

3D Printing Law



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3D Printing Law

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Presenter

PROF. SARA ANNE HOOK is professor of Informatics at Indiana University School of Informatics and Computing, IUPUI, where she has developed a suite of courses in the emerging field of legal informatics. She also has served as adjunct professor of law at the Robert H. McKinney School of Law, Indiana University, Indianapolis, where she has taught courses in intellectual property law and professional responsibility. Professor Hook is admitted to practice in Indiana and before the Supreme Court of the United States. She is a member of the American Intellectual Property Law Association (AIPLA), the Indiana State Bar Association, the International Legal Technology Association (ILTA), and of the Board of Governors of the Organization for Legal Professionals (OLP). Professor Hook regularly publishes and gives presentations on intellectual property law, electronic discovery, legal technology, legal research techniques, and issues related to privacy and security. She earned her B.A. and M.L.S. degrees from the University of Michigan; her M.B.A. degree from the Kelley School of Business, Indiana University; and her J.D. degree from the Robert H. McKinney School of Law, Indiana University, Indianapolis.

3D Printing Law

Sara Anne Hook, M.B.A., J.D.
November 2, 2016



My Interest in 3D Printing Law



- I am a lawyer and a professor in the Indiana University School of Informatics and Computing in Indianapolis.
- My primary areas of teaching and research are intellectual property law, legal informatics, cybersecurity, electronic discovery and entrepreneurship.
- I have been an active member of the American Intellectual Property Law Association (AIPLA) for many years.
- I have a passion for art and music, but especially Baroque flute.
- Our school offers several courses in 3D printing, along with printing labs, and two of my colleagues have special expertise in this area.
- One colleague, Zebulun Wood, worked with the Indiana University School of Dentistry to fashion a prosthesis for a patient who had lost part of his jaw.
- My other colleague, Albert William, and I collaborated to 3D print a Baroque flute for me.
- Prof. William and I presented our on the 3D printed flute, including various prototypes, at the 2015 Annual Conference of the National Flute Association.

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What is 3D Printing?

- According to Hall and colleagues,
 - 3D printing is a process of making a three-dimensional solid object of virtually any shape from a digital model. The process uses an additive process, where successive layers of material are laid down in different shapes, according to a digital blueprint, generated by computer aided design (CAD) or animation modelling software. By "slicing" the blueprint into digital cross-sections, the printer deposits the manufacturing material (liquid, powder, or sheet material) gradually building up layers, until complete. The virtual model and the physical article are almost identical. (Matthew Hall *et al.*, 3D Printing: Top Ten IP Challenges, *Association of Corporate Counsel*, July 3, 2013, <http://www.acc.com/legalresources/publications/topten/tdpipc.cfm>, accessed 10/12/16.)

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What is 3D Printing, cont.

- The process allows for rapid prototyping, rapid manufacturing and mass customization of products or components, and can reduce significantly new product development time, testing and costs. The technology has been used in the manufacture of jewelry, footwear, furniture, weapons, spare parts, and even food, as well as in architecture, civil engineering, construction and motor vehicle, aircraft and aerospace and dental and medical industries. (*Id.*)
- Its application is unlimited, except by our imaginations. (*Id.*)

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Some Examples: Dental Prosthetics



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The Happy Patient



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Some Examples: A Baroque Flute



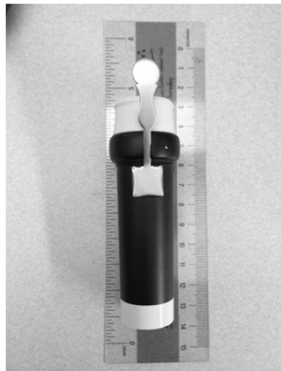
- The slides about the 3D printed flute project provided by my colleague, Prof. Albert William.
- Making the flutes demonstrates one of the major differences with 3D printing, which is that it is an additive versus subtractive manufacturing technology.
- Interestingly, one of the first questions that Prof. William asked when I proposed the project and provided one of my Baroque flutes as a starting point was whether there were any concerns related to copyright infringement.

