*

7. *Id.*

8. *Id.*

9. See *DSM Desotech, Inc. v. 3D Sys. Corp.*, 749 F.3d 1332 (Fed. Cir. 2014).

10. Interview with Ralph Hall, Professor of Practice, University of Minnesota Law School, in Minneapolis, Minn. (Mar. 8, 2015) (stating how the FDA has been busy in the past 3 months to figure out how to regulate 3D-printed medical devices) [hereinafter Interview with Hall].

11. Jasper L. Tran, *To Bioprint*, supra note 1, at n.38 (citing Press Release, The Garner Group, *Gartner Says Uses of 3D Printing Will Ignite Major Debate on Ethics and Regulation* (Jan. 29, 2014), available at <http://www.gartner.com/newsroom/id/2658315> (“Rapid development of 3D bioprinters will spark calls to ban the technology for human and nonhuman use by 2016”)).

12. *Id.* at n.169 (citing Gartner: *3D Printing to Result in \$100 Billion IP Losses per Year*, 3Ders.org (Oct. 14, 2013), <http://www.3ders.org/articles/20131014-gartner-3d-printing-to-result-in-100-billion-ip-losses-per-year.html>).

ferred around the country.<sup>13</sup>

Given its long-term potential to reshape the legal system, as well as the ways in which the law is already moving 3D printing into courtrooms and legislatures,<sup>14</sup> it is important for the legal community to have resources with which they can learn about and engage with 3D printing law. Such resources are all the more important because 3D printing is, for most law students and practicing lawyers, a technology with which they have little or no experience. To help navigate this emerging field, I created the accompanying Law and 3D Printing Bibliography to catalog legal scholarship on this emerging technology.

I offer in these brief introductory comments background on the creation and contents of the bibliography, and provide suggestions for where one should begin their research in the area. The comments focus on the following four areas:

- (1) 3D printing's background
- (2) Historical growth pattern of law and 3D printing scholarship
- (3) Identification of law and 3D printing scholarship;
- (4) Closing thoughts on the future of law and 3D printing scholarship.

Appendix A provides a list of recommended resources for those who wish to further their understanding of the field. It includes publications and selected court cases through 2015. To participate in the ongoing discussion of 3D printing law, scholars should be aware of the current landscape of legal scholarship on 3D printing law.

## I. 3D PRINTING'S BACKGROUND

3D-printers resemble the Star Trek<sup>15</sup> Replicator<sup>16</sup>—a machine that

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13. For instance, in August 2014, Hastings Law Journal hosted a symposium titled "The Legal Dimension of 3D Printing." Symposium, *The Legal Dimensions of 3D Printing*, 65 *Hastings L.J.* 1469 (2013-14). In February 2015, the Florida State University Office of Research hosted a symposium titled "Stacking Layers II." *Stacking Layers II*, Fla. State Univ. Off. of Research (2015), available at <http://stackinglayers.fsu.edu/>. In the same month, Georgetown's Southwestern University also hosted a symposium titled "What Things May Come: 3-D Printing in the Fine Arts and Sciences." *What Things May Come: 3-D Printing in the Fine Arts and Sciences*, Southwestern: Brown Symposium (Feb. 26-27, 2015), available at <http://www.southwestern.edu/academics/brownsymposium/>.

14. Interview with Hall, *supra* note 10.

15. Star Trek is an American science fiction ("sci-fi") TV series created by Gene Roddenberry in the 1960s and owned by CBS and Paramount Pictures. See generally Maire Messenger Davies & Roberta Pearson, *The Little Program That Could: The Relationship Between NBC and Star Trek*, in *NBC: AMERICA'S NETWORK 208-23* (Michele Hilmes & Michael Henry eds., 2007).

16. In Star Trek, the Replicators originally synthesized meals on demand, but took on other uses in the later series. See *Star Trek: The Original Series* (NBC television

can constitute any physical matter out of thin air.<sup>17</sup> 3D printers can print out anything, from a lithium-ion microbattery<sup>18</sup> to a human kidney,<sup>19</sup> and can print in materials like plastic, metal, ceramic, cement, wood, food, and human cells.<sup>20</sup>

3D printers print by setting raw ingredients into two-dimensional patterns on a platform and gradually raising to stack one layer on top of another until completion.<sup>21</sup> Similar to (2D) printers,<sup>22</sup> 3D printers need to follow an electronic blueprint to print, called a Computer-Aided Design file (“CAD file”).<sup>23</sup> Users can create CAD files by designing from scratch or scanning an object, then edit and share CAD files with others through the Internet.<sup>24</sup>

Soon, the 3D printer will be just another home appliance.<sup>25</sup> “A world in which everyone has advanced 3D printers at home or available in a public facility is a world in which manufactured goods no longer have to be produced in bulk and are no longer scarce,”<sup>26</sup> says Stanford Law Professor Mark A. Lemley.

