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THE 1ST AMENDMENT, 2ND AMENDMENT, AND 3D PRINTED GUNS

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THE 1ST AMENDMENT, 2ND AMENDMENT, AND 3D PRINTED GUNS

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We are standing at the dawn of the next great industrial revolution. With 3D printers people can print an infinite number of personalized and customized "things." However, one manifestation of this bold new technology threatens to cast a specter on innovation: 3D printed guns. This Article explores how efforts to regulate, or even ban 3D guns, must satisfy constitutional scrutiny under both the First and Second Amendments.

The Second Amendment right to keep and bear arms includes a subsidiary right to acquire arms—what else are you going to keep and bear—which covers both the buyer, and seller in the transaction. Further, the seller has to obtain guns, including newly manufactured firearms. Thus, the Second Amendment supply chain protects a right to make arms. These constitutional guarantees preserve the right to acquire and make firearms, by 3D printer or other means.

Prohibitions on sharing and receiving information about 3D guns, in the form of CAD source code files, violate the First Amendment right to free speech. The fact that information about 3D guns is distributed in electronic format does not shield it from the Bill of Rights. Further, the "hybrid" First and Second Amendment right offers heightened constitutional protections when the government attempts to restrict speech about the right to keep and bear arms.

This Article concludes by offering a preliminary analysis of several proposals to regulate 3D guns. First, laws that prohibit the manufacturing and possession of 3D guns, without a showing that the weapons are highly dangerous, would likely be unconstitutional. Second, bans on individuals making and possessing 3D guns for personal use would represent an unprecedented expansion of gun control laws, as there are virtually no regulations on homemade firearms. Third, the application of the International Traffic in Arms Regulation ("ITAR"), designed to keep dangerous weapons and munitions out of the hands of foreign nationals is an ill-equipped, and as applied unconstitutional means to regulate 3D guns.

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INTRODUCTION

We are standing at the dawn of the next great industrial revolution. Three-dimensional printing transforms designs on a computer into three-dimensional objects of all shapes and sizes. From the convenience of home, people can print an infinite number of personalized and customized "things." However, one manifestation of this bold new technology threatens to cast a specter on innovation: 3D printed guns. This Article explores how efforts to regulate, or even ban 3D guns, must satisfy constitutional scrutiny under both the First and Second Amendments.

Part I explains how 3D printers can transform computer source code—which describes the shapes and position of virtual objects—into actual, three-dimensional objects. Perhaps the most notorious object has been the Liberator, a handgun manufactured entirely out of plastic parts created by a 3D printer. Concerns about 3D printed guns have been vastly overstated. Under existing law, it is perfectly legal to personally manufacture a firearm, without any need to register it, or seek permission of the government. Further, with supplies available at any hardware store, it is quite simple to cheaply build an undetectable, lethal weapon out of non-metal parts. In addition, for the foreseeable future, it is exponentially more expensive and time consuming to build a gun with a 3D printer. These fears should not drive a broader debate about regulation of this new innovative technology

Part II places the individual right to keep and bear arms, as recognized in *District of Columbia v. Heller*, in the context of its two subsidiary rights: acquiring and making arms. First, before one can keep and bear arms, as the Constitution guarantees, one has to obtain the gun from somewhere. Thus, any meaningful Second Amendment right encompasses the *right to acquire arms*. This right can be reasonably regulated, but not banned. The right to acquire arms must offer constitutional protection for both participants in the transaction—the buyer and the seller. Again, these rights can be reasonably limited, but not banned. Second, the seller of the gun has to be able to obtain the gun from somewhere to resell it—either acquiring a used gun, or, through making a new gun. Both of these sources in the Second Amendment supply chain must be protected, and subject to constitutional scrutiny. The latter represents the *right to make arms*, which can also be reasonably regulated but not banned. The right to make arms for personal use, more so than commercial manufacturing, historically has been subject to virtually no regulations. It is deeply rooted in our nation's history and traditions. The Second Amendment, consistent with *Heller*, protects three guarantees: the right to keep and bear arms, the right to

acquire arms (for both the buyer and seller), and the right to make arms.

Part III considers the intersection of the First Amendment and the sharing and receiving of information about 3D guns. If Congress banned a book discussing how to build a handgun, which includes detailed blueprints and schematics of how the pieces should be assembled, it would be facially unconstitutional as a content-based prior restraint of speech. But what if Congress prohibited the same information, except rather than being printed on paper, it is shared in a digital format? This approach—how some propose stopping 3D guns—would similarly violate the freedom of speech. The Supreme Court has made clear that information, regardless of its format—whether books or movies or video games or electronic data—is protected speech. The 3D computer-aided design ("CAD") files used to describe and create 3D printed objects fit within this category of expressive information. Bans on these blueprints achieve neither the compelling state interest, nor are sufficiently narrowly tailored, to survive constitutional scrutiny. Further, the Supreme Court has found that the right of freedom of speech includes not only the rights of the speaker, but also of the public to receive that information. Restrictions on the ability to share 3D blueprints chill not only the constitutional rights of the teachers who shares that information, but also of the students who wish to learn. For these reasons, bans on 3D blueprints would violate the First Amendment.

Part IV introduces the concept of the *hybrid* First and Second Amendments right. These complimentary rights work together in tandem to bolster constitutional protections when the government attempts to restrict speech about the right to keep and bear arms. The Supreme Court has found that the freedom of speech is instrumental in promoting other constitutional guarantees, such as the freedom of religion, the freedom of association, the right to a public trial, and others. When one constitutional right reinforces another, the government bears a stronger burden to infringe individual liberty. The hybrid approach lends itself well to the context of 3D printed guns. Prohibitions on 3D gun blueprints would violate not only the First and Second Amendment standing by themselves, but also both guarantees working together in tandem. Efforts to stop the sharing, and receipt of this information, would impose a greater burden on the government to justify limiting two of our most fundamental constitutional guarantees. In this sense, the right to design, make, and share information about 3D guns is even more protected by the freedom of speech *and* the right to keep and bear arms.

Part V offers a preliminary analysis of several proposals to regulate 3D guns. First, laws that prohibit the manufacturing and possession of 3D guns, without a showing that the weapons are

highly dangerous, would likely be unconstitutional. Further, bans on individuals making and possessing 3D guns for personal use would represent an unprecedented expansion of gun control laws, as there are virtually no regulations on homemade firearms. However, the commercial sale of firearms, manufactured by 3D printers or otherwise, could be reasonably regulated in manners consistent with the current sale of traditional firearms. Second, efforts to regulate the supplies used to make 3D guns, whether the plastic polymers used in the printing process, or gunpowder for bullets would be an undue burden placed before the right to make arms. Further it would broadly chill speech by limiting what innovations, other than guns, can be created with 3D printers. Finally, the application of the International Traffic in Arms Regulation ("ITAR"), designed to keep dangerous weapons and munitions out of the hands of foreign nationals, represents an unconstitutional effort to chill speech, and censor information about the right to keep and bear arms. As applied to the Liberator, an open-sourced handgun—the quintessential weapon protected in *Heller*—international arms regulations are an ill-equipped, and as applied unconstitutional means to regulate 3D guns.

In the final analysis, 3D printers may lead to a renaissance of innovation. The government should tread carefully in restricting this technology to protect intellectual property. However, this prudential concern is transformed into a constitutional violation when efforts to infringe on this technology trample on the First and Second Amendments. Let technology and our constitutional rights be free.[1]

I. 3D PRINTED GUNS

A. 3D Printing

3D Printing, also known as "additive manufacturing," is a process where a three-dimensional model designed on a computer is transformed into a three-dimensional solid object. 3D Printing holds great potential to transform the way manufacturing works. During his February 2013 State of the Union address, President Obama said 3D printing "has the potential to revolutionize the way we make almost everything."[2]

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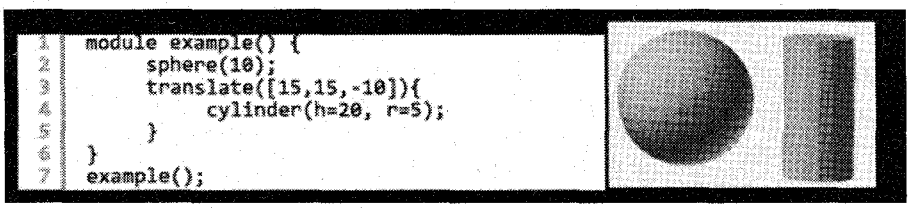
1. *See generally* ORLY LOBEL, TALENT WANTS TO BE FREE (2014).

2. Office of the Press Secretary, *Remarks by the President in the State of the Union Address*, WHITE HOUSE (Feb. 12, 2013 9:15 PM), http://www.whitehouse.gov/the-press-office/2013/02/12/remarks-president-state-union-address.

3D printers, much like desktop printers, "employ an additive process, which involves squirting molten plastic, targeting a laser to harden layers of powder or liquid resin, or shaping other materials such as metal, cake frosting, or living cells, to make an object."[3] Through this process, "raw material is set into two-dimensional patterns on a platform that is gradually raised to let each layer stack on top of the next until the item is complete."[4] The designs for these three-dimensional objects are controlled by a Computer-Aided Design ("CAD") files that use source code, much like other object-oriented programming languages, to define the shapes, sizes, and positions of three-dimensional objects.

For example, here is the source code for a very simple 3D CAD file creating two three-dimensional objects, a sphere and a cylinder.[5]



The source code consists of seven lines. Each line is numbered to the left of the column. First, the code on line 2 generates a sphere with a radius of 10. Second, the code on line 4 generates a cylinder with a height of 20 and a radius of 5. The code on line three spaces, or "translates," the two shapes apart from each other—it is moved 15 units to the right on the x-axis, 15 units to the right on the y-axis, and 10 units back on the z-axis (this is the third dimension). When viewed with perspective, the cylinder appears behind the sphere, lower, and to the right.

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3. Deven R. Desai & Gerard N. Magliocca, *Patents, Meet Napster: 3D Printing and the Digitization of Things*, 102 GEO. L.J. (forthcoming 2014) (manuscript at 9), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2338067; *see also* Bill Bumgarner, *Getting Started with a 3D Printer*, MAKE:, Winter 2013, at 12. ("There are three approaches to additive manufacturing in common use: *photopolymerization* (using light to cure a liquid material into solids of the desired shape), *granular materials binding* (using lasers, hot air, or other energy sources to fuse layers of powder into the desired shape), and the focus of this article, *molten polymer deposition* (MPD; extruding molten material in layers to build up the desired shape).").

4. Desai & Magliocca, *supra* note 3 (manuscript at 9).

5. Brian Benchoff, *3D Printering: Making a Thing with OpenSCAD*, HACKADAY (Dec. 11, 2013), http://hackaday.com/2013/12/11/3d-printering-making-a-thing-with-openscad/.

How are the 3D objects generated? This CAD file source code is "compiled," with a software compiler, which generates object code. This machine-readable object code will be transformed into the 3D shapes viewed on the right. Further, that machine-readable code—incomprehensible to humans, but understandable by computers—is transmitted to a 3D printer, which will create the object using the additive manufacturing process.

Though in its present form 3D printing is fairly time-intensive, expensive, and limited in what it can create, "[t]he promise of 3D printing is that people will be free to make almost anything they want themselves, which opens the door to a new wave of innovation from the home, the start-up, and large firms."[6]

B. The Liberator

While 3D printing has been used to create millions of different items, the creation of guns using additive manufacturing has generated vast amounts of controversy. The Wiki Weapons project, as it was then known, was able to create the plastic lower receiver for an AR-15 rifle from a 3D printer.[7] Initial versions fell apart after firing six shots.[8] Yet, later versions were able to fire six-hundred rounds successfully.[9]

The (aptly named) Liberator was the first handgun manufactured entirely from a parts created by a 3D printer.[10] It was designed by former-law student Cody Wilson, who created the organization Defense Distributed.[11] The Liberator consists of twelve separate parts of "acrylonitrile butadiene styrene thermoplastic polymer," with a single metal part—the firing pin.[12] Wilson posted

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6. Desai & Magliocca, *supra* note 3 (manuscript at 3).

7. *See* Andy Greenberg, *Meet the "Liberator": Test-Firing the World's First Fully 3D-Printed Gun*, FORBES, (May 5, 2013, 5:30 PM), http://www.forbes.com/sites/andygreenberg/2013/05/05/meet-the-liberator-test-firing-the-worlds-first-fully-3d-printed-gun/.

8. *Printed Reinforced AR Lower Review*, WIKIWEP DEVBLOG (2013), http://defdist.tumblr.com/post/37023487585/printed-reinforced-ar-lower-review.

9. John Biggs, *Defense Distributed Prints an AR-15 Receiver that Has Fired More than 600 Rounds*, TECHCRUNCH (Mar. 1, 2013), http://techcrunch.com/2013/03/01/defense-distributed-prints-an-ar-15-receiver-that-has-fired-more-than-600-rounds/.

10. Greenberg, *supra* note 7.

11. *Id.*

12. Brian Doherty, *The Unstoppable Plastic Gun*, REASON.COM (Nov. 12, 2013, 7:00 AM), http://reason.com/archives/2013/11/12/the-unstoppable-plastic-gun/print.

the CAD files for the Liberator on the Defense Distributed Website on May 5, 2013, where they would remain for a few days.[13] In a letter to Wilson dated May 8, 2013, the State Department asserted that the CAD files were regulated by export control laws, prohibiting the transmission of data about munitions to foreign nationals.[14] Wilson immediately took down the website and the CAD files. By that point, nearly 100,000 people had downloaded the blueprint, and the files are still readily available on the internet.[15]

C. The Problem of 3D Guns

The Liberator unleashed a panic about the threat of 3D guns. Senator Chuck Schumer, who has proposed legislation that would ban 3D guns, sounded the alarm.[16] "We're facing a situation where anyone—a felon, a terrorist—can open a gun factory in their garage and the weapons they make will be undetectable. It's stomach-churning."[17] The threat of the 3D guns, and the need for regulating them, has been *greatly* overstated.

Under federal law, it is legal to make pistols, revolvers, and rifles at home.[18] For semi-automatic rifles, such as the AR-15, it is legal to make the lower receiver—the lower receiver is what makes a gun a "gun."[19] As long as the gun is not being sold, shared, or traded, no license is required.[20] The Bureau of Alcohol, Tobacco, Firearms, and Explosive ("BAFTE") FAQ section explains, "[w]ith certain exceptions a firearm may be made by a non-licensee provided it is not for sale and the maker is not prohibited from possessing

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13. *See id.*

14. Tim Worstall, *The "Liberator" Plastic Gun and the Export Regulations Take Down of It*, FORBES, (May 10, 2013, 8:54 AM), http://www.forbes.com/sites/timworstall/2013/05/10/the-liberator-plastic-gun-and-the-export-regulations-take-down-of-it/.

15. Doherty, *supra* note 12.

16. *See* Tim Murphy, *Chuck Schumer Wants to Stop You from Printing a Gun at Home. Good Luck.*, MOTHER JONES (May 8, 2013, 6:00 AM), http://www.motherjones.com/politics/2013/05/chuck-schumer-defense-distributed-printed-gun.

17. *Id.*

18. *General Questions*, U.S. DEP'T OF JUST., BUREAU OF ALCOHOL, TOBACCO, FIREARMS & EXPLOSIVES, http://www.atf.gov/firearms/faq/general.html (last visited May 1, 2014).

19. Sebastian Anthony, *The World's First 3D-Printed Gun*, EXTREMETECH (Jul. 26, 2013, 10:56 AM), http://www.extremetech.com/extreme/133514-the-worlds-first-3d-printed-gun.

20. *See General Questions*, *supra* note 18.

firearms."[21] The resulting gun need not be registered with BAFTE and is legal for use.[22]

The simplest homemade guns are referred to as "zip guns."[23] Building these improvised, cheap but dangerous firearms requires little expertise. One video on YouTube shows an improvised shotgun, which consists of two pieces of walled tubing, a nail, and a shotgun shell.[24] It cost $7 of materials and took little time to make.[25] It is quite lethal, and will likely not set off a metal-detector.