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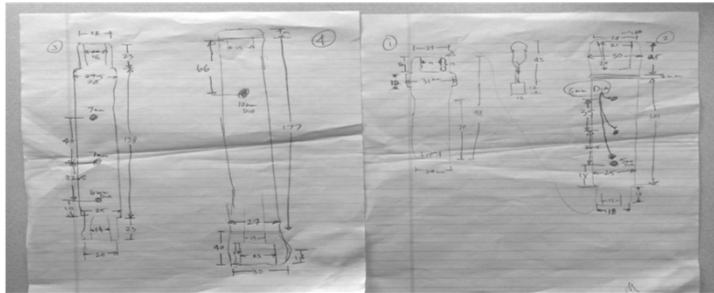
How is a 3D Printed Flute Made?

- Make precise measurements of an existing flute
- Take lots of photos



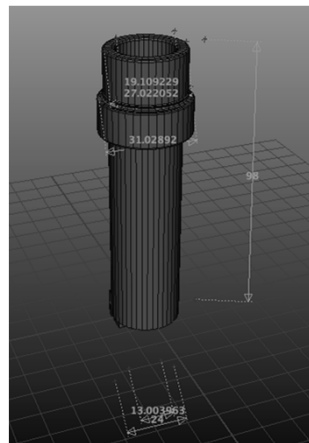
How is a 3D printed flute made?

- Make some sketches

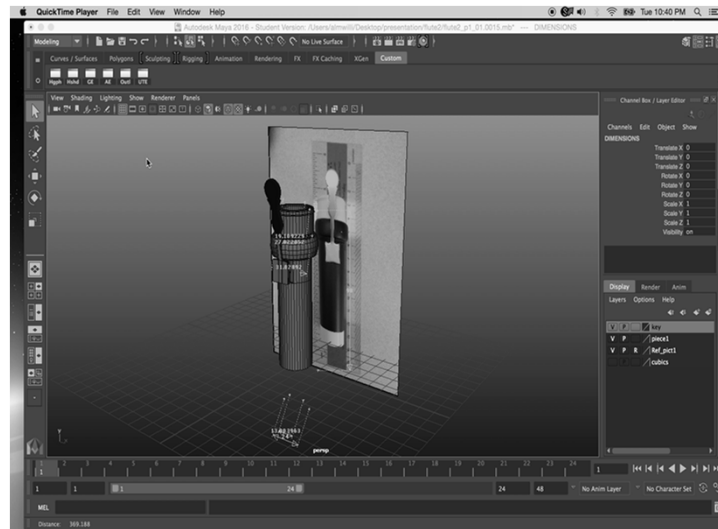


Model in 3D Program

- Used Autodesk Maya
 - Other programs can be more accurate
- Imported photos and sketches
- Set up a measuring system to be able to build on a precise grid-millimeters
- Scale reference photos to the grid