One interesting subset of 3D printing is bioprinting, the printing of mammalian or human body parts.<sup>27</sup> Bioprinting uses synthetic biology’s basic biological building blocks and the 3D printer’s mechanics to form functional living tissues by stacking multiple layers of cells within a gel-based material.<sup>28</sup> I coined the term “cloneprinting” to denote the bioprinting of an entire copy of an organism, either naturally existing or

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broadcast Sept. 8, 1966–June 3, 1969) (referred to as “food synthesizer”); *Star Trek: The Next Generation* (NBC television broadcast Sept. 28, 1987–May 23, 1994); *Star Trek: Enterprise* (NBC television broadcast September 26, 2001–May 13, 2005) (referred to as “protein resequencer” and “bio-matter resequencer”).

17. Jasper L. Tran, *To Bioprint*, *supra* note 1, at 2.

18. Ke Sun et al., *3D Printing of Interdigitated Li-Ion Microbattery Architectures*, 25 *ADVANCED MATERIALS* 4539, 4539–43 (2013). A microbattery is sized at a grain of sand. *Id.*

19. Anthony Atala, *Printing a Human Kidney*, TED (Mar. 2011), <http://ed.ted.com/lessons/printing-a-human-kidney-anthony-atala> (demonstrating a 3D printer using living cells to output a transplantable kidney”).

20. Jasper L. Tran, *To Bioprint*, *supra* note 1, at 6 & n.52.

21. *Id.* at 7.

22. 2D printers also need to follow an electronic blueprint to print, like a PDF document or the like. *Id.* at n.56.

23. *Id.* at 8 & n.56.

24. *Id.* at 8 & nn.57–58.

25. Steven Kurutz, *The 3D Printer May Be the Home Appliance of the Future*, N.Y. TIMES, Feb. 20, 2013, at D1, available at <http://www.nytimes.com/2013/02/21/garden/the-3-d-printer-may-be-the-home-appliance-of-the-future.html?pagewanted=all>.

26. Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y.U. L. REV. 460, 474–75 (2015).

27. Jasper L. Tran, *To Bioprint*, *supra* note 1,

28. *Id.*

man-made.<sup>29</sup>

## II. HISTORICAL GROWTH PATTERN OF LAW AND 3D PRINTING SCHOLARSHIP

It is unsurprising that constitutional issues attract many legal scholars' attention. For instance, 3D printing law has lured some interest regarding the implication of 3D-printed guns in the landscape of the Second Amendment.<sup>30</sup> Most recently, I argued that 3D printers fall under the umbrella of the Press Clause's meaning because the "freedom of the press"<sup>31</sup> covers the printing press as a technology in addition to the press as an industry.<sup>32</sup>

Likewise, intellectual property questions are "hot," especially when it comes to patent and copyright.<sup>33</sup> 3D printing does in fact transform the world of copyright, which originally reigns over (2D) printed documents.<sup>34</sup>

Other interesting issues are regulation and safety. For instance, Congress is still scratching its head on how to regulate 3D printing and 3D-printed products, especially 3D-printed food, medical devices, and bioprints.<sup>35</sup> Regarding safety, the intersection of 3D printing and product liability presents an interesting scenario.<sup>36</sup>

Currently, there is no official publication outlet for 3D printing law. Legal scholarship was found in either flagship or specialty law journals. There is currently no book on the law & 3D printing.

Computer software and wireless technologies currently dominate the patent litigation market.<sup>37</sup> Once the dust settles with computer

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29. *Id.*

30. See, e.g., Josh Blackman, *The 1st Amendment, 2nd Amendment, and 3D Printed Guns*, 81 TENN. L. REV. 479 (2014).

31. U.S. CONST. amend. I.

32. Jasper L. Tran, *Press Clause and 3D Printer*, 14 NW. J. TECH. & INTELL. PROP. \_\_\_\_ (2015), available at <http://ssrn.com/abstract=2614606>.

33. See, e.g., Jasper L. Tran, Symposium, *Patenting Bioprinting*, HARV. J.L. & TECH. DIG. \_\_\_\_ (forthcoming 2015) [hereinafter Jasper L. Tran, *Patenting Bioprinting*]. See generally, *Timing Matters: Prior Art's Age Infers Patent Nonobviousness*, 50 GONZAGA L. REV. 189 (2015).