While the notion of the homemade gun may make many uncomfortable, especially those unfamiliar with guns, this is not new technology. Columnist Brian Doherty observed that 3D printing brings a "change in convenience, not in kind; that people always had both the means and to some degree the legal right to arm themselves with homemade weapons."[26] 3D printing does nothing to stop these types of weapons. In fact, for the foreseeable future, 3D guns will be much, much more difficult and expensive than zip guns or illegally procured (but readily available) firearms. Senator Schumer's panic is unfounded. Using 3D printers to "open a gun factory in [a] garage"[27] would be an inefficient and expensive manner to create weapons that are undetectable.

Further, the fear of a factory spitting out pre-assembled weapons is fanciful. Contrary to Schumer suggestion, a working gun does not pop out of the 3D printer ready to fire, like a pop-tart from the toaster.[28] Using a 3D printer to create the parts, and assemble them, is a time-intensive process that requires advanced knowledge of machining and gunsmithing. In November of 2013, I visited Solid Concepts, a 3D printing firm in Austin, Texas. They manufactured

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21. *Id.*

22. *See id.*

23. Philip Luty, *The "Zip Gun"*, HOMEGUNSMITH.COM, http://thehomegunsmith.com/pdf/ZipGun.pdf (last visited May 1, 2014).

24. Marksurbu, *$7 12-Gauge Zip Gun Homemade Shotgun*, YOUTUBE (Sep. 23, 2010), http://www.youtube.com/watch?v=n1wV3lmbSv4.

25. *See id.*

26. Brian Doherty, *What 3D Printing Means for Gun Rights*, REASON.COM (Dec. 12, 2012), http://reason.com/archives/2012/12/12/what-3-d-printing-means-for-gun-rights.

27. Murphy, *supra* note 16.

28. Though if a Pop-Tart was chewed into the shape of a gun, Senator Schumer may want to ban that as well. *See* Deborah Hastings, *Boy, Suspended for Chewing Pop-Tart into Shape of Gun, Gets Lifetime NRA Membership*, N.Y. DAILY NEWS (May 31, 2013 3:10 PM), http://www.nydailynews.com/news/national/boy-suspended-gun-shaped-pop-tart-lifetime-nra-membership-article-1.1359918.

the first 3D-printed gun made out of metal.[29] The gun was an M1911, which was the standard issued sidearm for the United States army between 1911 and 1985.[30] Eric Mutchler, the project coordinator, told me that it took approximately a hundred hours to print all of the parts for the pistol.[31] After all of the parts were printed, they needed to be finished, polished, and then assembled.[32] Mutchler estimated the cost was roughly $10,000 for a single gun.[33] These numerous assembly steps must be performed by someone with a deep knowledge of gunsmithing. This approach is not even remotely comparable to the assembly process used to cheaply manufacture firearms. Anyone who possesses these skills can much more easily make a gun at home using parts available from any hardware store.

Stated simply, bad people who want guns will find 3D printing a terrible mechanism of acquiring a gun. As one media account noted, "officials do not believe there's a risk that street criminals will be able to mass produce guns using 3-D printing technology, as the printer required to produce a gun can cost more than $100,000 and quality varies."[34] The risk is not for "street criminals."[35] David Kopel commented, "[t]he guy who is robbing a 7-Eleven isn't going to buy a 3D printer."[36] Cody Wilson, the creator of the Liberator, stated the obvious—"[3D] printing is a ridiculous way of making gun parts."[37]

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29. *See* Cyrus Farivar, *Thought 3D-Printed Guns had to Be Made of Plastic? Think Again*, ARSTECHNICA (Nov. 7, 2013, 4:55 PM), http://arstechnica.com/business/2013/11/thought-3d-printed-guns-had-to-be-made-of-plastic-think-again/.

30. *See id.*

31. Josh Blackman, *Tour of 3D-Gun Printing Facility*, JOSH BLACKMAN'S BLOG (Nov. 12, 2013), http://joshblackman.com/blog/2013/11/12/tour-of-3d-gun-printing-facility/.

32. *See id.*

33. *See id.*

34. *Holder Takes Aim at 3-D Guns, Calls for Renewal of Metal Detection Law*, FOX NEWS (Nov. 15, 2013), http://www.foxnews.com/us/2013/11/15/holder-says-3-d-guns-extremely-serious-problem-calls-on-congress-to-renew/.

35. Devlin Barrett, *Threat of Plastic Guns Rises*, WALL ST. J. (Nov. 13, 2013, 9:34 PM), http://online.wsj.com/news/articles/SB10001424052702303559504579196342767042548.

36. Mark Gibbs, *The End of Gun Control*, FORBES (Jul. 28, 2012 4:24 PM), http://www.forbes.com/sites/markgibbs/2012/07/28/the-end-of-gun-control/

37. Jennifer Preston, *Printable-Gun Instructions Spread Online After State Dept. Orders Their Removal*, N.Y. TIMES (May 10, 2013, 5:19 PM), http://thelede.blogs.nytimes.com/2013/05/10/printable-gun-instructions-spread-online-after-state-dept-orders-their-removal/.

A BAFTE official conceded as much, noting "This is more for someone who wants to get into an area and perhaps be an assassin. Or they want to go to a courthouse and shoot a witness."[38] At the risk of sounding glib, creating undetectable guns, on a one-off basis, is much easier without a 3D printer. As the same official observed, plastic guns have been defeating security procedures, and "have been tried and true for the last 30 years,"[39] long before 3D printers existed. The apparent concern of these weapons is that they can be mass-produced by laymen—untrained assassins or perhaps amateur ninjas. There are so many better ways to obtain a gun more cheaply, easier, and without a paper trail, than to manufacture or buy a manufactured 3D gun.[40] The liberal magazine *Mother Jones* brings some calm to this panic: "[T]here are already upwards of 300 million nonplastic firearms currently in circulation in the United States, and they're pretty easy to get a hold of. (It's also already perfectly legal to make your gun from normal materials.)"[41] The fear of 3D guns, therefore, is largely unfounded.

3D guns are not the only harmful items that can be created through 3D printing. "The ability to print . . . illicit drugs . . . suggests a dark side to 3D printing."[42] These negatives should not drive the broader debate over regulations of 3D printers. We should resist the urge to impose serious costs on a quickly moving industry out of an unrealistic fear of 3D guns. As one recent article notes, "[t]he danger is that these potential negatives will swamp the analysis and policy debates so that an incumbent or one sector gains an upper hand in demanding the hammer of the law stop certain technology."[43] In many respects, regulations on 3D guns are gun

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38. Barrett, *supra* note 35.

39. *Id.*

40. Paul M. Barrett, *Let's All Calm Down About 3D Plastic Guns*, BUS. WK. (May 6, 2013), http://www.businessweek.com/articles/2013-05-06/lets-all-calm-down-about-3-d-plastic-guns ("Here's why: If you've got the skills, you can already make a gun in your basement, and there are less complicated ways to do it than using a $10,000 3D printer and computer set-up. Why would bad guys bother making comic book firearms when they can go online and order anything from a Glock 9 mm pistol to a Bushmaster military-style semiautomatic rifle with 30-round ammunition magazines? Perhaps the evil doer wouldn't want to leave a credit-card trail. Then he pays cash at a Main Street gun shop, a weekend gun show, or to the criminal down the block who sells black market firepower from the trunk of his car. Or the crook steals or borrows his gun.").

41. Murphy, *supra* note 16.

42. Desai & Magliocca, *supra* note 3 (manuscript at 18).

43. *Id.*

control solutions in search of a public safety problem. Putting aside policy arguments, however, efforts to regulate these guns will need to satisfy constitutional scrutiny under both the First and Second Amendments.

II. THE RIGHT TO BEAR, ACQUIRE, AND MAKE ARMS

The Second Amendment protects an individual right to keep and bear arms.[44] This right embodies two complimentary guarantees: the right to acquire arms, and the right to make arms. A meaningful right to keep and bear arms would require the preliminary steps of being able to create, and obtain guns. Without both of these two prerequisite incidents of the Second Amendment, the right to keep and bear arms would be quite hollow. What can you keep and bear if you cannot obtain arms made somewhere? Regulations limiting the manufacturing of guns with 3D printers will run into all three guarantees of the Second Amendment.

A right to sell arms must include a prerequisite that arms can be sold, which is the necessary consequence of a right to buy arms. Thus, it can be reasoned that the Second Amendment's right to bear arms, which is enabled by the right to sell arms, has at its base a right to make arms. While all three can be regulated, all three exist as necessary constitutional incidents of the Second Amendment, and they must adhere to constitutional scrutiny.[45]

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44. *See* District of Columbia v. Heller, 554 U.S. 570, 636 (2008) ("[T]he enshrinement of constitutional rights necessarily takes certain policy choices off the table. These include the absolute prohibition of handguns held and used for self-defense in the home. Undoubtedly some think that the Second Amendment is outmoded in a society where our standing army is the pride of our Nation, where well-trained police forces provide personal security, and where gun violence is a serious problem. That is perhaps debatable, but what is not debatable is that it is not the role of this Court to pronounce the Second Amendment extinct.").

45. *See* David B. Kopel, *Does the Second Amendment Protect Firearms Commerce?*, 127 HARV. L. REV. F. 230 (2014), *available at* http://harvardlawreview.org/2014/04/does-the-second-amendment-protect-firearms-commerce/ ("The *Heller* rule —that there is a qualified right to the commercial sale of arms—does not utterly forbid statutes governing non-commercial sales, gifts, or loans; but those statutes enjoy no presumption of constitutionality. They would have to be proven constitutional under some form of heightened scrutiny.").

A. The Right to Acquire Arms

District of Columbia v. Heller recognized that the Second Amendment protects an individual right to keep and bear arms for purposes of self-defense.[46] The Supreme Court reaffirmed this right in *McDonald v. Chicago*, as applied to the states.[47] A thorough treatment of the Second Amendment, is far, far beyond the scope of this Article.[48] Since *McDonald*, the Supreme Court has consistently denied certiorari in every case implicating the Second Amendment.[49] As a result, the lower courts have split in many different ways, respecting the appropriate tier of scrutiny (intermediate or strict), who bears the burden of persuasion (the individual or the state), and the role that history plays in defining the right.[50]

For purposes of 3D guns, one split in particular is salient. *Heller* did not address, directly at least, whether the Supreme Court protects the right to acquire arms. The ability to acquire arms requires, at a minimum, two parties—someone willing to buy the gun, and someone willing to sell the gun. Both are necessary conditions for any transaction. Thus, any right to acquire firearms would have to consider both the buyer and the seller—it takes two to tango. Protecting the right to buy, but banning the right to sell, would make a transaction impossible. Likewise, protecting the right to buy, but banning the right to sell, would not get you very far. Of course, each element could be regulated to different degrees, but the fact that neither can banned entirely is a necessary consequence of the Second Amendment protecting this activity.

In *Heller,* the Supreme Court recognized that District of Columbia resident Dick Heller had the constitutional right to lawfully use a handgun.[51] Or stated differently, the District of Columbia could not deny residents the ability to obtain, and register

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46. *See id.*

47. *See* McDonald v. Chicago, 561 U.S. 742, 130 S.Ct. 3020, 3036 (2010).

48. For background on *Heller* and *McDonald*, see Ilya Shapiro & Josh Blackman, *Keeping Pandora's Box Sealed*, 8 GEO. J.L. & PUB. POL'Y 1 (2010); Alan Gura, Ilya Shapiro, & Josh Blackman, *The Tell-Tale Privileges or Immunities Clause*, 2010 CATO SUP. CT. REV. 163 (2010).

49. *See* Josh Blackman, *Our Gun-Shy Justices—The Supreme Court Abandons the Second Amendment*, AM. SPECTATOR, July 2014; Josh Blackman, *Cert. Denied in* Lane v. Holder *and* NRA v. ATF, JOSH BLACKMAN'S BLOG (Feb. 24, 2014), http://joshblackman.com/blog/2014/02/24/cert-denied-in-lane-v-holder-and-nra-v-atf/.

50. *See generally* David B. Kopel, *The First Amendment Guide to the Second Amendment*, 81 TENN. L. REV. 417 (2014).

51. *See Heller*, 554 U.S. at 592.

a firearm.[52] The case was primarily about the right of Dick Heller, who owned his gun from before the District instituted its gun ban, to be able to legally keep and bear it for self-defense. Though, *Heller* did discuss, indirectly, the rights of sellers. Justice Scalia's majority opinion noted that the Second Amendment should not "cast doubt" on "laws imposing conditions and qualifications on the commercial sale of arms."[53] This mitigating language was intended to assuage concerns that the Second Amendment would now invalidate many laws on the books limiting the ability to buy and sell arms. However, this proviso does much more.

David Kopel reads this "exception [to] prove[] the rule. There is a right to the commercial sale of arms, but it is a right that may be regulated by 'conditions and qualifications.'"[54] In other words, if the "sale of arms" was not a constitutional right, it could be prohibited altogether under the police power, and not just limited by "conditions and qualifications." The need to qualify a right dictates the existence of the right in the first place. This operates in much the same way that noting that "laws forbidding the carrying of firearms *in sensitive places*" implies that there is a constitutional right to carry them in places that are not *sensitive*.[55] If it did not, carrying could be banned everywhere.

Following *Heller*, the Circuit Courts have split concerning whether the Second Amendment protects the right not only to bear arms, but also to acquire them. In an unpublished decision, the Fourth Circuit observed that nothing "remotely suggests that, at the time of its ratification, the Second Amendment was understood to protect an individual's right to *sell* a firearm."[56] In contrast, in *Ezell v. City of Chicago*, the Seventh Circuit found that a shooting range that sold ammunition and rented firearms successfully raised a claim under the Second Amendment on behalf of individuals who used the facility.[57] The court held that a Chicago law banning shooting ranges inside the city was very likely unconstitutional.[58] In its reasoning, the court stressed that the right to keep and bear arms

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52. *See id.* at 628 ("The handgun ban amounts to a prohibition of an entire class of 'arms' that is overwhelmingly chosen by American society for that lawful purpose. The prohibition extends, moreover, to the home, where the need for defense of self, family, and property is most acute.").

53. *Id.* at 571.

54. Kopel, *supra* note 45.

55. *Id.*

56. United States v. Chafin, 423 F. App'x 342, 344 (4th Cir. 2011).

57. Ezell v. City of Chicago, 651 F.3d 684, 696–711 (7th Cir. 2011).

58. *Id.* at 710.

was burdened beyond an individual keeping and bearing arms: "The right to possess firearms for protection implies a *corresponding right to acquire and maintain* proficiency in their use; the core right wouldn't mean much without the training and practice that make it effective."[59] The key word is "acquire."

After *Ezell*, a district court in Illinois found unconstitutional a ban on selling and acquiring firearms in Chicago city limits: "[The Second Amendment] right must also include the right to *acquire* a firearm."[60] In light of *McDonald*, the court found invalid a law that "outright ban[ned] legal buyers and legal dealers from engaging in lawful acquisitions and lawful sales of firearms, [where] the evidence d[id] not support that the complete ban sufficiently further[ed] the purposes that the ordinance trie[d] to serve."[61] This reasoning is consistent with *Heller's* implication about the unconstitutionality of a ban on firearms. The court reasoned, "[t]herefore, just as in *Ezell*, where the fact '[t]hat residents may travel outside the jurisdiction to fulfill the training requirement is irrelevant to the validity of the ordinance inside the City,' so too here: the fact that Chicagoans may travel outside the City to acquire a firearm does not bear on the validity of the ordinance inside the City."[62]

David Kopel, observing the "developing" circuit split on the issue, has written that the "operating a business that provides Second Amendment services is protected by the Second Amendment," in much the same way that the "First Amendment protects both book buyers and booksellers."[63] Some courts have analogized the First and Second Amendments.[64] Kopel found that in other contexts, "businesses that provide constitutionally related services have standing in their own right to challenge statutes that injure them."[65] To use the language of *Ezell*, many constitutional rights have a "corresponding right" to engage in that right.

In *Pierce v. Society of Sisters*, religious schools successfully raised an individual liberty due process claim on behalf of students and

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59. *Id.* at 704.

60. Ill. Ass'n of Firearms Retailers v. City of Chicago, 961 F. Supp. 2d 928, 930 (N.D. Ill. Jan. 6, 2014).

61. *Id.* at 930–31.

62. *Id.* at 939.