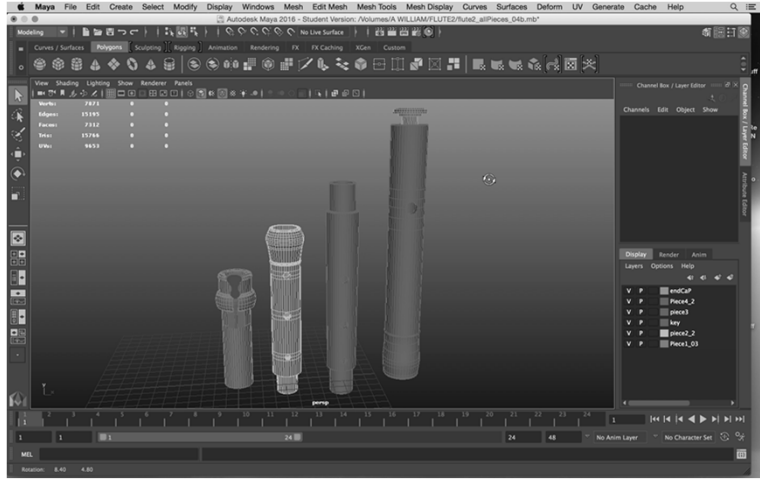
Use of Coordinate System



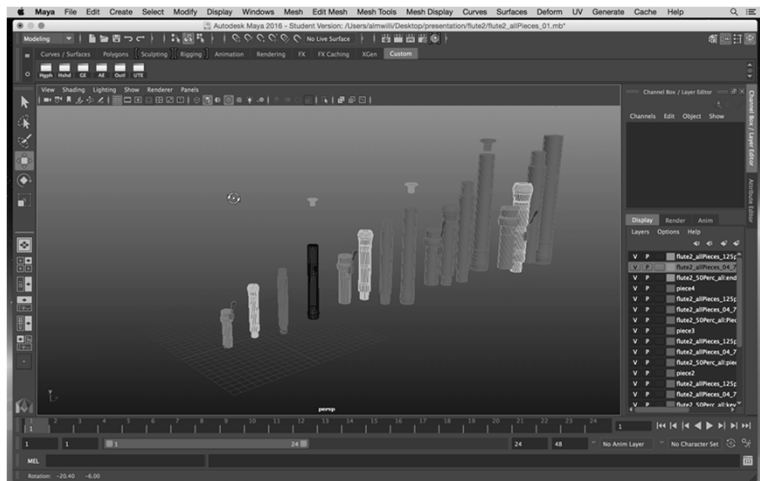
Build the Model

- Polygon models
 - ~7500 quads
- Built from simple shapes
- Keep as simple as possible
- Needs to be waterproof
- Clean up model, check for problems
- Can introduce design modifications