34. See, e.g., Kyle Dolinsky, *Cad's Cradle: Untangling Copyrightability, Derivative Works, and Fair Use in 3D Printing*, 71 Wash. & Lee L. Rev. 591 (2014); Joseph C. Storch, *3-D Printing Your Way Down the Garden Path: 3-D Printers, the Copyrightization of Patents, and A Method for Manufacturers to Avoid the Entertainment Industry's Fate*, 3 NYU J. INTELL. PROP. & ENT. L. 249 (2014).

35. Jasper L. Tran, *To Bioprint*, *supra* note 1; Interview with Hall, *supra* note 10.

36. See Nicole D. Berkowitz, Note, *Strict Liability for Individuals? The Impact of 3-D Printing on Products Liability Law*, 92 WASH. U. L. REV. 1019 (2015); Nora Freeman Engstrom, Essay, *3-D Printing and Product Liability: Identifying the Obstacles*, 162 U. PA. L. REV. ONLINE 35 (2013).

37. See, e.g., Colleen V. Chien, *Of Trolls, Davids, Goliaths, and Kings: Narratives*

software and hardware and as 3D printing moves into more households as a home appliance, I anticipate future IP litigation will shift its main focus to 3D printing disputes.

There remain many unexplored questions about 3D printing and its subcategories. This bibliography hopes to excite and inspire those who may someday produce similar scholarship of their own to enrich this emerging field of 3D printing law.

### III. IDENTIFICATION OF LAW AND 3D PRINTING SCHOLARSHIP

The Law and 3D Printing Bibliography focuses on scholarship that has meaningfully engaged with the intersection of law and 3D printing.<sup>38</sup> That is, only scholarships integrating both legal and scientific discussion and/or analysis in a single text—not 3D printing research that has potential legal implications nor legal scholarship that may benefit from 3D printing perspectives and research, has been included.<sup>39</sup>

I constructed this bibliography through a series of (1) online searches conducted in the Journals and Law Reviews (JLR) database in WestlawNext; (2) online searches conducted through Social Science Research Network (SSRN); and (3) additional online searches in scientific databases such as PubMed and ScienceDirect. Additionally, I conducted searches in multiple waves over the course of the calendar year, September 2014 through May 2015. I limited my research to only articles that deal with American law in some shape or form. I utilized a variety of 3D-printing-related search terms, both in article titles and in the full text of articles.<sup>40</sup>

The searches returned a large number of hits, which I then filtered through a three-tier process.<sup>41</sup> Tier I included those articles clearly ripe for inclusion, dealing with both law and 3D printing. At the other end of the spectrum, Tier III included those articles clearly excluded because they simply mentioned the search term in a footnote, or otherwise did not substantively engage in the subject matter. I took additional steps to review articles in the middle for Tier II because these articles en-

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*and Evidence in the Litigation of High-Tech Patents*, 87 N.C.L. REV. 1571, 1580 n.44 (2009).

38. I focus here on *published* works, including works with forthcoming publication, but not works in progress.

39. See Francis X. Shen, *The Law and Neuroscience Bibliography: Navigating the Emerging Field of Neurolaw*, 38 INT'L J. LEGAL INFO. 352, 355 (2010).

40. These search terms included, both individually and in combination: 3D print!, three dimension! print!, bioprint!, additive manufacture!, and others.

41. For instance, a search conducted in March 2015 for the search term “3D print!” across all years of the WestlawNext database returned 495 results. In general, the author found that the irrelevant hits were in large part generated by singular references to 3D printing in the bodies of the articles or footnotes. The term “3d printing” sometimes appeared in a book citation indicating the third time the book was printing.

gaged somewhat, but not entirely, with law and 3D printing. To determine whether or not to include these middle-tier articles, I employed three decision rules. First, I selected articles containing at least one section specifically dedicated to an integrated 3D printing and law/policy discussion; a discussion must be essential to an article's conclusion.<sup>42</sup> Second, this discussion must appear in the article with substantive weight—discussion in footnotes does not suffice.<sup>43</sup> Third, to define what constitutes “discussing 3D printing” for the law articles and “discussing law” for the science articles about 3D printing,<sup>44</sup> I did not expect science articles to also be legal treatises, nor that legal articles present 3D printing scientific advancement; rather, I employed a “totality of the circumstances” approach to determine whether the discussion was substantive enough to merit inclusion.<sup>45</sup>

For the selected caselaw,<sup>46</sup> I conducted online searches in the court cases database available on WestlawNext. I included the court cases that deal with the legal issues arising out of 3D-printing technologies.