63. Kopel, *supra* note 45; *see also* Kopel, *supra* note 50.

64. *See, e.g.*, *Ezell*, 651 F.3d at 703 ("Borrowing from the Court's First Amendment doctrine, the rigor of this judicial review will depend on how close the law comes to the core of the Second Amendment right and the severity of the law's burden on the right.").

65. Kopel, *supra* note 45 (collecting cases).

families.[66] At issue in *Pierce* was both the individual right of children to learn,[67] and the *corresponding right* of schools to teach the students.[68] The latter is a necessary incident of the former. Without a guarantee of the freedom to teach, the right to learn would be quite hollow.[69] In *Craig v. Boren*, the owner of the Honk-N-Holler Grocery store had standing to raise an equal protection claim on behalf of under-age male purchasers.[70] It was not asserted that the grocer had a constitutional right to sell beer to males under the age of 21.[71] Instead, in order for an underage male to engage in that commercial transaction—based on an unconstitutional classification—a grocer had to be able to provide the beer.[72] Here the guarantee of the ability to sell the beer was necessary to vindicate the right to buy it.

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66. Pierce v. Soc'y of the Sisters of the Holy Names of Jesus & Mary, 268 U.S. 510 (1925).

67. *See id.* at 535 ("The fundamental theory of liberty upon which all governments in this Union repose excludes any general power of the State to standardize its children by forcing them to accept instruction from public teachers only. The child is not the mere creature of the State; those who nurture him and direct his destiny have the right, coupled with the high duty, to recognize and prepare him for additional obligations.").

68. *See id.* ("Appellees are corporations, and therefore, it is said, they cannot claim for themselves the liberty which the Fourteenth Amendment guarantees. Accepted in the proper sense, this is true.. But they have business and property for which they claim protection. These are threatened with destruction through the unwarranted compulsion which appellants are exercising over present and prospective patrons of their schools. And this court has gone very far to protect against loss threatened by such action." (citation omitted)).

69. *See also* Holder v. Humanitarian Law Project, 561 U.S. 1, 41 (2010) (Breyer, J., dissenting) ("I cannot agree with the Court's conclusion that the Constitution permits the Government to prosecute the plaintiffs criminally for engaging in coordinated *teaching* and advocacy furthering the designated organizations' lawful political objectives." (emphasis added)).

70. *See* Craig v. Boren, 429 U.S. 190, 195 (1976) ("As a vendor with standing to challenge the lawfulness of §§ 241 and 245, appellant Whitener is entitled to assert those concomitant rights of third parties that would be 'diluted or adversely affected' should her constitutional challenge fail and the statutes remain in force." (citations omitted)).

71. *See id.* at 192 ("The complaint sought declaratory and injunctive relief against enforcement of the gender-based differential on the ground that it constituted invidious discrimination against males 18-20 years of age.").

72. *See id.* at 194 ("The legal duties created by the statutory sections under challenge are addressed directly to vendors such as appellant. She is obliged either to heed the statutory discrimination, thereby incurring a direct economic injury through the constriction of her buyers' market, or to disobey the statutory command and suffer . . . sanctions and perhaps loss of license." (internal quotation marks

In *Planned Parenthood v. Danforth*, physicians at Planned Parenthood had standing to challenge abortion regulations.[73] It was not asserted that there was a constitutional right to provide abortions, but rather that restricting the ability to provide them infringes on the core constitutional right to terminate a pregnancy.[74] In this sense an individual right is coupled with a constitutional guarantee of the provider of the right. The right to abortion would be meaningless if doctors were prohibited from providing them. In *American Booksellers Association v. Hudnut*, book sellers had standing to challenge a law that criminalized the sale of "pornography."[75] There is no constitutional right to sell books (outside of the liberty of contract), though censorship of "pornography" restricts the First Amendment's guarantee of free speech of those selling books. In a similar fashion, the Court has construed a freedom of association from the First Amendment rights of freedom of speech, assembly, and other constitutional guarantees.[76]

As a matter of first principles, the primary mechanism that allows people to keep and bear arms is the threshold ability to acquire it from someone else. Acquiring a gun entails two separate rights—the rights of the buyer (protected in *Heller*) and the rights of the seller (implied in *Heller*). A constitutional right to bear arms, without a complementary right to acquire (buy and sell) arms, would be meaningless. If the former is protected, and the latter is banned—the Second Amendment would cease to even be a "parchment barrier."[77]

None of this analysis is to suggest that the state cannot place reasonable regulations on the commercial sale of firearms. Asserting that certain activities are constitutionally protected only subjects them to the same scrutiny the courts have applied to other aspects of the Second Amendment. What cannot stand is an outright ban on

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omitted)).

73. *See* Planned Parenthood of Cent. Mo. v. Danforth, 428 U.S. 52, 62–63 (1976).

74. *See id.* at 57–58 (outlining the petitioners' arguments).

75. American Booksellers v. Hudnut, 771 F.2d 323, 327 (7th Cir. 1985), *aff'd mem.*, 475 U.S. 1001 (1986).

76. *See* Nat'l Ass'n for Advancement of Colored People v. State of Ala. *ex rel.* Patterson, 357 U.S. 449, 460 (1958) ("Effective advocacy of both public and private points of view, particularly controversial ones, is undeniably enhanced by group association, as this Court has more than once recognized by remarking upon the close nexus between the freedoms of speech and assembly.").

77. *See generally* THE FEDERALIST NO. 48 (James Madison).

the sale or purchase of firearms. Many "longstanding prohibitions" "imposing conditions and qualifications on the commercial sale of arms" would likely satisfy even heightened scrutiny.[78] However, the same cannot be said of the corresponding right to *make* arms, especially for personal use.

B. The Right to Make Arms

Supporting the right to keep and bear arms, and the "corresponding right" to *acquire* arms, is the right to *make* arms. The right to acquire arms must entail, at the minimum, the creation of arms somewhere in the supply chain. The base of the Second Amendment pyramid, before selling, or bearing, must be the creation of guns. If the government permitted the owning of firearms, and the acquisition of firearms, but prohibited the manufacturing or importation of firearms, the vitality of the Second Amendment would implode fairly quickly.

In light of *Heller*, a personal right to make one's own arms for individual use has a much stronger constitutional pedigree than the right to buy and sell arms from others, especially in the commercial context. There are no "longstanding prohibitions" on making a gun for oneself. Americans have been making their own guns since the founding of the Republic.[79] This practice, deeply rooted in our nation's history and tradition, is fairly well-established.[80] Today, it is legal to make a gun for personal use, with very limited exceptions.[81] In contrast, the sale of firearms has been burdened much more heavily than the right to make firearms.

The right to make arms can be viewed as constitutional guarantee to provide the means necessary to keep and bear arms. The creation of guns, by 3D printing, or other means, directly serves the right protected in *Heller*. A ban on 3D printing would be

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78. For a discussion of the Second Amendment and constitutional scrutiny, see Josh Blackman, *The Constitutionality of Social Cost*, 34 HARV. J.L. & PUB. POL'Y 1 (2011).

79. Robert Beckhusen, *Gun Lobby Loves 3D-Printed Weapons*, WIRED (Aug. 10, 2012, 6:30 AM), http://www.wired.com/2012/08/3d-weapons/ ("As Dudley Brown, executive vice president of the National Association for Gun Rights remarked, 'People have been making firearms at home since before America was a country.'").

80. *See* Washington v. Glucksberg, 521 U.S. 702 (1997) (noting that the Constitution "protects those fundamental rights and liberties which are, objectively, deeply rooted in this Nation's history and tradition" (citations omitted) (internal quotation marks omitted)).

81. *General Questions*, *supra* note 18.

subjected to the heightened scrutiny applied to the Second Amendment. A showing that a person may obtain the gun by other means (buying a manufactured gun from someone else), without a showing of an important state interest, would not be narrowly-tailored enough to survive review. In fact, the ability to make a personalized gun that is not available on the market for oneself may render the countervailing governmental interest less salient. A ban on manufacturing one's own firearms, not for sale, but for personal consumption would hardly be a "longstanding" prohibition, as defined in the dicta in *Heller*.[82] Since the time of the American Revolution, gun-owners have created their own firearms and ammunition.[83]

Further, the right is heightened because people can now customize their weapons to meet specific self-defense needs. Peter Jensen-Haxel derives from *Heller* the principle that people have "a strong interest in deciding the characteristics of the defensive device in which to put faith."[84] Specifically, "[r]ather than accepting pre-packaged attribute bundles determined by marketability, personal design allows someone to choose without limitation the characteristics he or she believes are best suited to self-defense."[85] People can pick different feature that are "most reliable" for their needs.[86] For example, one custom-design a gun that strikes the right balance between a longer barrel (more accurate) and shorter barrel (lighter). 3D printing of guns may even "provide the physically disabled with meaningful access to self-defense."[87] Customizing a firearm for a person with a disability may in fact be a constitutionally-protected reasonable accommodation. Forcing a person to purchase a pre-fabricated gun on the market that fails to meet a person's need would not be a viable alternative and may fail the narrow tailoring necessary to survive constitutional scrutiny.

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82. *See* District of Columbia v. Heller, 554 U.S. 570, 626–27 (2008) ("[N]othing in our opinion should be taken to cast doubt on longstanding prohibitions on the possession of firearms by felons and the mentally ill, or laws forbidding the carrying of firearms in sensitive places such as schools and government buildings, or laws imposing conditions and qualifications on the commercial sale of arms.").

83. *See* Beckhusen, *supra* note 79.

84. Peter Jensen-Haxel, *3d Printers, Obsolete Firearm Supply Controls, and the Right to Build Self-Defense Weapons Under* Heller, 42 GOLDEN GATE U. L. REV. 447, 480–81 (2012).

85. *Id.* at 480.

86. *Id.*

87. *Id.* at 470.

Still, easily obtaining firearms through 3D printing could diminish the efficacy of "presumptively lawful regulatory measures" in place before *Heller*.[88] If it becomes facile to easily create weapons prohibited by federal law, then the ability to print 3D guns would frustrate federal gun laws. Further, under existing precedent, Congress could still regulate the manufacture of homemade automatic weapons. For example, the Ninth Circuit found that Congress "could prohibit the possession of a homemade machine gun because it could have rationally concluded that the possession of homemade machine guns would substantially affect the interstate market in machine guns."[89] The court reaffirmed this holding, finding that *Heller* "has absolutely no impact on *Stewart*'s Commerce Clause holding."[90] Even with that caveat, a right to make arms, however defined, is firmly grounded in the Second Amendment.

3D guns will be limited not only by the three guarantee of the Second Amendment, but also by the First Amendment's guarantee of freedom of speech.

III. THE FIRST AMENDMENT AND 3D-PRINTED GUNS

A. Information is Speech

Early advocates of limiting the threat of 3D guns have recognized that once these blueprints are available on the internet, the genie is out of the bottle, and it is too late to stop them. A Department of Homeland Security bulletin stressed that the risk of 3D guns stems from the fact that it is "impossible" to contain the sharing of the blueprints: "Significant advances in [3D] printing capabilities, availability of free digital 3D printer files for firearms components, and difficulty regulating file sharing may present public safety risks."[91] The bulletin stated the obvious—a ban on 3D-printed guns will not eliminate them—"[p]roposed legislation to ban 3D printing of weapons may deter, but cannot completely prevent their production."[92]

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88. *See* District of Columbia v. Heller, 554 U.S. 570, 626 n.6 (2008).

89. Mont. Shooting Sports Ass'n v. Holder, 727 F.3d 975, 981–82 (9th Cir. 2013) *cert. denied*, 134 S. Ct. 955 (2014) (citing United States v. Stewart, 451 F.3d 1071, 1077 (9th Cir. 2006)).

90. United States v. Henry, 688 F.3d 637, 638 (9th Cir. 2012).

91. Jana Winter, *Homeland Security Bulletin Warns 3D-Printed Guns May Be "Impossible" to Stop*, FOX NEWS (May 23, 2013), http://www.foxnews.com/us/2013/05/23/govt-memo-warns-3d-printed-guns-may-be-impossible-to-stop/.

92. *Id.*

The Department of Homeland Security concluded that "[e]ven if the practice is prohibited by new legislation, online distribution of these digital files will be as difficult to control as any other illegally traded music, movie or software files."[93] In other words, impossible. Therefore, some have proposed stopping 3D guns by cutting off the problem at the source—banning the sharing, and distribution of the 3D CAD files. For example, the State Department has claimed that posting the CAD files for the Liberator on the internet violates export control laws.[94] One recent article noted that a possible solution would be "to ban the distributions of the designs for 3D printed firearms, and to prosecute people who distribute these designs."[95] Such a regime would likely be unconstitutional under the First Amendment.

Electronic communications are considered speech for purposes of the First Amendment.[96] Even though printing the guns is conduct, at its heart, the government is regulating expression which is "sufficiently imbued with elements of communication to fall within the scope of the First . . . Amendment[]."[97] In *Brown v. Entertainment Merchants Association*, the Supreme Court found that "video games qualify for First Amendment protection."[98] In the same way that "protected books, plays, and movies that preceded them, video games communicate ideas—and even social messages—through many familiar literary devices (such as characters, dialogue, plot, and music) and through features distinctive to the medium (such as the player's interaction with the virtual world)."[99] These

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93. *Id.*

94. *See infra* Part V.D. for discussion of export control laws.

95. Michael L. Smith, *The Second Amendment Implications of Regulating 3D Printed Firearms* 18–19, *available at* http://ssrn.com/abstract=2401563.

96. *See* Reno v. Am. Civil Liberties Union, 521 U.S. 844, 851 (1997) ("Taken together, these tools constitute a unique medium–known to its users as 'cyberspace'–located in no particular geographical location but available to anyone, anywhere in the world, with access to the Internet.").

97. Texas v. Johnson, 491 U.S. 397, 404 (1989) (citation omitted) (internal quotation marks omitted); *see also* Holder v. Humanitarian Law Project, 561 U.S. 1, 27 (2010) ("The Government is wrong that the only thing actually at issue in this litigation is conduct, and therefore wrong to argue that *O'Brien* provides the correct standard of review. *O'Brien* does not provide the applicable standard for reviewing a content-based regulation of speech, and [the material-support statute] regulates speech on the basis of its content. Plaintiffs want to speak to the [groups identified by the government as foreign terrorist organizations] and whether they may do so under [the material-support statute] depends on what they say." (citations omitted)).

98. Brown v. Entm't Merchants Ass'n, 131 S. Ct. 2729, 2733 (2011).

99. *Id.*

attributes "suffice[] to confer First Amendment protection."[100] The Supreme Court stressed "whatever the challenges of applying the Constitution to ever-advancing technology, 'the basic principles of freedom of speech and the press, like the First Amendment's command, do not vary' when a new and different medium for communication appears."[101]

The Supreme Court has found that a broad species of electronic communications, broadly dubbed "information," was "speech within the meaning of the First Amendment."[102] In addition, recent case law[103] and scholarship[104] have found that data—the output from algorithms—such as search engine results, are speech. In *Brown*, Justice Scalia (inadvertently) made the case for heightened scrutiny for the CAD files of 3D guns. In finding that California's regulation of violent video games was unconstitutional, he praised California for "(wisely) declin[ing] to restrict Saturday morning cartoons, the sale of games rated for young children, or the *distribution of pictures of guns*."[105] Why? Because such laws would be patently

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100. *Id.*

101. *Id.* (citing Joseph Burstyn, Inc. v. Wilson , 343 U.S. 495, 503 (1952)) .

102. Sorrell v. IMS Health, 131 S. Ct. 2653, 2667 (2011) ("Facts, after all, are the beginning point for much of the speech that is most essential to advance human knowledge and to conduct human affairs. There is thus a strong argument that prescriber-identifying information is speech for First Amendment purposes.").

103. Jian Zhang v. Baidu.com Inc., 11-CIV-3388, 2014 WL 1282730, at *5 (S.D.N.Y. Mar. 28, 2014) ("When search engines select and arrange others' materials, and add the all-important ordering that causes some materials to be displayed first and others last, they are engaging in fully protected First Amendment expression — '[t]he presentation of an edited compilation of speech generated by other persons.'" (alteration in original) (citation omitted)); *see* Langdon v. Google, Inc., 474 F. Supp. 2d 622 (D. Del. 2007); Search King, Inc. v. Google Tech., Inc., No. CIV-02-1457-M, 2003 WL 21464568 (W.D. Okla. May 27, 2003).