Scale Models

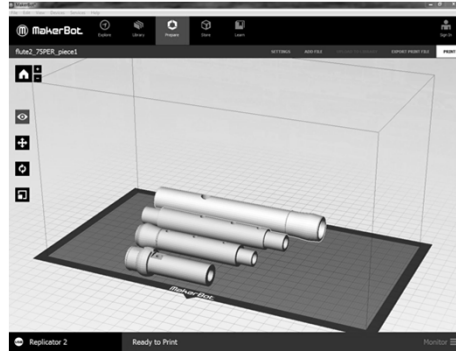


Scale Models

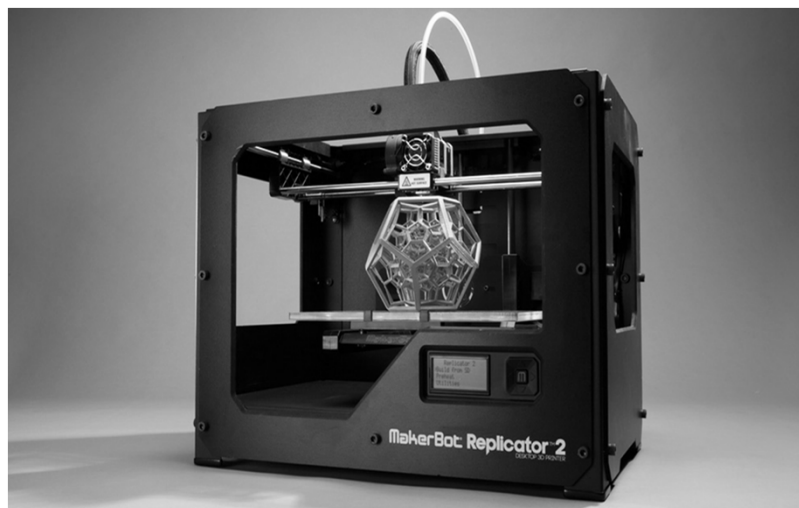


MakerWare

- Software for printer
- Slices the model
- Sends info to printer



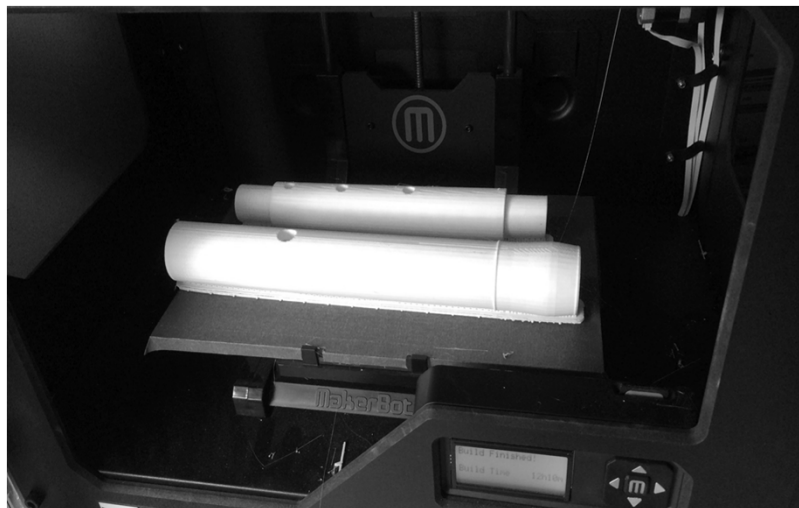
MakerBot



MakerBot

- Uses PLA plastic
- Can adjust many factors
 - Thickness of walls
- Extrudes a filament at 0.2 mm
- Lays down a raft and supports
- Print time varied from 2 hours to 22 hours

Results





Post-Production

- Need to clean up surfaces
- Remove rafts and supports
- Smooth out irregularities
- Use x-acto and dremel tools



Clean-up



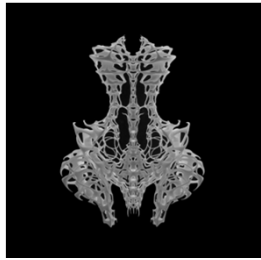
3D Printing of Other Instruments

- 3D-Printed Cello: Video: Met Orchestra cellist performs 3D-printed cello. *The Strad* (April 23, 2015), <http://www.thestrad.com/cpt-latests/met-orchestra-cellist-performs-3d-printed-cello/> (last visited 9/29/16).
- 3D-Printed Violin: 2-string 3D printed violin to be revealed in New York. *The Strad* (March 9, 2015), <http://www.thestrad.com/cpt-latests/2-string-3d-printed-violin-revealed-new-york/> (last visited 9/29/16).
- 3D-Printed Violin Bow: Student Creates 3D Violin Bow. *The Strad* (May 27, 2015), <http://www.thestrad.com/cpt-latests/student-creates-3d-printed-violin-bow/> (last visited 9/29/16).
- 3D-Printed Guitar
<http://www.odd.org.nz/atom.html> (last visited 9/29/16).



Some Examples: 3D Printing Used for Fashion Design

- Iris van Herpen: *Transforming Fashion*, Exhibit at the Grand Rapids Art Museum (GRAM), October 23, 2016 – January 15, 2017.



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Implications for Fashion Design

- Piracy is already rampant within the fashion industry.
- Legislation has been introduced that would attempt to provide more protection for fashion design under a variety of legal doctrines.
- For example, H.R. 2511, the Innovative Design Protection and Piracy Protection Act (112th Congress, 2011-2011), would extend copyright protection to fashion designs and revise the definition of “useful article” to include an article of apparel.
- Luczkow provides an exceptionally fine article about the risks posed to fashion design from 3D printing, reviewing first some of other technologies that have contributed to piracy and then explaining why protection is lacking under current copyright, trademark and patent law. (Anna M. Luczkow, *Haute Off the Press: Refashioning Copyright Law to Protect American Fashion Designs from the Economic Threat of 3D Printing*. 100 *Minn. L. Rev.* 1131 (2016).

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Threats to Fashion Design

- As Luczkow concludes,
 - “[t]hough the fashion industry is not alone in fearing the arrival of personal 3D printers, it is one of the few without enforceable rights. Society is not far off from a time when consumers will be able to select a runway look from Style.com, scan the image onto their computer, and print off the design to wear the following day. Though it is unclear at this point what rights 3D printing's components will vest in users, one thing appears clear: consumers will be free to do with these components as they please, regardless of the fashion designs they imitate.” (*Id.* at 1170).

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Threats to Fashion Design, cont.