#### IV. FUTURE OF LAW AND 3D PRINTING SCHOLARSHIP

Past performance in law and 3D printing scholarship may not predict future returns in the field—3D printing law could have “its moment in the scholarly sun, and fail[] to flourish.”<sup>47</sup> To avoid such a fate, both inventors and lawyers need to do the difficult translational work to allow the laboratory to inform the law.<sup>48</sup> Researchers, practitioners, scholars and law librarians can use the Law and 3D Printing Bibliography as a tool when they do interdisciplinary work. But clearly, those who wish to understand and advance this interdisciplinary field require more. Thus, I conclude with a few thoughts on the future of law and policy in response to emerging 3D-printing products.

First, and especially relevant to law librarians, both students and professors interested in this field may be likely to seek out 3D printing resources to learn about the technology behind 3D printing and different 3D-printed products. There is a tremendous amount of free, online material readily available to provide introductions with the knowledge base required for effective work in the field. Since 3D printing is a grow-

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42. See Shen, *supra* note 37, at 356.

43. *Id.*

44. *Id.*

45. *Id.* The judgment calls are, of course, subject to debate, and the bibliography is thus an organic document, open to revisions and additions.

46. The caselaw was “selected” because I did not conduct a PACER search. Although there might be more 3D-printing-related cases than presented, the Bibliography's list serves as a good starting place to research 3D printing caselaw.

47. See Shen, *supra* note 37, at 356.

48. See *id.*



ing field,<sup>49</sup> it is important to stay abreast of new 3D-printed products.

Second, although “law and 3D printing” is useful as a general descriptive phrase, it remains too vague to be applicable in particular research and applied contexts. In practice, it is particular aspects of law that may be affected by particular types of 3D printing research.<sup>50</sup> Broad pronouncements about the future of law and 3D printing should be, in practice, refined to dialogue about more precisely defined intersections. Much of the scholarship included in the bibliography does just this, reviewing a specific set of 3D-printed products (e.g., bioprinting<sup>51</sup>) and applying them to a particular problem of law. More of this precise, detailed work will be required in the years to come.

Third, new 3D-printed products are coming out every day.<sup>52</sup> The field is no longer in its infancy,<sup>53</sup> but neither has it reached maturity. With each new 3D-printed product comes with new disruption to the current legal system (e.g., 3D-printed gun<sup>54</sup>). This calls for a resolution of its respective complex legal issues. Legal scholars and thinkers are badly needed to work through and address this emerging field of 3D printing law.

#### APPENDIX A. RECOMMENDED RESOURCES FOR GENERAL INTRODUCTIONS TO THE FIELD OF LAW AND 3D PRINTING

Jasper L. Tran, *To Bioprint or Not to Bioprint*, 17 N.C. J.L. & TECH. \_\_\_\_ (forthcoming 2015).

Deven R. Desai & Gerard N. Magliocca, *Patents, Meet Napster: 3D Printing and the Digitization of Things*, 102 GEO. L.J. 1691 (2014).

Kyle Langvardt, *The Replicator and the First Amendment*, 25 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 59 (2014).

Lucas S. Osborn, Symposium, *Of PhDs, Pirates, and the Public: Three-Dimensional Printing Technology and the Arts*, 1 TEX. A&M L. REV. 811 (2014).

HOD LIPSON & MELBA KURMAN, *FABRICATED: THE NEW WORLD OF 3D PRINTING* (2013).

CHRIS ANDERSON, *MAKERS: THE NEW INDUSTRIAL REVOLUTION*

49. Lemley, *supra* note 26, at 471 (“3D printing[s] . . . potential for transformation is clear.”).

50. For example, 3D-printed food, medical devices and bioprinting present complete different set of legal issues. See Jasper L. Tran, *To Bioprint*, *supra* note 1; Interview with Hall, *supra* note 10.

51. Jasper L. Tran, *To Bioprint*, *supra* note 1.

52. See, e.g., Lemley, *supra* note 26, at 471 (“3D printing[s] . . . potential for transformation is clear.”).

53. *But see id.* (“3D printing is in its infancy as a technology”).

54. See, e.g., Blackman, *supra* note 30.

(2012).

#### LAW AND 3D PRINTING BIBLIOGRAPHY<sup>55</sup>

This bibliography<sup>56</sup> includes publications and selected court cases through 2015. Publication entries are listed by year, and then by first author's last name. Court cases' entries are listed by date.

2015 and after

Lucas S. Osborn, *Intellectual Property's Digital Future*, in RESEARCH HANDBOOK ON DIGITAL TRANSFORMATIONS (F. Xavier Olleros and Majlinda Zhegu eds., forthcoming 2016).