104. *Zhang*, 2014 WL 1282730, at *2 ("The question of whether search-engine results constitute speech protected by the First Amendment has been the subject of vigorous academic debate." (citing Stuart Minor Benjamin, *Algorithms and Speech*, 161 U. PA. L. REV. 1445 (2013); Josh Blackman, *What Happens if Data Is Speech?*, 16 U. PA. J. CONST. L. HEIGHTENED SCRUTINY 25 (2014); James Grimmelmann, *Speech Engines*, 98 MINN. L. REV. 868 (2014); Eugene Volokh & Donald M. Falk, *Google, First Amendment Protection for Search Engine Search Results*, 8 J.L. ECON. & POL'Y 883 (2012); Oren Bracha & Frank Pasquale, *Federal Search Commission? Access, Fairness, and Accountability in the Law of Search*, 93 CORNELL L. REV. 1149 (2008); Tim Wu, *Machine Speech*, 161 U. PA. L. REV. 1495 (2013); Michael J. Ballanco, Comment, *Searching for the First Amendment: An Inquisitive Free Speech Approach to Search Engine Rankings*, 24 GEO. MASON U. C.R. L.J. 89 (2013)).

105. *Brown*, 131 S. Ct. at 2740 (emphasis added).

unconstitutional. Pictures of guns are not that conceptually different from more sophisticated 3D blueprints.

3D CAD files of guns are, in truth, nothing more than information—"pictures of guns" defined in lines of source code, rather than graphic visuals. Anyone trained in the language of CAD can understand how this information expresses the ideas. This information explains the shape, size, and dimensions of various types of objects, and offers instructions of how someone can modify or recreate a similar object for their own personal use. The State Department's letter to Cody Wilson implicitly acknowledges the expressive nature of the source code and specifically refers to the 3D blueprints of the Liberator as "data" in several places.[106] It ordered Wilson to "treat the above technical *data* as ITAR-controlled," meaning that "all such *data* should be removed from public access immediately."[107] Consider the CAD source file example discussed earlier.[108] The source code describes in detail three-dimensional objects that, once printed, are expressive.[109] More sophisticated source code could describe works of art, architectural structures, and even the pages of a book. This code, perhaps more so than other types of code, should warrant First Amendment protection because it describes and expresses information about real-world objects that once created, are protected.[110]

Regulation on the 3D CAD source files is really a regulation on information, and therefore must satisfy constitutional scrutiny. Because bans on 3D CAD files are based on the content of the source code—in this case the object the information expresses—strict scrutiny applies.[111] Banning the distribution of information about

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106. *See* Letter from Glenn E. Smith, Chief, Enforcement Div., U.S. Dept. of State, to Cody Wilson, Dir., Def. Distributed (May 8, 2013), *available at* http://www.documentcloud.org/documents/698728-defense-distributed-ddtc.html#document/p1/a101955.

107. *Id.*

108. *See* Benchoff, *supra* note 5.

109. *See id.*

110. *See* Stephan E. Halpern, *Harmonizing the Convergence of Medium, Expression, and Functionality: A Study of the Speech Interest in Computer Software*, 14 HARV. J.L. & TECH. 139, 148–49 (2000) ("Object code that serves as a medium for photographs, movies, music, and literature should not be considered less expressive simply because the medium is constructed of differentiated voltage states instead of traditional materials such as paper or film.").

111. *See* Simon & Schuster, Inc. v. Members of N.Y. State Crime Victims Bd., 502 U.S. 105, 115 (1991) ("A statute is presumptively inconsistent with the First Amendment if it imposes a financial burden on speakers because of the content of

how to exercise a constitutional right constitutes a prior restraint of free speech.[112] Even more pressing is the fact that banning the distribution of these CAD files also inhibits the ability of others to learn from them. The First Amendment consists of both a right of "creation *and dissemination* of information."[113]

B. The Right to Create and Disseminate Information

The Supreme Court has long affirmed that the First Amendment is not a one-sided right. The freedom of speech protects not only the speaker, but also the "public and its right to receive information."[114] In *Red Lion Broadcasting Co. v. Federal Communications Commission*, the Supreme Court recognized that the First Amendment protects "the right of the public to receive suitable access to social, political, esthetic, moral, and other ideas and experiences."[115] In *Martin v. City of Struthers*, the Supreme Court invalidated a law that banned door-to-door solicitations to hand out literature.[116] The Court found the First Amendment "embraces the right [of the solicitor] to distribute literature" and also "necessarily protects the right [of the public] to receive it."[117] In *Stanley v. Georgia*, the Supreme Court unanimously rejected a ban on the "right to receive information and ideas, regardless of their social worth."[118] In *Time, Inc. v. Hill*, the Supreme Court stressed the importance of access to information of matter of public interest.[119] "Exposure of the self to others in varying degrees is a concomitant of

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their speech." (citation omitted)).

112. *See, e.g.*, Org. for a Better Austin v. Keefe, 402 U.S. 415, 419 (1971) (finding that an injunction against distributing literature constituted an impermissible prior restraint).

113. Sorrell v. IMS Health Inc., 131 S. Ct. 2653, 2667 (2011) (citing Bartnicki v. Vopper, 532 U.S. 514, 527 (2001); Rubin v. Coors Brewing Co., 514 U.S. 476, 481 (1995); Dun & Bradstreet, Inc. v. Greenmoss Builders, Inc., 472 U.S. 749, 759 (1985) (plurality opinion)).

114. *See* Bigelow v. Virginia, 421 U.S. 809, 822 (1975) ("The advertisement . . . did more than simply propose a commercial transaction. It contained factual material of clear 'public interest.'"); *see also* Ronald K.L. Collins & David M. Skover, *Commerce & Communication*, 71 TEX. L. REV. 697, 730 (1993) ("The informational function is central to the Court's approval of commercial expression as a form of protected speech.").

115. Red Lion Broad. Co. v. Fed. Commc'ns Comm'n, 395 U.S. 367, 390 (1969).

116. Martin v. City of Struthers, 319 U.S. 141, 146–49 (1943).

117. *Id.* at 143 (citing Lovell v. Griffin, 303 U.S. 444, 452 (1938)).

118. Stanley v. Georgia, 394 U.S. 557, 564 (1969).

119. *See* Time, Inc. v. Hill, 385 U.S. 374, 388–89 (1967).

life in a civilized community. The risk of this exposure is an essential incident of life in a society which places a primary value on freedom of speech and press."[120]

Lamont v. Postmaster General recognized a First Amendment right to an uncensored access to receive mail.[121] *New York Times v. Sullivan* found that the First Amendment promotes an "uninhibited, robust, and wide-open" public debate.[122] Among the "penumbras formed by emanations" observed in the total constitutional eclipse of *Griswold v. Connecticut* was the right to distribute and receive information about birth control.[123] This principle was expanded in Justice Douglas's concurrence in *Eisenstadt v. Baird*.[124]

Recent cases have reaffirmed the First Amendment right to access information on the internet, and other electronic mediums. *Reno v. Americans Civil Liberties Union* extended the broad protections of the First Amendment to communications on the internet, addressing both the right to express, and to access information: "In order to deny minors access to potentially harmful speech, the CDA effectively suppresses a large amount of speech that adults have a constitutional right to receive and to address to one another."[125] In *Sable Communications of California v. Federal Communications Commission*, the Court recognized that a ban on adults receiving indecent speech over a "dial-a-porn" service "far exceeds that which is necessary to limit the access of minors to such messages."[126] These principles were most clearly articulated in *Sorrell v. IMS Health*, where the Supreme Court found that "The *creation and dissemination* of information are speech within the meaning of the First Amendment."[127]

The First Amendment should be viewed in terms of a constitutional right to create and access information. This dual-faceted approach to the freedom of speech accounts for the two key incidents of any First Amendment inquiry—the individual right to express information and the right of individuals in society to learn and consume that information.

Viewed through this lens, the 3D CAD source files of the Liberator assume a high constitutional order of magnitude. Cody

120. *Id.* at 388.
121. *See* Lamont v. Postmaster General of U.S., 381 U.S. 301, 305–07 (1965).
122. New York Times Co. v. Sullivan, 376 U.S. 254, 270 (1964).
123. Griswold v. Connecticut, 381 U.S. 479, 482, 485 (1965).
124. *See* Eisenstadt v. Baird, 405 U.S. 438, 457–58 (Douglas, J., concurring).
125. Reno v. Am. Civil Liberties Union, 521 U.S. 844, 874 (1997).
126. Sable Commc'ns of Cal., Inc. v. F.C.C., 492 U.S. 115, 131 (1989).
127. Sorrell v. IMS Health, 131 S. Ct. 2653, 2667 (2011) (emphasis added).

Wilson created the design for a simple handgun. Wilson's expressions should be protected as the "creation . . . of information."[128] Posting these files on the internet should be protected as the "dissemination of information."[129] And, the ability of others to learn of this information by downloading the CAD source files embodies the "right to receive information and ideas, regardless of their social worth."[130] Each of these three activities touches a constitutional base, bringing home the right to 3D-printed guns. Further, scrutiny is even more heightened because the information to be regulated concerns information about another constitutional right—the Second Amendment.

IV. THE HYBRID FIRST AND SECOND AMENDMENTS

The Supreme Court has found, in several contexts, that the First Amendment often bolsters other constitutional rights. The freedom of the press clause supports the right to public trial by jury. Building on *Richmond Newspapers Inc. v. Virginia*, in which a plurality found a "constitutional right of access to criminal trials,"[131] the Court held in *Globe Newspaper Co. v. Superior Court* that the First Amendment protects a "right of access to criminal trials" because "'a major purpose of that Amendment was to protect the free discussion of governmental affairs.'"[132] In this way, the First Amendment "ensure[s] that the individual citizen can effectively participate in and contribute to our republican system of self-government."[133] Free speech supports this complimentary tenant of our Republic. The First Amendment "ensure[s] that this constitutionally protected 'discussion of governmental affairs' is an informed one."[134] The Court found that "[t]he First Amendment is thus broad enough to encompass those rights that, while not unambiguously enumerated in the very terms of the Amendment, are nonetheless necessary to the enjoyment of other First Amendment rights."[135]

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128. *See id.*

129. *See id.*

130. *See* Stanley v. Georgia, 394 U.S. 557, 564 (1969).

131. Globe Newspaper Co. v. Superior Court for Norfolk Cnty., 457 U.S. 596, 603 (1982) (citing Richmond Newspapers, Inc. v. Virginia, 448 U.S. 555, 558–81 (1980) (plurality opinion)).

132. *Id.* at 604 (quoting Mills v. Alabama, 384 U.S. 214, 218 (1966)).

133. *Id.* (citing *Richmond Newspapers*, 448 U.S. at 587–88 (Brennan, J., concurring); Thornhill v. Alabama, 310 U.S. 88, 95 (1940)).

134. *Id.* at 605.

135. *Id.* at 604 (citing *Richmond Newspapers*, 448 U.S. at 579–80 (plurality

In the context of religion clause jurisprudence, the Supreme Court recognized a "hybrid claim" that merges together the power of a free speech claim, coupled with a free exercise claim. In *Employment Division v. Smith*, Justice Scalia identified a "hybrid situation" which involves "not the Free Exercise Clause alone, but the Free Exercise Clause in conjunction with other constitutional protections, such as freedom of speech and of the press."[136] In these cases, the Court applied heightened scrutiny, in finding that the "First Amendment bars application of a neutral, generally applicable law to religiously motivated action."[137] Justice Scalia added that "it is easy to envision a case in which a challenge on freedom of association grounds would likewise be *reinforced* by Free Exercise Clause concerns."[138]

For example, in *Roberts v. United States Jaycees*, the Court daisy-chained together several constitutional rights to bolster a freedom of association claim—free speech, free exercise, right to petition: "An individual's freedom to speak, to worship, and to petition the government for the redress of grievances could not be vigorously protected from interference by the State [if] a correlative freedom to engage in group effort toward those ends were not also guaranteed."[139] How does this hybrid right work in practice? For example, "an individual who desires to defend the clergy-

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opinion)).

136. Employment Div., Dep't of Human Res. of Or. v. Smith, 494 U.S. 872, 881, 882 (1990).

137. *Id.* at 782–33 (citing Wisconsin v. Yoder, 406 U.S. 205 (1972); Cantwell v. Connecticut, 310 U.S. 296, 304–07 (1940)).

138. *Id.* at 882 (citing Roberts v. United States Jaycees, 468 U.S. 609, 622 (1984)). Not everyone was satisfied with the "hybrid exception." For example, Justice Souter wrote in *Church of the Lukumi Babalu Aye v. City of Hialeah*:

> [T]he distinction *Smith* draws strikes me as ultimately untenable. If a hybrid claim is simply one in which another constitutional right is implicated, then the hybrid exception would probably be so vast as to swallow the Smith rule, and, indeed, the hybrid exception would cover the situation exemplified by Smith . . . . But if a hybrid claim is one in which the litigant would actually obtain an exemption from a formally neutral, generally applicable law under another constitutional provision, then there would have been no reason for the Court in what Smith calls the hybrid cases to have mentioned the Free Exercise Clause at all.

Church of the Lukumi Babalu Aye, Inc. v. City of Hialeah, 508 U.S. 520, 567 (1993) (Souter, J., dissenting).

139. Roberts v. U.S. Jaycees, 468 U.S. 609, 622 (1984).

communicant privilege may receive heightened scrutiny if he or she alleges that a mandatory disclosure statute compels him or her to engage in speech that violates deeply held beliefs and also interferes with the free exercise of religion."[140] In this way, our constitutional rights work together, in tandem, anchored by the freedom of speech.

I should stress, emphatically, that is approach does not even remotely resemble *Griswold*'s "penumbras formed by emanations" test. The hybrid approach focuses on the actual, textual protections in the Constitution. The facts in *Smith*, did "not present such a hybrid situation, but a free exercise claim unconnected with any communicative activity or parental right."[141] This "hybrid" exception is "aimed at the level of scrutiny to be applied by the court in examining the constitutionality of a law burdening religious activity."[142] While there is some dispute about the appropriate level of scrutiny, many courts have found that coupling together these rights warrants strict scrutiny.[143]

A similar doctrine could be understood in the context of regulating 3D-printed guns. The First and Second Amendments working in tandem would protect speaking and expressing ideas about how to design guns to fit one's individual needs for self-defense. To use the language of *Smith*, the Second Amendment claim is "reinforced" by the First Amendment. Further, this is not a case where "an invalid free-exercise claim" is "convert[ed]" into "a valid free-speech claim" by virtue of their coupling.[144] Both the First and Second Amendment claims could stand on their own feet.

Communicating about how to exercise the right to keep and bear arms combines the protections of the Free Speech Clause and the Second Amendment. The right to keep and bear arms includes the

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140. Christopher R. Pudelski, *The Constitutional Fate of Mandatory Reporting Statutes and the Clergy-Communicant Privilege in A Post-*Smith *World*, 98 NW. U. L. REV. 703, 737–38 (2004). The Supreme Court avoided the issue of compelled speech about a matter affecting the free exercise of religion by denying certiorari in *Elane Photography, LLC v. Willock*, 309 P.3d 53 (N.M. 2013), *cert. denied*, 134 S. Ct. 1787 (2014). *See* Josh Blackman, Elane Photography *is a Bad Vehicle For Religious Liberty Case*, JOSH BLACKMAN'S BLOG (Mar. 23, 2014), http://joshblackman.com/blog/2014/03/23/elane-photography-is-a-bad-vehicle-for-religious-liberty-case/.

141. Employment Div., Dep't of Human Res. of Or. v. Smith, 494 U.S. 872, 882 (1990).

142. William L. Esser IV, *Religious Hybrids in the Lower Courts: Free Exercise Plus or Constitutional Smoke Screen?*, 74 NOTRE DAME L. REV. 211, 213 (1998).

143. *See id.* (collecting cases).