- As the author continues,
 - “[t]his rapid advancement in technology, coupled with cultural changes and shifting attitudes about fashion, signals to the legal community that the time is ripe to reconsider the underlying rationale for unprotected fashion design. Though proponents of bills to grant protection to fashion designs offer similar reasoning, these rationales are not comprehensive enough to guide future courts in making the distinction between protectable and unprotectable subject matter. This Note seeks to do just that, relying on 3D printing's potential effect on the fashion industry as a guide for what types of fashion design the law should protect. Unless and until a bill has passed, however, fashion designers should take advantage of 3D printing while it is still in its infancy to establish themselves as purveyors of the technology, rather than doomed observers.” (*Id.*)

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Another Use of 3D Printing – In the Courtroom

- A number of authors report on the exciting possibilities for 3D printing in the courtroom:
 - Lorelei Laird, Florida Company Offers 3D Printing for Demonstrative Evidence, *ABA Journal*, February 1, 2015.
 - Printing a Verdict: The Power of 3D Printed Evidence at Trial. *IMS Expert Services*, July 28, 2015.
 - Samuel G. Sudler, III. *Use of 3D Printing in Forensic Investigations*. S-E-A, Ltd.
 - Forensic Uses of 3D Printing. *Objex Unlimited*, April 4, 2014, <http://objexunlimited.com/forensic-uses-3d-printing/>, accessed 10/12/16. Among the uses are footprints, facial reconstruction and identification, fingerprint examination, accident reconstruction and structural and industrial accidents.
 - Chance A. McMillan, Using Technology in the Courtroom. *50 Houston Lawyer* 20 (March/April 2013).

From Forensic Uses of 3D Printing



Lawyers Becoming Aware of the Legal Issues with 3D Printing

- Hunton & Williams has established a cross-practice 3D printing team that has been formed to advise its clients on a wide range of legal topics related to the industry and technology.
 - As indicated in the article, many of its clients are already preparing for any potential legal roadblocks ahead. (Scott J. Grunewald, Global Law Firm Hunton & Williams Launches New Team Dedicated to Dealing with 3D Printing Legal Issues. *3DPrintBoard.com*, April 21, 2016.)
- Recently, the Cleveland-based law firm of Benesch offered its second annual 3D printing conference, with an emphasis on the legal issues with 3D printing. (Scott J. Grunewald, Cleveland Law Firm Benesch Is Hosting Its Second Annual 3D Printing Conference on April 21st, Focusing on 3D Printing Legal Issues, *3DPrintBoard.com*, April 13, 2016.)
 - Among the topics advertised as being covered were impact of 3D printing on the manufacturing industry, the maker movement, product liability, licensing of digital files and intellectual property law concerns.

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Legal Issues with 3D Printing

- Coraggio identifies the following questions as the top three legal issues with 3D printing, noting that 3D printing will change the world as we know it because it will be possible to recreate any type of item by means of a 3D printer. (Giulio Coraggio, Top 3 Legal Issues of 3D Printing. *Technology's Legal Edge*, September 7, 2015.)
 - Is 3D printing the new piracy?
 - Who is liable for products manufactured through 3D printers?
 - Are replicas privacy threats? He goes on to state that “[a]n issue that is quite rarely addressed is that CADs and replicas might contain personal data. Indeed, 3D printers are often used to test surgeries for instance. In such case the doctor will manufacture a perfect copy of the patient’s organ in order to see whether during the surgery he will encounter any issue.” (*Id.*)
- He concludes the article by stating that “[t]here are still a number of open questions on 3D printing and, as frequently happened in relation to any new type of technology, legislators and courts might not be fully prepared for them.” (*Id.*)

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Legal Issues with 3D Printing, cont.

- Another thought-provoking article alerts lawyers to potential legal issues with 3D printing. (Lyndsey Gilpin, The Dark Side of 3D Printing: 10 Things to Watch. *TechRepublic*, March 5, 2014, <http://www.techrepublic.com/article/the-dark-side-of-3d-printing-10-things-to-watch/>, accessed 10/12/16.)
 - 3D printers are energy hogs
 - Unhealthy air emissions
 - Reliance on plastic
 - IP and licensing deals
 - Gun control loopholes
 - Responsibility of manufacturers
 - Bio-printing ethics and regulation
 - Possibility of 3D printed drugs
 - National security risks
 - Safety of items that come into contact with food

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Legal Issues with 3D Printing, cont.