Jasper L. Tran, Essay, *3D Printing and the Law: An Overview*, MINN. L. REV. DE NOVO (forthcoming 2016).

Nicole D. Berkowitz, Note, *Strict Liability for Individuals? The Impact of 3-D Printing on Products Liability Law*, 92 WASH. U. L. REV. 1019 (2015).

Daniel Harris Brean, *Patenting Physibles: A Fresh Perspective for Claiming 3D-Printable Products*, 55 SANTA CLARA L. REV. \_\_\_\_ (forthcoming 2015).

Danton Bryans, Comment, *Unlocked and Loaded: Government Censorship of 3D-Printed Firearms and A Proposal for More Reasonable Regulation of 3d-Printed Goods*, 90 IND. L.J. 901 (2015).

Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CAL. L. REV. 513 (2015).

Katie Curtis, Note, *A Wiki Weapon Solution: Firearm Regulation for the Management of 3D Printing in the American Household*, 41 RUTGERS COMPUTER & TECH. L.J. 74 (2015).

Timothy R. Holbrook & Lucas Osborn, *Digital Patent Infringement in an Era of 3D Printing*, 49 U.C. DAVIS L. REV. 1319 (2015).

John F. Hornick & Kai Rajan, *Intellectual Property in 3D Printing and Nanotechnology*, in LIJIE GRACE ZHANG ET AL., 3D BIOPRINTING AND NANOTECHNOLOGY IN TISSUE ENGINEERING AND REGENERATIVE MEDICINE 349–64 (2015).

Peter Jensen-Haxel, *A New Framework for A Novel Lattice: 3d Printers, DNA Fabricators, and the Perils in Regulating the Raw Materials of the Next Era of Revolution, Renaissance and Research*, 5 WAKE FOREST J.L. & POL'Y 231 (2015).

Elizabeth J. Kennedy & Andrea Giampetro-Meyer, *Gearing Up for*

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55. Additions and corrections to the bibliography should be sent to Jasper L. Tran: tran4lr@gmail.com.

56. For a list of technical articles not necessarily related to law, Wohlers Associates keeps an up-to-date database of Internet and Magazine articles. See *Articles and Other Publications*, WOHLERS ASSOCS, <http://www.wohlersassociates.com/technical-articles.html> (last visited Mar. 20, 2015).

*the Next Industrial Revolution: 3D Printing, Home-Based Factories, and Modes of Social Control*, 46 LOY. U. CHI. L.J. 955 (2015).

Jan Kietzmann et al., *Disruptions, Decisions, and Destinations: Enter the Age of 3-D printing and Additive Manufacturing*, 58 BUS. HORIZONS 09 (Mar.–Apr. 2015).

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Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y.U. L. REV. 460 (2015).

Tyler Macik, Note, *Global Data Meets 3-D Printing: The Quest for a Balanced and Globally Collaborative Solution to Prevent Patent Infringement in the Foreseeable 3D-Printing Revolution*, 22 IND. J. GLOBAL LEGAL STUD. 149 (2015).

Nathan Reitinger, *Cad's Parallel to Technical Drawings: Copyright in the Fabricated World*, 97 J. PAT. & TRADEMARK OFF. SOC'Y 111 (2015).

Benjamin J. Siders & Kirk A. Damman, *Emerging Challenges in Tabletop Gaming: Player Modifications, Third-Party Parts, and Disruptive Technology*, 7 LANDSLIDE 52 (2015).

Michael L. Smith, *The Second Amendment Implications of Regulating 3D Printed Firearms*, 31 SYRACUSE J. SCI. & TECH. L. REP. 60 (2015).

Jasper L. Tran, *The Law and 3D Printing*, 31 J. MARSHALL J. INFO. TECH. & PRIVACY L. \_\_\_\_ (2015).

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Mathew Varkey & Anthony Atala, *Organ Bioprinting: A Closer Look at Ethics and Policies*, 5 WAKE FOREST J.L. & POL'Y 275 (2015).

Charlie Wapner, *Progress in the Making: 3D Printing Policy Considerations through the Library Lens*, OITP PERSPECTIVES (Jan. 2015), available at [http://www.ala.org/offices/sites/ala.org.offices/files/content/3D\\_Library\\_Policy-ALA\\_OITP\\_Perspectives-2015Jan06.pdf](http://www.ala.org/offices/sites/ala.org.offices/files/content/3D_Library_Policy-ALA_OITP_Perspectives-2015Jan06.pdf).

Michael N. Widener, *Shared Spatial Regulating in Sharing-Economy Districts*, 46 SETON HALL L. REV. \_\_\_\_ (forthcoming 2015).

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