144. Watchtower Bible & Tract Soc'y of N.Y., Inc. v. Vill. of Stratton, 536 U.S. 150, 171 (2002) (Scalia, J., concurring).

right to acquire firearms. Acquiring firearms, either through purchasing them, or making them oneself, is not a solipsistic exercise. Potential buyers or manufacturers must be able to discuss, learn, and share ideas about different guns that may meet different self-defense needs. All of these discussions, by themselves, would be protected speech, unless they are deemed to be an "incitement to imminent lawless action"[145] or one of the other rare forms of unprotected speech. Because these communications are made in pursuance of exercising one's Second Amendment right, the analysis takes on a higher level of scrutiny. Stated differently, the derivative First Amendment right to speak freely about keeping and bearing arms bolsters the primary Second Amendment right. A law prohibiting posting of CAD source files of a handgun hits the unconstitutional trifecta—the right to create speech, the right to disseminate speech, and the right to make arms.

V. THE REGULATION OF 3D GUNS

In this section, I will offer a preliminary analysis of the constitutionality of various proposals to regulate the printing of 3D guns. First, I will review the constitutionality of a law that prohibits the manufacturing, possession, and sale of a 3D gun. Without a showing that these guns are highly dangerous, or pose a special threat to security, these laws banning the personal manufacturing of, and possession of 3D guns, would likely not survive Second Amendment scrutiny. However, the commercial sale of firearms could be regulated in manners consistent with the current sale of traditional firearms.

Second, I will consider a supply-side approach to regulation—a law that would ban the materials used to make 3D guns, or the even gunpowder itself. Efforts to place a substantial burden in front of the right to keep and bear arms would likely violate the Second Amendment.

Third, I turn to the data-centric approach of regulation of 3D guns that would implicate both the First and Second Amendments acting in hybrid. These laws would prohibit the distribution of, and access to, the CAD source files for a 3D gun. In this way, the laws would implicate the rights of both the creator of the CAD files to speak about a constitutional right, and of the recipient to have access to this information and learn about a constitutional right.

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145. Brandenburg v. Ohio, 395 U.S. 444, 448–49 (1969).

Initially, regulations aimed at protecting intellectual property may sweep in 3D guns. To prevent the infringement of patents, there may be efforts to block the sharing of CAD files of protected objects. Or, industry leaders may install digital rights management technologies onto printers to block printing patented objects. The best alternative model proposed is the Digital Millennium Patent Act, which would use notice-and-takedown approaches to eliminate infringing material. Although, permitting such a system could expand the Digital Millennium Copyright Act's overbroad censoring of constitutionally protected material.

Finally, the International Traffic in Arms Regulations ("ITAR") prohibits the transfer of certain arms and munitions to foreign nationals. The federal government has claimed in its letter to Cody Wilson that the source code for the 3D guns would fall on the protected munitions list.[146] As a result, it would be illegal to post blueprints for a 3D gun online, and allow others to download it. In its current form, this practice would be overbroad, and violate both the First and Second Amendments.

A. Bans on Manufacturing and Possession of 3D-Printed Guns

Today, there does not seem to be any momentum towards a federal ban on manufacturing or possessing of 3D guns for personal use.[147] The sale of 3D guns, like all other guns, would be regulated by existing federal law. There has, however, been some movement on this front at the local level. A proposed law in California, aimed directly at 3D printing, would criminalize making your own firearm without permission (and a serial number) from the state.[148] The bill requires that "prior to manufacturing or assembling a firearm, a person making or assembling the firearm shall . . . apply to the [California] Department of Justice for a unique serial number or other mark of identification . . . ."[149] This law would seem to sweep very broadly to anyone who assembles a firearm, whether or not it

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146. *See* Letter from Glenn E. Smith to Cody Wilson, *supra* note 106.

147. Or for any federal gun control laws, for that matter. *See* Josh Blackman & Shelby Baird, *The Shooting Cycle*, 46 CONN. L. REV. (forthcoming 2014), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2375010.

148. *See* Jacob Gershman, *California Considers Plastic-Gun Measure*, WALL ST. J. (Jan. 14, 2014 11:03 AM), http://blogs.wsj.com/law/2014/01/14/california-considers-plastic-gun-measure/.

149. S.B. 808, Leg., 2013–14 Reg. Sess. (Cal. 2014), *available at* http://www.leginfo.ca.gov/pub/13-14/bill/sen/sb_0801-0850/sb_808_bill_20140121_amended_sen_v95.pdf.

involves 3D printing.[150] The meaning of "assemble" is not defined.[151] It is not clear if "assemble" would include taking a gun apart, perhaps to clean or repair it, and reassembling it.

In November of 2014, Philadelphia passed a ban on 3D-printed guns.[152] The sponsor of the bill was not aware of any actual 3D-printed guns in the City of Brotherly Love.[153] Her legislative director said, "It's all pre-emptive. It's just based upon internet stuff out there."[154] Speaking of preemption, the Philadelphia ban is almost certainly preempted by Pennsylvania law, which provides that "no county, municipality or township may in any manner regulate the lawful ownership, possession, transfer or transportation of firearms, ammunition or ammunition components when carried or transported for purposes not prohibited by the laws of this Commonwealth."[155]

The primary mechanism under federal law to address the manufacturing, and possession of 3D guns would be the Undetectable Firearms Act ("UFA").[156] This law makes it illegal to "manufacture, import, sell, ship, deliver, possess, transfer, or receive any firearm" that "is not detectable" by a metal detector.[157] The law requires the metallic equivalent of 3.7 ounces of stainless steel to be installed into all firearms.[158] This law was passed in 1988 following an unfounded panic that the Austrian-made Glock pistol was manufactured out of plastic and could evade metal detectors.[159] The idea of an undetectable gun was forever immortalized in the 1990 action thriller *Die Hard 2*, when John McClaine, played by Bruce Willis, described his (fictional) "Glock 7" pistol: "Luggage? That punk pulled a Glock 7 on me. You know what that is? It's a porcelain gun made in Germany. It doesn't show up on your airport X-ray

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150. *See* Josh Blackman, *California Bill Would Make It a Crime to Make Your Own Firearm (Without a 3D Printer)*, JOSH BLACKMAN'S BLOG (Jan. 14, 2014), http://joshblackman.com/blog/2014/01/14/california-bill-would-make-it-a-crime-to-make-your-own-firearm-without-a-3d-printer/.

151. *See* S.B. 808.

152. *See* Simon Van Zuylen-Wood, *Philly Becomes First City to Ban 3-D Gun Printing*, PHILADELPHIA (Nov. 21, 2013, 3:36 PM), http://www.phillymag.com/news/2013/11/21/philly-becomes-first-city-ban-3-d-gun-printing/.

153. *See id.*

154. *Id.*

155. 18 PA. CONS. STAT. § 6120(a) (2014).

156. 18 U.S.C § 922(p) (2012).

157. *Id.*

158. *See id.*

159. Barrett, *supra* note 40.

machines here and it costs more than what you make in a month!"[160] Glocks have never been made out of plastic or porcelain.[161]

The UFA was reauthorized in 1998,[162] 2003,[163] and was set to expire in December of 2013, shortly after the Liberator and 3D guns entered the national conversation. In calling for the UFA's reauthorization, Attorney General Holder specifically cited the threat of 3D guns, which he called an "extremely serious problem."[164] He added, "[t]his is a very worrisome threat to law enforcement and to people who fly every day. We can't have guns legally in circulation that are not detectable by metal detectors."[165] The "rapid progress" of a 3D-printed AR-15 "lower" receiver—the part that contains the operating guts of the guns—from only being able to handle a few rounds, to 600 rounds in 2013, "sends shivers up the spine of public officials who want to regulate firearms."[166]

Proposals were introduced in the House[167] and the Senate[168] that would have expanded the reach of the law to criminalize certain types of 3D-printed guns.[169] Specifically, the Undetectable Firearms Modernization Act ("UFMA") would have extended the UFA ban to "undetectable firearm receivers made by individuals" and "undetectable ammunition magazines by individuals."[170] While in the past, the manufacturing of firearms for personal consumption was largely unregulated, now do-it-yourself guns would become a federal crime.

It is clear UFMA was proposed in direct response to the Liberator, as it was mentioned numerous times during the legislative debate. The findings for these bills specifically cited the fact that "3D printers . . . are quickly advancing to a point where it will soon be possible to fabricate fully operational firearm

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160. DIE HARD (20th Century Fox 1988).

161. *See generally* PAUL M. BARRETT, GLOCK: THE RISE OF AMERICA'S GUN (2012).

162. Act of Oct. 21, 1998, Pub. L. No. 105-277, § 649, 112 Stat. 2681, 3209 (1998).

163. Act of Dec. 9, 2003, Pub. L. No. 108-174, § 649, 117 Stat. 2481 (2003).

164. *Holder Takes Aim at 3-D Guns, Calls for Renewal of Metal Detection Law*, *supra* note 34.

165. *Id.*

166. Desai & Magliocca, *supra* note 3 (manuscript at 20).

167. Undetectable Firearms Modernization Act, H.R. 1474, 113th Cong. (2013).

168. Undetectable Firearms Modernization Act, S. 1149, 113th Cong. (2013).

169. Murphy, *supra* note 16.

170. Undetectable Firearms Modernization Act, S. 1149, 113th Cong. §§ 4, 5 (2013); Undetectable Firearms Modernization Act, H.R. 1474, 113th Cong. §§ 4, 5 (2013).

components."[171] Senator Chuck Schumer was concerned that 3D printing can "make what was once a hypothetical threat into a terrifying reality. We are actively exploring all options to pass legislation that will eliminate the threat of completely undetectable weapons."[172] Ultimately, these modifications to the law were defeated. The UFA was reauthorized without amendments on December 9, 2013[173] and signed into law by President Obama's autopen.[174]

A requirement that a firearm contain some small amount of metal will likely survive any constitutional scrutiny. The UFA allows 3D guns to be printed from plastic so long as there is a small piece of metal installed into it.[175] This approach is narrowly tailored to make it easier to detect firearms in certain "sensitive places" guarded by metal detectors, or body scanners (which could detect an entirely plastic gun).[176] Adding a small amount of metal would not alter the operation, effectiveness, or usability of the firearm, so the burden seems *de minimis*.

Though, it is doubtful how effective this law would be. Even if the UFMA were passed, it could easily be evaded by adding a small amount of metal, such as a roofing nail, which can be used as a firing pin for the gun. In fact, the plans for the Liberator called for the installation of a piece of metal (the firing pin made out of a nail) that would satisfy the UFA.[177] Someone intent on inflicting harm could just as easily remove the nail to evade security. So-called "ghost-guns," made out of plastic parts,[178] have been in existence long before 3D printing was in existence.

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171. Undetectable Firearms Modernization Act, S. 1149, 113th Cong. § 2 (2013); Undetectable Firearms Modernization Act, H.R. 1474, 113th Cong. § 2 (2013).

172. Barrett, *supra* note 35.

173. Act of Dec. 9, 2003, Pub. L. No. 108-174, § 649, 117 Stat. 2481 (2003).

174. *See* Josh Blackman, *Undetectable Gun Act, Autopen, and Pocket Veto*, JOSH BLACKMAN'S BLOG (Dec. 10, 2013), http://joshblackman.com/blog/2013/12/10/undetectable-gun-act-autopen-and-pocket-veto/.

175. *See* 18 U.S.C § 922(p) (2012).

176. *See* District of Columbia v. Heller, 554 U.S. 570, 626–27 (2008) (affirming the validity of laws "forbidding the carrying of firearms in sensitive places such as schools and government buildings").

177. *See* Sebastian Anthony, *The Liberator: The First Downloadable 3D-Printed Gun Gets Test Fired*, EXTREMETECH (May 6, 2013, 6:23 AM), http://www.extremetech.com/extreme/155084-the-liberator-the-first-downloadable-3Dprinted-gun-gets-test-fired.

178. *See California Bill Aims to Regulate 3-D "Ghost Guns"*, RT (Jan. 14, 2014 11:55 AM), http://rt.com/usa/california-bill-ghost-guns-senator-577/.

B. Bans on Materials Used For Printing 3D Guns

An alternative to banning the manufacturing or possession of 3D guns would be to ban, or heavily regulate, the supplies needed to print a 3D gun. One proposal, noted by Professors Desai and Magliocca, would involve the regulation of the "material used to make the [3D] gun."[179] This directed approach would restrict access to the "particular blend of plastic or metal can be shaped into reliable guns."[180] If these guns can be manufactured from a "common material"—more likely—"then the answer would be to alert law enforcement authorities when someone buys an unusually large amount of that input, much as some states do with fertilizer because terrorists can make bombs out of that."[181]

There are practical and constitutional problems with this approach. Practically, it would be virtually impossible to single out the type of plastic used to make 3D guns, as there many, many different materials that can be used. In fact, 3D guns are not limited to plastic parts. Solid Concepts has built a 3D-printed metal gun.[182] Rather than using plastic powder, the 3D printer relies on finely-grounded metal powder to create three-dimensional parts.[183] Constitutionally, banning a certain type of plastic that can be used for 3D printing would unduly regulate vast amounts of innovative non-gun designs people can create. This would burden many protected forms of expression. The state's interest in banning a certain type of plastic, because it may be used in a gun design, along with thousands of other designs, would be overbroad.

Professors Desai and Magliocca further suggested that it may be necessary to limit access to "bullets" and "gunpowder."[184] A professor at Cornell University noted that, "[p]erhaps the only way forward, if we choose to try and control this, is to control the gunpowder—the explosives—and not the actual device."[185] Limiting access to

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179. Desai & Magliocca, *supra* note 3 (manuscript at 21).

180. *Id.*

181. *Id.*; *see also* Jensen-Haxel, *supra* note 84, at 469 ("The most obvious legislative response would be to criminalize the act of making or possessing homemade guns. More narrowly, new rules might ban firearms made by specific processes (e.g., additive manufacturing) or made from certain materials employed by those processes (e.g., plastics and powder-based metals).").

182. Blackman, *supra* note 31.

183. *See id.*

184. Desai & Magliocca, *supra* note 3 (manuscript at 21).

185. *See* Robert Beckhusen, *3-D Printing Pioneer Wants Government to Restrict Gunpowder, Not Printable Guns*, WIRED (Feb. 19, 2013 6:30 AM), http://www.wired

ammunition, and the gunpowder needed to load ammunition, would have serious constitutional problems.

The Supreme Court has held that denying someone the equipment to exercise a right is itself a constitutional violation. For example, the Supreme Court found that a Minnesota law that imposed a tax on newspaper ink and paper "violates the First Amendment" because it "singles out the press."[186] Under such a regime, people were free to own newspapers, and could freely buy and sell newspapers, but the means necessary to create the newspapers was unconstitutionally burdened. Banning gunpowder and bullets is comparable to banning newspaper ink and paper. As Professor Nicholas Johnson explained, "Even though Heller did not explicitly address ammunition, it would eviscerate the right to say that guns are protected but ammunition is not."[187] Neither of these proposals are constitutionally viable, to say nothing of the public backlash against informing the 100 million Americans who own firearms that they are restricted in their purchase bullets or gunpowder due to a weak concern of 3D-printed guns.[188]

C. Intellectual Property Regulations and 3D-Printed Guns

Although the promise of 3D printing is great, the ability to instantly and easily reproduce objects that may be protected by patents, trademarks, copyrights, or trade dresses, will create a quantum shift in intellectual property law. Professors Desai and Magliocca have observed that this technology is "launching an Industrial Counter-Revolution, and the laws governing the way things are made will need to make peace with the reality of digitized objects made of simple raw materials and software."[189] The "rapid

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.com/dangerroom/2013/02/gunpowder-regulation/ (emphasis added).

186. Minneapolis Star & Tribune Co. v. Minnesota Comm'r of Revenue, 460 U.S. 575, 591 (1983).

187. Nicholas J. Johnson, *Administering the Second Amendment: Law, Politics, and Taxonomy*, 50 SANTA CLARA L. REV. 1263, 1265 (2010) ("Even though Heller did not explicitly address ammunition, it would eviscerate the right to say that guns are protected but ammunition is not.").

188. *See* PEW RESEARCH CTR., PERSPECTIVES OF GUN OWNERS, NON-OWNERS: WHY OWN A GUN? PROTECTION IS NOW TOP REASON 16, *available at* http://www.people-press.org/files/legacy-pdf/03-12-13%20Gun%20Ownership%20Release.pdf (detailing survey finding that 24% of adult Americans own guns). For a discussion on public perceptions of the right to keep and bear arms, see Blackman & Baird, *supra* note 147.