- According to tagline, “[a] Stanford professor warns that in a world of 3-D printing, people may not be protected under traditional product liability law if they buy a risky home-printed object and get hurt. Rather, they could be left to pursue harder-to-prove negligence.” Clifton B. Parker, 3-D Printing Creates Murky Product Liability Issues, Stanford Scholar Says. *Stanford Report*, December 12, 2013, <http://news.stanford.edu/news/2013/december/3d-legal-issues-121213.html>, accessed 10/12/16.
- Panel Discusses Legal, Ethical Concerns of 3D Printing, *ABA News*, August 9, 2014, http://www.americanbar.org/news/abanews/aba-news-archives/2014/08/panel_discusses_lega.html, accessed 10/12/16.
- Jeremy Nobile. 3-D Printing Spurs New Legal Issues. *Plastics News*, May 25, 2016, <http://www.plasticsnews.com/article/20160525/NEWS/160529902/3-d-printing-spurs-new-legal-issues>, accessed 10/12/16.

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Legal Issues with 3D Printing, cont.

- In their article, Hall and colleagues identified the following as questions about the legal issues with 3D printing: (see Hall, *supra*)
 - What does this mean for manufacturers and rights holders?
 - Do current IP laws deal with the challenges faced by this new technology?
 - Will patent law protect my products?
 - Will copyright protect my products?
 - Will industrial design protection assist?
 - Are 3D products counterfeit?
 - Are 3D printer manufacturers liable if the machines are used to make copies?
 - Will the law be changed?
 - How can we prepare for our products or market being threatened by 3D printing?

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Legal Issues with 3D Printing, cont.

- As indicated by Hall and colleagues,
 - “3D scanning and printing technology has the potential to revolutionize manufacturing, like the rise of the personal computer challenged the orthodoxy of the traditional world of computing. As the availability and ease of use 3D printing technology increases, and the price drops, the technology will gain wider use, and the prospects of disruption will increase. This poses a number of challenges for everybody in the manufacturing and distribution chain, and creates opportunities for new entrants. How we react to those challenges and opportunities will be critical to success or failure!” (*Id.*)

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Legal Issues with 3D Printing, cont.

- Likewise, Nemeč raises the following issues about 3D printing: (Douglas R. Nemeč, Intellectual Property Issues Stacking Up for 3-D Printing. *Skadden Insights*, October 2, 2014, <https://www.skadden.com/insights/intellectual-property-issues-stacking-3-d-printing>, accessed 10/12/16.)
 - Who owns the idea? Who owns the design?
 - Protecting proprietorship among open-source design elements
 - Patent eligibility: Recent decisions build uncertainty for 3-D printing applications (analogizing the *Myriad Genetics* and *Alice v. CLS Bank* cases)
 - Are 3-D printer designs trade secrets?
 - Threats to tangible trademarks and trade dress
- The author concludes that “[t]ime will tell whether old rules in intellectual property law are sufficiently flexible to adapt to the nuanced problems raised by 3-D printing. In the meantime, recognizing the potential issues can go a long way toward ensuring that 3-D printing becomes a company’s next great technology rather than its next great liability.” (*Id.*)

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Legal Issues with 3D Printing, cont.

- Lewis raises a number of legal issues with 3D printing: (Anne Lewis, The Legality of 3D Printing: How Technology is Moving Faster Than the Law. 17 Tul. J. Tech. & Intell. Prop. 303 (Fall 2014):
 - Plastic guns and legislative attempts to address this
 - Patent infringement
 - Copyright and the art world
- As the author states, “[a]s 3D printing revolutionizes science and industry, the art world is using the printers to reach new creative heights. Artists are creating one-of-a-kind objects that push the boundary of multimedia art, employing the technology to directly reproduce their visions. World class museums such as the Metropolitan Museum of Art and the Museum of Modern Art in New York City have hosted exhibitions on technology and art, and the Museum of Arts and Design (MAD) is the most recent institution to mount an exhibition featuring mostly 3D-printed art. The MAD even offered a free workshop about “demystifying the process” behind 3D printing. As this technology gains popularity in the art world, 3D printing enthusiasts could face potential copyright liability.” (*Id.* at 315-316.)