189. Desai & Magliocca, *supra* note 3 (manuscript at 3) (footnote omitted).

uptake at different layers of society [of 3D printing] indicates disruption of some sort is at hand and growing."[190] 3D printing challenges the basic assumption underlying patent law—that "the cost to infringe is relatively high."[191] The manufacturing sector is very concerned about 3D printing, as it gives people the ability to create items at home, vitiating the need for manufacturing services.[192]

The proliferation of 3D printing will "reduce the value of many patents, some copyrights, and all trade dress, because even the best efforts to stop this surge in infringement will fall short."[193] Yet, one of the greatest benefits of 3D printing is that it will "accelerate the pace at which design, prototyping, and entrepreneurial launches and failures occur," leading to "rapid, unpredictable experimentation, faster learning, and increased knowledge growth."[194]

An alternate approach to regulating 3D guns could be built on an intellectual property regime aimed at prohibiting the printing of patented objects. I consider two possible approaches to an intellectual-property approach to regulating 3D printing, and 3D-printed guns in particular. First, government-mandated filters can be installed throughout the internet to stop the sharing of certain prohibited files, such as CAD files. If the files being blocked pertain to constitutionally protected information, this would amount to an unconstitutional prior restraint of protected speech. Second, I look at laws requiring the installation of Digital Rights Management technology in 3D printers that would not permit printing certain prohibited files. This raises the specter of chilling wide swaths of protected expressions. Finally, I consider a vastly-superior alternative, the Digital Millennium Patent Act ("DMPA"), based on the Digital Millennium Copyright Act's ("DMCA") notice-and-takedown process, as described by Professors Desai and Magliocca. This system would allow for the takedown of files that infringe on patents but would permit sharing of other constitutionally protected materials.

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190. *Id.*

191. *Id.*

192. *See* John Biggs, *Home 3D Printing Is Killing the Manufacturing Industry*, TECHCRUNCH (Oct. 2, 2012), http://techcrunch.com/2012/10/02/home-3d-printing-is-killing-the-manufacturing-industry/.

193. Desai & Magliocca, *supra* note 3 (manuscript at 5).

194. *Id.* (manuscript at 6).

1. Filtering CAD Files on the internet

Today, mechanisms exist to detect, and filter files shared on the internet that violate certain copyrights. For example, the popular video-sharing site YouTube has installed a Content ID system. As Professors Desai and Magliocca have noted:

> Copyright holders share digital fingerprints of their work with YouTube. When a user creates a file, it is compared against the fingerprint database. If it appears to be a match, the copyright holder is notified and then chooses how to proceed by either issuing a takedown notice under the DMCA, doing nothing, or choosing to place advertisements and/or links to buy the song on the page where the video is watched.[195]

Dropbox, a file-sharing system, uses a similar process to determine if users are sharing pirated files—they rely on a "technique known as 'file hashing against a blacklist' to block pre-selected files from being shared person-to-person over its servers."[196] This "hashing—a simple algorithmic tool which maps data of arbitrary length to data of a fixed length—to produce a unique identifier for every file you upload (it also then encrypts your file so others can't read them)."[197]

These filters are not limited to individual sites. The Copyright Alerts System ("CAS") is an internet-wide filter that can identify illegally shared files being downloaded.[198] CAS was created through an agreement among the five largest Internet Service Providers (AT&T, Cablevision, Comcast, Time Warner, or Verizon) and media companies.[199] By closely monitoring peer-to-peer filing share sites, CAS can inspect what a user is downloading, and match its signature (called a "hash") against a set of signatures for known pirated files.[200] If the system determines an illegal file is being downloaded, it offers a "graduated response," ranging from an email

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195. *Id.* (manuscript at 53 n.132).

196. Jamie Condliffe, *How Dropbox Knows When You're Sharing Copyrighted Files*, GIZMODO (Mar. 31, 2014 8:56 AM), http://gizmodo.com/how-dropbox-knows-when-youre-sharing-copyrighted-files-1555180683.

197. *Id.*

198. Kevin Collier, *Your Guide to Life Under the Copyright Alerts System*, DAILY DOT (Feb. 20, 2013), http://www.dailydot.com/news/copyright-alerts-system-six-strikes-primer-guide/.

199. *See id.*

200. *See id.*

notification to throttling maximum internet speeds to a slow crawl to termination of the account.[201]

Even if this system is implemented voluntarily by private parties, and not by government mandate, the "service providers are acting 'in the shadow of the law,' motivated by the state action that established copyright liability and the DMCA.[202] Government cannot insulate itself from responsibility for this abridgment of free speech by routing its influence through third-party service providers."[203]

A similar provision, whether mandated by the government, or implemented voluntarily could be used to police downloading 3D blueprints for guns. Any uploads of a banned blueprint that has signatures of being a 3D gun, could be flagged, and filtered. Anyone who attempts to download the file could be reported to the authorities. Already, popular 3D printing file-sharing sites have removed all 3D guns. Thingiverse, a database of downloadable 3D files, has banned 3D gun blueprints.[204] Somewhat ironically, Kim Dotcom, the world's most famous intellectual pirate, deleted all links to the blueprint of the Liberator from his file-sharing website.[205] In response, Wilson created DEFCAD, which he dubbed "the island of misfit objects."[206]

The folly of censoring the blueprints is that the simplest encryption can evade filtering. The "Disarming Corruptor" algorithm allows designers to encrypt the appearance of blueprints using a special key, so that the CAD file does not resemble a gun, and only those with the key can unscramble the designs.[207] Further,

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201. *Id.*

202. Wendy Seltzer, *Free Speech Unmoored in Copyright's Safe Harbor: Chilling Effects of the DMCA on the First Amendment*, 24 HARV. J.L. & TECH. 171, 190 (2010) (citing Robert H. Mnookin & Lewis Kornhauser, *Bargaining in the Shadow of the Law: The Case of Divorce*, 88 YALE L.J. 950 (1979)).

203. *Id.*

204. *See* Andy Greenberg, *3D-Printing Firm Makerbot Cracks Down on Printable Gun Designs*, FORBES (Dec. 19, 2012 4:30 PM), http://www.forbes.com/sites/andygreenberg/2012/12/19/3d-printing-startup-makerbot-cracks-down-on-printable-gun-designs/.

205. *See* Gregory Ferenstein, *Offshore 3D Printed Gun Blueprint Protector Kim Dotcom Reportedly Deleting Files*, TECHCRUNCH (May 11, 2013), http://techcrunch.com/2013/05/11/offshore-3d-printed-gun-blueprint-protector-kim-dotcom-reportedly-deleting-files/.3d-

206. *See* Brian Benchoff, *DEFCAD, The Island of Misfit Objects*, HACKADAY (Mar. 12, 2013), http://hackaday.com/2013/03/12/defcad-the-island-of-misfit-objects/.

207. *See* Georgi Kantchev, *Authorities Worry 3-D Printers May Undermine Europe's Gun Laws*, N.Y. TIMES (Oct. 17, 2013), http://www.nytimes.com/2013/10/18/business/international/european-authorities-wary-of-3-d-guns-made-on-printers.

information cannot be controlled. DEFCAD, if shut down, will spawn countless other mirror sites that can replicate the files.[208] Filtering will not work, and will only serve to over-broadly sweep in constitutionally protected expressions.

2. Digital Rights Management on 3D Printers

Digital Rights Management ("DRM") is a set of controls installed on computers and accessories to prevent the reproduction of certain protected materials.[209] For example, eBooks you purchase on the Amazon Kindle store cannot be copied onto other devices without permission due to DRM.[210] Many CDs and DVDs cannot be duplicated due to DRM installed on the disks.[211] Specifically, because the song and movie are copyrighted, they were encoded with a certain digital signature. A DRM-equipped device, such as an iPad or Kindle, will read that signature, and prevent their reproduction.

Similar technologies could be installed onto 3D printers. One startup that distributes 3D printers opposed government intervention, favored "industry self-imposed regulation, perhaps using DRM-style access control technologies."[212] If a CAD file would create an object that is protected by a patent or a trade dress, DRM technology could be implemented to prevent it from being printed. A

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html.

208. *See* Tim Murphy, *State Department Forces Texas Law Student to Take Down Instructions for 3-D-Printed Guns*, MOTHER JONES (May 9, 2013, 4:38 PM), http://www.motherjones.com/mojo/2013/05/state-department-cody-wilson-defense-distributed ("As with everything else on the Internet, the takedown notice from the DTCC has its limitations. For one thing, there are already a number of 'mirror' sites that essentially replicate DEFCAD but are not controlled by Wilson—or anyone in the United States, for that matter. You can also download the plans for the Liberator or various component parts from the Pirate Bay, the notorious Swedish file-sharing index site.").

209. *See generally* Dan L. Burk, *Legal and Technical Standards in Digital Rights Management Technology*, 74 FORDHAM L. REV. 537 (2005).

210. *See* Cyrus Farivar, DRM Be Damned: How to Protect Your Amazon E-Books from Being Deleted, ARSTECHNICA (Oct. 25, 2012, 8:15 PM), http://arstechnica.com/gadgets/2012/10/drm-be-damned-how-to-protect-your-amazon-e-books-from-being-deleted/.

211. *See* Julia Layton, How Digital Rights Management Works, HOWSTUFFWORKS, http://computer.howstuffworks.com/drm4.htm (last visited Jun. 14, 2014).

212. Lorenzo Franceschi-Biccherai, *3D-Printed Weapons Builder Says He's Ready to Print Entire Handgun*, MASHABLE (Apr. 24, 2013), http://mashable.com/2013/04/24/3d-printed-handgun/.

patent has already been granted that would install a DRM filter into a 3D printer.[213] Such printers would refuse to print something that a user does not have permission to print.[214] With this DRM, "[e]ven if users were able to obtain digital blueprints to print firearms, they would not be able to print from these blueprints."[215] Relatedly, Stratasys, a maker of 3D printers, repossessed Cody Wilson's printer,[216] explaining that they would not permit him to build a gun with it.[217]

It is not inconceivable for the private industry groups, or even the government, to mandate that 3D printers will not print certain blueprints that have a certain DRM signature on them. In other words, if you tried to print a 3D gun, the 3D printer would not work. An analogy to this would be the SSL (secure socket layer) certificates used on certain commercial web sites. In order to engage in secure online transactions, a site must have a certain public and private key. If they do not match, the transaction would not work. Congress could require that 3D printers only print if a certain key is provided.

The danger of a digital rights management scheme is that the "could fall into path-dependent solutions where creators are told to use a 3D printer only for certain purposes."[218] As Professors Desai and Magliocca note, "[i]ncumbent patentees may lobby Congress to pass statutes that hobble the 3D printing industry."[219] "Incumbents will challenge the technology," and "demand that the law limit" 3D printing.[220] Specifically, these "efforts could use the fear of guns as a

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213. U.S. Patent No. 8,286,236 (filed Jan 31, 2008) (granted on October 9, 2012 to Intellectual Ventures of Bellevue, Washington for a system lending a 3D printer the ability to assess whether a computer design file it is reading has an authorization code that grants access for printing—and preventing the machine from printing if it does not—whether it is a solid object, a textile, or even a food that is being printed)

214. *See* Paul Marks, *New Patent Could Saddle 3D Printers with DRM*, GIZMODO (Oct. 18, 2012 4:52 AM), http://gizmodo.com/5952780/new-patent-could-saddle-3d-printers-with-drm.

215. Smith, *supra* note 95, at 19.

216. *See Imagine if Your Biggest Part in the Human Drama Was to Stand in the Way of an Innovation*, WIKIWEP DEVBLOG (2012), http://defdist.tumblr.com/post/32381907035/imagine-if-your-biggest-part-in-the-human-drama.

217. *See* Paul Marks, *DIY Gun Project Misfires as 3D Printer Is Seized*, NEW SCIENTIST (Oct. 2, 2012 10:31 AM), http://www.newscientist.com/article/dn22323-diy-gun-project-misfires-as-3d-printer-is-seized.html.

218. Desai & Magliocca, *supra* note 3 (manuscript at 56).

219. *Id.* (manuscript at 20–21).

220. *Id.* (manuscript at 7).

rallying cry for limits on 3D printing that stretch beyond what may be required for those limited issues."[221]

The primary difficulty with using an intellectual property regime to police 3D guns is that the opposition to 3D guns is not based on intellectual property. No one claims that the Liberator violates any patents. In fact the Liberator was created as an open-sourced document.[222] And this was a firearm model that was in the public domain for decades, available to anyone.[223] Yet, the infrastructures that could police infringing 3D CAD files could easily be extended to files deemed illicit—such as 3D guns.

In other words, the government could simply hijack the existing process to censor and block prohibited CAD files as a means to eliminate 3D guns. "[C]ompanies with a vested interest in the current system must not be allowed to use concerns about homemade guns or other distractions as an excuse to shackle 3D printing."[224] There is always the risk of a Baptist and Bootlegger coalition forming.[225] Manufacturers who seek to shut down 3D-printing will ride the wave of opposition to 3D guns to stifle this innovative industry. Desai and Magliocca conclude that "[t]he understandable desire to prevent individuals from making untraceable or illegal guns should not cause undue alarm."[226]

Alas, the seeds have already been planted. The Create it REAL 3D printer has "developed software that looks for the characteristics of weapon designs and, when detected, blocks the printer from

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221. *Id.* (manuscript at 21).

222. Wilson claims that the fact that the blueprint is open-sourced exempts it from the scope of export control laws. *See* Andy Greenberg, *State Department Demands Takedown of 3D-Printable Gun Files for Possible Export Control Violations*, FORBES (May 9, 2013 2:36 PM), http://www.forbes.com/sites/andygreenberg/2013/05/09/state-department-demands-takedown-of-3d-printable-gun-for-possible-export-control-violation/ ("Defense Distributed is excluded from the ITAR regulations under an exemption for non-profit public domain releases of technical files designed to create a safe harbor for research and other public interest activities. That exemption, he says, would require Defense Distributed's files to be stored in a library or sold in a bookstore. Wilson argues that Internet access at a library should qualify under ITAR's statutes, and says that Defcad's files have also been made available for sale in an Austin, Texas bookstore that he declined to name in order to protect the bookstore's owner from scrutiny.").

223. *See id.*

224. Desai & Magliocca, *supra* note 3 (manuscript at 7).

225. *See* Bruce Yandle, *Bootleggers and Baptists: The Education of a Regulatory Economist*, REGULATION, May–June 1983, at 12.

226. Desai & Magliocca, *supra* note 3 (manuscript at 21).

making a firearm."[227] Regulating firearms is far beyond the purview of intellectual property law, and it should not be quietly co-opted for this purpose. I agree with Professors Desai and Magliocca that concern about 3D-printed guns is a red herring regarding possible regulation.[228] Congress should avoid the urge of muddying the intellectual property waters by tackling the difficult and constitutionally sensitive area of 3D guns under the guise of protecting patents.[229] "Trying to stop or dictate the way a 3D printer is used unduly limits the potential of these general-purpose machines and mimics the failed DRM ideas of the copyright industry."[230]

3. Digital Millennium Patent Act

Rather than seeking government-mandated filtering of protected objects or installing DRM into printers, in a path-breaking article, Professors Desai and Magliocca propose a "Digital Millennium Patent Act" modeled on the Digital Millennium Copyright Act.[231] They offer a two-part legislative strategy to balance these important interests: Congress must "(1) remove[] the shadow of infringement liability from some people who use 3D printers for personal purposes; and (2) provide[] clear rules for websites that host the programs that let these devices function."[232] Specifically, Congress should create "infringement exemption for personal 3D printing . . . that would not facilitate large-scale commercial manufacturing," and a "Digital Millennium Patent and Trademark Act (DMPA) . . . that would impose notice and takedown rules on the sites that host 3D printing software." Under such a regime, "website that serves as a conduit for 3D printer software should be liable for contributory infringement if it refuses to take down a file after receiving a plausible complaint from a patentee."[233]

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227. Georgi Kantchev, *Authorities Worry 3-D Printers May Undermine Europe's Gun Laws*, N.Y. TIMES (Oct. 17, 2013), http://www.nytimes.com/2013/10/18/business/international/european-authorities-wary-of-3-d-guns-made-on-printers.html.

228. *See* Desai & Magliocca, *supra* note 3 (manuscript at 17–23).

229. *See id.* (manuscript at 12) ("Lower costs, the ability to make specialized and just-in-time parts, and a return to local manufacturing are all positive developments that should be embraced. Yet these advances will threaten if not destroy many firms and jobs that live off rents from intellectual property.").

230. *Id.* (manuscript at 56).

231. *See id.* (manuscript at 7).

232. *Id.*

233. *Id.* (manuscript at 44).

This approach would build on the Digital Millennium Copyright Act's "notice-and-takedown rules" which most "sites are already complying with . . . for files involving copyrights."[234] Creators of protected work could request that an internet site remove any CAD file. If the internet site reasonably complies, it would not be liable for infringement. The person who posted the file would have some recourse to challenge the takedown. Extending this regime to protect patents would avoid the "odd" regime of having "two sets of rules for these clearinghouses, one for copyrights and another for patents and trade dress."[235]

A Digital Millennium Patent and Trademark Act would serve as a powerful tool to protect intellectual property. Already, several 3D printing repositories "such as Thingiverse and Shapeways, have a notice-and-takedown policy, in part because some of their CAD files cover copyrighted content."[236] One of the greatest benefits of the DMPA is that it would not require filtering of protected 3D CAD files, or prohibiting the printing of these files on printers. To the extent that Congress considers an approach to regulate the intellectual property implications of 3D printing—of which there are many—the DMPA would be a viable option to pursue.

Though, in some cases, it may lead to an undue chilling of speech, in much the same way the DMCA does. If a similar "takedown procedure took place through the courts, it would trigger First Amendment scrutiny as a prior restraint—silencing speech before an adjudication of unlawfulness."[237] How can it be that in the "wake of *Citizens United*," "copyright law [can] remove political videos from public reach when campaign finance law [can] not?"[238]

While this analysis should in no way be viewed as an attack or criticism of regimes aimed at protecting intellectual property, care must be taken to ensure that these regulations are not expanded beyond the purpose of protecting intellectual property. Regulations to protect intellectual property have been upheld against free speech challenges by the Supreme Court, as noted in *Eldred v. Ashcroft*: "[W]hen . . . Congress has not altered the traditional contours of copyright protection, further First Amendment scrutiny is unnecessary."[239] The authors acknowledge this point, noting that "[a]lthough the framework created by the DMCA is still

234. *Id.* (manuscript at 53).
235. *Id.*
236. *Id.* (manuscript at 52).
237. Seltzer, *supra* note 202, at 176.
238. *Id.*
239. Eldred v. Ashcroft, 537 U.S. 186, 215, 221 (2003).

controversial in some quarters, the notice-and-takedown system works reasonably well."[240] But, notwithstanding *Eldred*, the use of notice-and-takedown systems for non-patented expressions that are constitutionally protected would run headlong into the First and Second Amendments.

D. Export Controls of Information about 3D Guns

Beyond regulating the manufacturing and possession of 3D guns, and the materials needed to create them, the most constitutionally troubling regulatory regime would prohibit the exchange of the 3D CAD blueprints. Even the Undetectable Firearms Modernization Act would not have restricted "what kind of [3D] printer files you can post online."[241] As Rep. Steve Israel, who co-sponsored the Undetectable Firearms Modernization Act said, "Nobody is regulating 3D printers in this bill. Nobody is regulating the ability of people to acquire digital blueprints in this bill."[242] But other provisions of federal law could do just that. Shortly after Cody Wilson published the CAD source code for the Liberator, the State Department sent him a letter *strongly hinting* that posting this information online violated export control laws that were meant to prohibit sharing weapon technology with foreign nationals.[243] This prior restraint of speech about the right to keep and bear arms conflicts with the First and Second Amendments.

1. ITAR and the First Amendment

Under the Arms Export Control Act of 1976 ("AECA"),[244] the United States government operates two overlapping systems to limit what can be exported.[245] The first regime is the Department of Commerce's Commerce Control List ("CCL"),[246] which controls "dual-

240. Desai & Magliocca, *supra* note 3 (manuscript at 53).

241. *See* Murphy, *supra* note 16.

242. Lorenzo Franceschi-Biccherai, *Law Banning 3D-Printed Guns Up for Crucial Vote*, MASHABLE (Dec. 2, 2013), http://mashable.com/2013/12/02/3d-printed-guns-law-renew/.

243. *See* Letter from Glenn E. Smith to Cody Wilson, *supra* note 106.

244. 22 U.S.C. § 2778 (2012).

245. *See* David R. Fitzgerald, *Leaving the Back Door Open: How Export Control Reform's Deregulation May Harm America's Security*, 15 N.C.J.L. & TECH. ON. 65 (2014).

246. *Commerce Control List*, U.S. DEPT. OF COM., http://www.bis.doc.gov/index.php/regulations/commerce-control-list-ccl (last visited May 31, 2013).

use items, i.e., commercial items with possible military applications, and some military items of lesser sensitivity."[247]

The second regime is the United States Munitions List ("USMIL"),[248] operated by the Department of State pursuant to the International Traffic in Arms Regulations ("ITAR").[249] ITAR restricts the export of so-called Significance Military Equipment ("SME"), defined as "articles for which special export controls are warranted because of their capacity for substantial military utility or capability."[250] Prior authorization from the State Department is required prior to exporting any SME listed on ITAR.[251] The USMIL lists 21 categories of technologies, including most relevant for our purposes, many types of firearms and "munitions."[252]

Salient to this discussion, there have been several attempts by the federal government to use ITAR as a prohibition on sharing the source code for encryption algorithms outside the United States. Encryption refers to "the process of converting a message from its original form ('plaintext') into a scrambled form ('ciphertext')."[253] When performed on a computer, encryption relies on an "algorithm, a mathematical transformation from plaintext to ciphertext, and a key that acts as a password."[254] Encryption software is programmed primarily through "source code," which represents instructions to "the computer's circuitry to execute the encoding process."[255] The encryption source code, much like the CAD source code described earlier, "can [be] read and understood by "[i]ndividuals familiar with a particular computer programming language."[256]

There are three leading cases that discuss whether a ban on the export of the encryption source code constitutes a prior restraint in violation of the First Amendment. The first case, *Karn v. United States Department of State*, upheld such a ban.[257] Even assuming that the source code was protected speech, the countervailing

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247. Office of the Press Secretary, *Fact Sheet: Implementation of Export Control Reform*, WHITE HOUSE (Mar. 8, 2013), http://www.whitehouse.gov/thepress-office/2013/03/08/fact-sheet-implementation-export-control-reform.

248. 22 C.F.R. § 121.1 (2013).

249. *Id.*

250. *Id.* § 120.7(a).

251. *Id.* § 123.1.

252. *Id.* § 121.1.

253. Junger v. Daley, 209 F.3d 481, 482 (6th Cir. 2000).

254. *Id.*

255. *Id.*

256. *Id.*

257. *See* Karn v. U.S. Dep't of State, 925 F. Supp. 1, 10–13 (D.D.C. 1996).

interests in preserving national security trumped.[258] The second case (which was withdrawn following the grant of a petition for rehearing en banc), *Bernstein v. United States Department of Justice*, found that the source code was encrypted speech and that it would be difficult for the government to justify the prior restraint based on national security interests.[259] Third, *Junger v. Daley* considered a case where a law professor sought to upload encryption source code to his website to demonstrate the code to his students.[260] The Sixth Circuit found that the source code for encryptions algorithms was speech, and that the government bears a strong burden to show that the national security interests justify this prior restraint.[261] A careful study of each case informs the constitutional inquiry of the First Amendment value in the 3D CAD files.

a. Karn v. United States Department of State

Phillip Karn sought permission to export the book *Applied Cryptography* by Bruce Schneier outside the United States.[262] The book included the source code for an encryption algorithm, both in a printed format and on an attached computer diskette.[263] The government determined that the book was not subject to the jurisdiction of ITAR, but the diskette was designated as a protected "munition."[264] (Though, it is reassuring that the government is not arguing here, as it has elsewhere, that it has the power to ban a book.[265]) The District Court for the District of Columbia dismissed

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258. *See id.* at 4.

259. *See* Bernstein v. U.S. Dep't of Justice, 176 F.3d 1132, 1141, 1143–45 (9th Cir.), *reh'g granted, opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999).

260. *See* Junger v. Daley, 209 F.3d 481, 483 (6th Cir. 2000).

261. *See id.* at 482.

262. *See Karn*, 925 F. Supp. at 4.

263. *See id.*

264. *See id.*

265. *See* Oral Argument at 31:04, Citizens United v. Fed. Election Comm'n, 558 U.S. 310 (No. 08-205), *available at* http://www.oyez.org/cases/2000-2009/2008/2008_08_205 (Deputy Solicitor General Malcolm Stewart conceding that the government could ban a book under campaign finance law); *see also* Jonathan H. Adler, *Jeffrey Toobin on* Citizens United, VOLOKH CONSPIRACY (May 14, 2012 9:53 PM), http://www.volokh.com/2012/05/14/jeffrey-toobin-on-citizens-united/. Fortunately, during re-argument, then-Solicitor General Elena Kagan made clear the government could not ban a book. *See* Richard L. Hasen, *The Big Ban Theory*, SLATE (May 24, 2010 12:16 PM), http://www.slate.com/articles/news_and_politics/jurisprudence/2010/05/the_big_ban_theory.html.

Karn's First Amendment challenge.[266] First, the court "assume[d] that the protection of the First Amendment extends to the source code and [explanatory] comments on the plaintiff's diskette."[267] Though, it stressed in a footnote that "[t]he Court makes no ruling as to whether source codes, without the comments, fall within the protection of the First Amendment. Source codes are merely a means of commanding a computer to perform a function."[268]

Second, the court found that the regulation was content-neutral: the government was "not regulating the export of the diskette because of the expressive content of the comments and or source code, but instead . . . because of the belief that the combination of encryption source code on machine readable media will make it easier for foreign intelligence sources to encode their communications."[269] After determining that the regulation was content-neutral, the court concluded that, under the under the intermediate scrutiny of the *O'Brien* test, it was valid.[270]

The court refused to "delve" into the policy dispute of whether the government correctly listed the algorithm on ITAR, even though "cryptographic algorithms contained on the Karn diskette are already widely available in other countries [through the Internet and other sources] or are so 'weak' that they can be broken by the [National Security Agency].'"[271] That something is in the public domain, and is readily available, does not suggest a lack of narrow tailoring on the part of the executive branch.[272] The court was not willing to "scrutinize the actual injury to national security" by allowing the export of these algorithms.[273]

In the end, the court concluded "that the regulation of the plaintiff's diskette is narrowly tailored to the goal of limiting the proliferation of cryptographic products and that the regulation is

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266. *See Karn*, 925 F. Supp. at 3.

267. *Id.* at 9.

268. *Id.* at 9 n.19.

269. *Id.* at 10.

270. *See id.* at 9 ("The[] . . . criteria [that a] regulation is (1) within the constitutional power of the government, (2) 'furthers an important or substantial governmental interest,' and (3) is narrowly tailored to the governmental interest—have been referred to as the *O'Brien* test after the Supreme Court upheld the government's prohibition against burning draft cards based on these criteria in [*United States v. O'Brien*, 391 U.S. 367 (1968)].").

271. *Id.* at 11.

272. *See id.* at 10–11.

273. *Id.* at 12 (citing United States v. Martinez, 904 F.2d 601, 602 (11th Cir. 1990)).

justified."[274] Following an appeal, the D.C. Circuit Court of Appeals reversed and remanded the case after President Clinton issued an "Executive Order transferring regulatory authority of non-military cryptographic computer source code to the Commerce Department, and the Commerce Department's promulgation of a new regulation under the authority of the International Emergency Economic Powers Act."[275] This effectively mooted the case.

b. Bernstein v. U.S. Department of Justice

Bernstein is a bear of a case, with a tortured procedural posture. Professor Daniel Bernstein sought permission to publish "The Snuffle Encryption System" in two forms: a paper containing analysis of the algorithm and the source code of algorithm written in the "C" programming language.[276] The State Department authorized Bernstein to publish the written paper, but it classified the source code of the algorithm as a "munition under the International Traffic in Arms Regulations" and required that Bernstein register for a license to "export" the source code.[277] Bernstein challenged the licensing scheme imposed by ITAR as a prior restraint on free speech in violation of the First Amendment.[278]

In a scholarly treatment of the subject, Judge Betty Fletcher, on appeal, found that the government's enforcement of ITAR violated the First Amendment.[279] The *Bernstein* court "conclude[d] that encryption software, in its source code form and as employed by those in the field of cryptography, must be viewed as expressive for

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274. *Id.*

275. Karn v. U.S. Dep't of State, 107 F.3d 923 (D.C. Cir. 1997) (per curiam). To the extent that ITAR derives any of its statutory authority from legislation implementing a treaty, that would not give Congress additional power to violate provisions in the Bill of Rights, such as the First and Second Amendments. *See* Reid v. Covert, 354 U.S. 1, 5 (1957) ("At the beginning we reject the idea that when the United States acts against citizens abroad it can do so free of the Bill of Rights."); *see also* Josh Blackman, *Regulating the Second Amendment Through the Treaty Power*, JOSH BLACKMAN'S BLOG (Feb. 7, 2013), http://joshblackman.com/blog/2013/02/07/regulating-the-second-amendment-through-the-treaty-power/.

276. *See* Bernstein v. U.S. Dep't of Justice, 176 F.3d 1132, 1135–36 (9th Cir.), *reh'g granted, opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999).

277. *Id.* at 1136.

278. *See id.*

279. *See id.* at 1147.

First Amendment purposes, and thus is entitled to the protections of the prior restraint doctrine."[280]

The government's arguments, which the Ninth Circuit systematically rejected, are instructive. The government did not "seriously dispute that source code is used by cryptographers for expressive purposes."[281] Interestingly, the *Bernstein* court noted that the government acknowledged that "blueprints" are a form of expression (this concession would not bode well for their position on 3D CAD files).[282] Instead, the Department of State argued that source code is different from other expressive content because it "can be used to control directly the operation of a computer without conveying information to the user."[283] To the government, it was the "unique functional aspect of source code," that defined it, rather than the "content of the ideas that may be expressed."[284] By this logic, the "export regulations manage to skirt entirely the concerns of the First Amendment."[285] The court found this argument "flawed for at least two reasons."[286]

First, source code is "written in a language intended also for human analysis and understanding," in addition to its ability to be compiled into object code which can be read solely by the computer.[287] Second, the court rejected the government's argument that "even one drop of 'direct functionality' overwhelms any constitutional protections that expression might otherwise enjoy."[288] The First Amendment, Judge Fletcher found, "is concerned with expression, and . . . the notion that the admixture of functionality necessarily puts expression beyond the protections of the Constitution" is incorrect.[289] Though the CAD files are certainly functional, they also have a strong expressive element that warrants First Amendment protection. The court did narrow its opinion, though, stressing that not all source code is protected by the First Amendment: "We do not hold that all software is expressive. Much of it surely is not."[290]

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280. *Id.* at 1141.
281. *Id.*
282. *See id.* at 1142.
283. *Id.* at 1141–42.
284. *Id.* at 1142.
285. *Id.*
286. *Id.*
287. *Id.*
288. *Id.*
289. *Id.*
290. *See id.* at 1145.

Professor Eugene Volokh views source code as protected by the First Amendment regardless of whether it is viewed as functional or not.[291] If source code restrictions are viewed as "restrictions on the functional aspect of the code (since the code can be directly compiled into object code and executed, without a human reading it) rather than the expressive aspect," then the "human-language descriptions of the algorithm that the source code embodies" would be protected.[292]

As a result, the government's application of ITAR enforcement, as applied to the cryptography algorithm "allow[s] the government to restrain speech indefinitely with no clear criteria for review" and "scientists have been effectively chilled from engaging in valuable scientific expression."[293] In conclusion, "because the challenged regulations grant boundless discretion to government officials, and because they lack the required procedural protections," the court found that "they operate as an unconstitutional prior restraint on speech."[294]

Alas, the precedential value of *Bernstein* is bare. On September 30, 1999, the court granted the government's petition for rehearing en banc, and withdrew the published opinion.[295] The case fizzled out following a remand after the government no longer sought to enforce the regulation against Bernstein.[296]

c. Junger v. Daley

Peter Junger, a law professor at Case Western University School of Law, sought to "post on his web site encryption source code that he has written to demonstrate how computers work."[297] The code was meant as a teaching tool for his students.[298] The government determined that, similar to *Karn* and *Bernstein*, Junger's "printed book chapter containing encryption code could be exported" but that

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291. *See* Eugene Volokh, *Crime-Facilitating Speech*, 57 STAN. L. REV. 1095, 1222 (2005).