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Legal Issues with 3D Printing, cont.

- Among the opportunities for using 3D printing identified by Weinberg are: (Michael Weinberg, Chapter 2: When 3D Printing and the Law Get Together, Will Crazy Things Happen? IN Bibi van den Berg, Simone van der Hof & Eleni Kosta, ed. *3D Printing: Legal, Philosophical and Economic Dimensions*. Springer, 2016, pp. 11-35.
 - Creating original products
 - Copying products
 - Replacement objects
 - Using logos and other trade dress
 - Remixing
- Among the future issues he highlights are:
 - Patent
 - Copyright
 - Trademark
 - Expansion of Liability

Legislation

- Perhaps the greatest concern with 3D printing is because of the items that could be easily fabricated with this technology, such as weapons. States have been active in trying to pass legislation related to 3D printing of guns.
 - Katie Armstrong, California Passes New 3D Printed Gun Laws, *3D Printing Industry*, July 27, 2016.
 - John Ribeiro, New York Introduces Legislation to Regulate 3D Printed Arms. *IDG News Service*, June 14, 2013.
- Other legislation related to 3D printing includes:
 - H.Res. 547: Expressing Support for Designation of December 3, 2015, as the “National Day of 3D Printing”. Interestingly, December 1, 2016, is the 2nd Annual E-Discovery Day.
 - H.R. 4583: To Promote a 21st Century Energy and Manufacturing Workforce. Section 1(a)(1)(H) specifically mentions 3D printing.

Other Practical Applications of 3D Printing, But Should Be Regulated

- Jessica McLaughlin provides a number examples of beneficial uses of 3D printing technology that should be regulated. (Jessica McLaughlin, *Regulating the Innovative World of 3D Printing*, *Law Street*, May 30, 2015.)
 - 3D Printed Food – being experimented with by the U.S. Army
 - Medical application, such as 3D prosthetic hands (and my colleague’s work with 3D printing part of a patient’s jaw) – but how is this regulated? What is the role of the FDA?
 - Aviation applications, such as 3D printed jet engine parts, which are monitored by the FAA and must be fire-resistant and reliable
 - Weapons, with Congressman Steve Israel (R-NY) introducing legislation in 2014 that would fully ban 3D guns.

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Most Common Issues with 3D Printing Concern Intellectual Property Law

- Trade dress: William J. Cass, *Protecting 3D Printed Designs – Can Trade Dress Rights Fill the Void?* *3DPrintBoard.com*, March 25, 2016, <https://3dprint.com/126221/trade-dress-rights/>, accessed 10/12/16.
- Copyright: Haritha Dasari, *Assessing Copyright Protection and Infringement Issues Involved with 3D Printing and Scanning*. *AIPLA Quarterly Journal*, vol. 41, no. 2, Spring 2013, pp. 279-318.
- Patent: Sam Dillon, *Infringement by Blueprint: Protecting Patent Rights in a World of Low-Cost 3D Printing*. *AIPLA Quarterly Journal*, vol. 42, no. 3, Summer 2014, pp. 425-458.
- Patent: Tabrez Y. Ebrahim, *3D Printing: Digital Infringement & Digital Regulation*. *14 Nw. J. Tech. & Intell. Prop.* 37 (2016).
- Copyright, patent, trademark and trade dress: Perry J. Viscounty, Andrew M. Gass & Kyle A. Virgien, *3D Printing: A New Technology Challenges Existing Intellectual Property Framework*. *56 Orange County Lawyer* 16 (October 2014).

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Additional Information

- Review of cases
- Update since slides were prepared

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For Additional Information

- For additional information on the law and 3D printing, Tran has compiled a law and 3D printing bibliography with over 100 entries. *See* Jasper L. Tran, The Law and 3D Printing. 31 J. Marshall J. Computer & Info. L. 505 (Spring 2015).

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Thank you for attending today's
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Please let me know if you have questions.

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