292. *Id.* at 1222.

293. *Bernstein*, 176 F.3d at 1145.

294. *Id.*

295. Bernstein v. U.S. Dep't of Justice, 192 F.3d 1308, 1308 (9th Cir. 1999) (order).

296. *See* D.J. Bernstein, *Summary of the Case Status*, CR.YP.TO, http://cr.yp.to/export/status.html (last visited May 31, 2014).

297. Junger v. Daley, 209 F.3d 481, 483 (6th Cir. 2000).

298. *See id.*

the "export of the book in electronic form would require a license."[299] Junger claimed that the "encryption source code is protected speech."[300] The district court opinion, which was issued after *Karn* was remanded and while *Bernstein* was being appealed to the Ninth Circuit, found that the "subject regulations [was] content neutral" and survived intermediate scrutiny.[301]

In *Junger v. Daley*, the Sixth Circuit rejected the claim that the government could restrict the exportation of encryption software, finding that "First Amendment protects computer source code."[302] After determining that "computer source code is an expressive means for the exchange of information and ideas about computer programming," Judge Martin held that "it is protected by the First Amendment."[303] The court added a caveat to the holding, however, finding that "national security interests can outweigh the interests of protected speech and require the regulation of speech."[304]

While disentangling the "functional" and "expressive" nature of cryptographic source code, the court observed that "source code is the most efficient and precise means by which to communicate ideas about cryptography."[305] The Sixth Circuit rejected the district court's characterization that "the functional characteristics of source code overshadow its simultaneously expressive nature" and stressed that the "fact that a medium of expression has a functional capacity should not preclude constitutional protection."[306]

The First Amendment protects "symbolic conduct, such as draft-card burning, that has both functional and expressive features."[307] The court analogized a "a musical score" —clearly protected by the First Amendment—that "cannot be read by the majority of the public but can be used as a means of communication among musicians" to "computer source code, though unintelligible to many, is the preferred method of communication among computer programmers."[308] Therefore, "computer source code is an expressive

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299. *Id.* at 484.

300. *Id.*

301. Junger v. Daley, 8 F. Supp. 2d 708, 720 (N.D. Ohio 1998) *rev'd*, 209 F.3d 481 (6th Cir. 2000).

302. *Junger*, 209 F.3d at 482.

303. *Id.* at 485.

304. *Id.*

305. *Id.* at 484.

306. *Id.*

307. *Id.* (citing United States v. O'Brien, 391 U.S. 367 (1968)).

308. *Id.*

means for the exchange of information and ideas about computer programming, [and] it is protected by the First Amendment."[309]

Noting that intermediate scrutiny applies under the *O'Brien* test, the court found that the "record does not resolve whether the exercise of presidential power in furtherance of national security interests should overrule the interests in allowing the free exchange of encryption source code."[310] The court remanded the case to the district court to consider the impact of "recent amendments to the Export Administration Regulations" on Junger's constitutional claim.[311] This case also fizzled out on remand, apparently due to a lack of enforcement. Sensing a pattern?

2. Unliberating the Liberator

On May 8, 2013, the U.S. Department of State's Bureau of Political Military Affairs, Office of Defense Trade Controls Compliance, unliberated the Liberator.[312] In a letter to Cody Wilson, the Office's Chief Enforcement Officer wrote that "Defense Distributed may have released ITAR-controlled technical data without the required prior authorization from the Directorate of Defense Trade Controls (DDTC), a violation of the ITAR." Citing section 120.10 of ITAR, the letter classified the CAD source files as "information in the form of blueprints" that are forbidden "technical data."[313] (Note how the restricted content is described in terms of "information" and "data"). The letter closed by asking Defense Distributed to submit information concerning ITAR-compliance.[314] Until that information is submitted, the "technical data [is deemed] ITAR-controlled" and must be "removed from public access immediately."[315] That letter shot down the Liberator.

Wilson "complied . . . [i]nstantly," removing all of the files even though he contested the legality of the order.[316] He noted that he did not expect the plans to be online for long: "If the Liberator works, it's only logical that government will fight it."[317] Reason Magazine

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309. *Id.* at 485.
310. *Id.*
311. *Id.*
312. *See* Letter from Glenn E. Smith to Cody Wilson, *supra* note 106.
313. *Id.*
314. *Id.*
315. *Id.*
316. Doherty, *supra* note 12.
317. Uwe Buse, *Danger in 3-D: The Rapid Spread of Printable Pistols*, ABC NEWS (June 9, 2013), http://abcnews.go.com/International/danger-rapid-spread-print

reported that "[m]aybe the files were acts of free speech, maybe not; Wilson wasn't going to press the issue just now."[318]

3. The Constitutionality of ITAR as Applied to 3D Guns

As applied to the Liberator, ITAR restricts speech made in support of the Second Amendment. More precisely, the enforcements constitute a content-based prior restraint on highly-protected speech. With this perspective, the primary right being violated is the right to free speech, which courts have acknowledged is infringed by ITAR. But the derivative or hybrid right, which bolsters free speech, is that the communications are made in pursuance of the right to keep and bear arms. In conjunction with the free speech limitations of ITAR, a heightened scrutiny would apply.

a. ITAR as Content-Based Prior Restraint of Speech

The First Amendment, Judge Fletcher found, "is concerned with expression, and . . . the notion that the admixture of functionality necessarily puts expression beyond the protections of the Constitution [is incorrect]."[319] Though the CAD files are certainly functional, they have a strong expressive element that warrants First Amendment protection. The *Bernstein* court's definition of "source code" is instructive, as it closely resembles the nature of the CAD files used to print 3D guns. "'Source code,' at least as currently understood by computer programmers, refers to the text of a program written in a 'high-level' programming language."[320] Source code "is meant to be read and understood by humans and . . . can be used to express an idea or a method."[321] A computer cannot make any "direct use of source code until it has been translated ('compiled') into a 'low-level' or 'machine' language, resulting in computer-executable 'object code.'"[322] The source code "must follow stringent grammatical, syntactical, formatting, and punctuation conventions" as it is "destined for the maw of an automated, ruthlessly literal translator—the compiler."[323]

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ablepistols/story?id=19348773.

318. Doherty, *supra* note 12.

319. Bernstein v. U.S. Dep't of Justice, 176 F.3d 1132, 1142 (9th Cir.), *reh'g granted, opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999).

320. *Id.* at 1140.

321. *Id.*

322. *Id.*

323. *Id.*

Only those programmers "trained in programming can easily understand source code."[324] The CAD files closely resemble source code, as described by the *Bernstein* court. Programming source code is compiled to generate object code. CAD files are rendered to generate the 3D files. In much the same way, the CAD files are clearly "intended also for human analysis and understanding."[325] The source code, once compiled, displays, in vivid three dimensions, the shape and size of the quintessential gun parts used for self-defense. And the CAD rendering program, like the compiler, can translate the vertices and data points in an actual object code, which is then used to 3D print the object.

In *Karn*, the district court agreed with the government that the regulation of the source code was "content-neutral."[326] The court accepted the government's rationale "rationale for regulating the export of the diskette is that 'the proliferation of [cryptographic hardware and software] will make it easier for foreign intelligence targets to deny the United States Government access to information vital to national security interests.'"[327] Judge Richey added:

> [The government is] not regulating the export of the diskette because of the expressive content of the comments and or source code, but instead [is] regulating because of the belief that the combination of encryption source code on machine readable media will make it easier for foreign intelligence sources to encode their communications.[328]

The district court opinion in *Junger* also found that applying the export control laws to the electronic source code in question was "content-neutral."[329]

The *Bernstein* court declined to decide "whether the challenged regulations constitute content-based restrictions subject to the strictest constitutional scrutiny or whether they are, instead, content-neutral restrictions meriting less exacting scrutiny."[330] Instead, the Ninth Circuit held that "because the prepublication licensing regime challenged . . . applies directly to scientific

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324. *Id.*

325. *Id.* at 1142.

326. *See* Karn v. U.S. Dep't of State, 925 F. Supp. 1, 10–11 (D.D.C. 1996).

327. *Id.* at 11.

328. *Id.* at 10.

329. *See* Junger v. Daley, 8 F. Supp. 2d 708, 720 (N.D. Ohio 1998), *rev'd*, 209 F.3d 481 (6th Cir. 2000).

330. *Bernstein*, 176 F.3d at 1145.

expression, vests boundless discretion in government officials, and lacks adequate procedural safeguards, it constitutes an impermissible prior restraint on speech."[331] The argument that restrictions on these source code files are content-neutral seems rather weak. What the government was regulating was certain types of encryption algorithms.

The State Department's letter to Cody Wilson makes no reference to the fact that the files being shared are in an electronic format.[332] In fact, it is not even clear if a non-electronic format of the blueprints exists.[333] Instead, the letter focuses on the content of the "subject technical data" on "DEFCAD.org."[334] Specifically, it enumerates ten items, based on the subject of their source code:

> [The] Department believes Defense Distributed may not have established the proper jurisdiction of the subject technical data:
> 1. Defense Distributed Liberator Pistol
> 2. .22 electric
> 3. 125mm BK-14M high-explosive anti-tank warhead
> 4. 5.56/.223 muzzle brake
> 5. Springfield XD-40 tactical slide assembly
> 6. Sound Moderator – slip on
> 7. "The Dirty Diane" 1/2-28 to 3/4-16 STP S3600 oil filter silencer adapater
> 8. 12 gauge to .22 CB sub-caliber insert
> 9. Voltlock electronic black powder system
> 10. VZ-58 front sight.[335]

These are all classifications based on the subject of the source code—in particular, what objects the 3D CAD files express. This seems to conflict with the Supreme Court's pronouncement that, "as a general matter, . . . government has no power to restrict expression because of its message, its ideas, its subject matter, or its content."[336] Intermediate scrutiny, as the *Karn* and *Junger* district courts applied, is therefore inappropriate.

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331. *Id.* at 1143.

332. *See* Letter from Glenn E. Smith to Cody Wilson, *supra* note 99.

333. *See* Greenberg, *supra* note 210 ("Wilson . . . says that Defcad's files have also been made available for sale in an Austin, Texas bookstore that he declined to name in order to protect the bookstore's owner from scrutiny.").

334. *See* Letter from Glenn E. Smith to Cody Wilson, *supra* note 99.

335. *Id.*

336. Ashcroft v. Am. Civil Liberties Union, 535 U.S. 564, 573 (2002) (internal quotation marks omitted).

Rather, content-based restrictions of speech, particularly prior restraints, must pass strict scrutiny and be "justified by a compelling government interest and [be] narrowly drawn to serve that interest."[337] Under strict scrutiny, the government "must specifically identify an 'actual problem' in need of solving."[338] Any "curtailment of free speech must be actually necessary to the solution."[339] As the Court found in *Brown v. EMA*, "that is a demanding standard,"[340] and "[i]t is rare that a regulation restricting speech because of its content will ever be permissible."[341]

Even if the ITAR regulation is viewed as content-neutral, then the *O'Brien* intermediate scrutiny would be merged with the *Heller* intermediate scrutiny (as determined by the majority of cases).[342] What does intermediate plus intermediate result in? *Smith* suggested that something approaching strict scrutiny would be appropriate for hybrid claims.[343]

Further, allowing the author to release the expression in book form, and not digital form, would not in the least be narrowly tailored. Practically speaking, a printed version of the source code—which may run in the hundreds of pages—is effectively useless. It would have to be manually re-typed into the computer to render the objects in three-dimensions. The only viable means of using source code is in a digital format. In addition, presumably, if someone were to type all of the source code correctly, once completed, it would be deemed an unlawful munition, and subject to ITAR control. There are no "reasonable alternative avenues of communication."[344] You can't win. ITAR renders 3D blueprints useless. As applied, ITAR unconstitutionally infringes on both First and Second Amendment rights of Cody Wilson, and those who wanted to learn from that information about the right to keep and bear arms.

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337. Brown v. Entm't Merchants Ass'n, 131 S. Ct. 2729, 2738 (2011) (citing R.A.V. v. St. Paul, 505 U.S. 377, 395 (1992)).

338. *Id.* (quoing United States v. Playboy Entm't Grp., Inc., 529 U.S. 803, 822–23 (2000)).

339. *Id.* (citing *R.A.V.*, 505 U.S. at 395).

340. *Id.*

341. *Playboy*, 529 U.S. at 818.

342. *See* Nelson Lund, *Second Amendment Standards of Review in a* Heller *World*, 39 FORDHAM URB. L.J. 1617, 1622 (2012).

343. *See* Employment Div., Dep't of Human Res. of Or. v. Smith, 494 U.S. 872, 881–82 (1990).

344. Renton v. Playtime Theatres, Inc., 475 U.S. 41, 64 (1986).

b. *Balancing National Security and the First and Second Amendments*

The government's strongest countervailing interest to regulate the CAD files is national security, and the ability to speak with a single voice with respect to foreign affairs.[345] As the Court recently explained in upholding a restriction on providing material support to foreign terrorist organizations, "[e]veryone agrees that the Government's interest in combating terrorism is an urgent objective of the highest order," even against a First Amendment challenge.[346] For example, in *Karn*, the district court was not willing to "question the logic" of the government's rationale, and would not inquire whether "there is no actual danger to national security because the source codes can be obtained abroad through the book or on the Internet."[347]

However, under strict scrutiny, this is exactly the type of inquiry that courts must perform. As the Court made clear in the context of cell phone privacy, even if using information in an illicit manner may harm others, data by itself "can endanger no one."[348] The Supreme Court has imposed a high burden on the government for content-based prior restraints of speech, even when the asserted interest is national security: "[T]he presumption against prior restraints may be overcome where publication would directly and imminently imperil national security."[349] For the government to "justify a prior restraint on national security grounds, the government must prove the publication would 'surely result in direct, immediate, and irreparable damage to our Nation or its people.'"[350] Justice Brennan explained that national security is only a valid interest to justify prior restraint when there is "governmental allegation and proof that publication must inevitably, directly, and immediately cause the occurrence of an event kindred

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345. *See* United States v. Curtiss-Wright Exp. Corp., 299 U.S. 304, 321 (1936).

346. Holder v. Humanitarian Law Project, 561 U.S. 1, 29 (2010).

347. Karn v. U.S. Dep't of State, 925 F. Supp. 1, 10 (D.D.C. 1996).

348. Riley v. California, 573 U.S. __ (2014).

349. Bernstein v. U.S. Dep't of Justice, 176 F.3d 1132, 1144 n.19 (9th Cir.), *reh'g granted, opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999) (citing N.Y. Times Co. v. United States, 403 U.S. 713, 730 (1971) (Stewart, J., joined by White, J., concurring); Near v. Minnesota *ex rel.* Olson, 283 U.S. 697, 715 (1931); United States v. Progressive, Inc., 467 F. Supp. 990, 992 (W.D. Wis. 1979)).

350. *Id.* (quoting *N.Y. Times*, 403 U.S. at 730 (Stewart, J., joined by White, J., concurring)).

to imperiling the safety of a transport already at sea."[351] Recently, the Court stressed that merely showing a connection between speech and harming national interests would not be dispositive to satisfy a First Amendment challenge.[352] An open-sourced CAD file of a simple pistol that is readily available all over the internet would not even come close to meeting this lofty threshold.

The State Department, in their efforts to stop the distribution of a simple handgun that anyone with basic parts can construct, hardly justifies this burden. To the extent that scientific research is an important facet of the First Amendment, engaging in expression about another constitutional right, the Second Amendment, is of a much higher constitutional order. Further, the handgun is at the core of the Second Amendment, which was the firearm singled out by Justice Scalia in *Heller* as the quintessential self-defense weapon.[353]

Relying on the *Pentagon Papers Case* in *Bernstein*, the Ninth Circuit concluded that the government did not, and could not plausibly argue that "prior restraint at issue here falls within the extremely narrow class of cases where publication would directly and immediately imperil national security."[354] When read together with the Second Amendment right to make arms, the government's countervailing interest in imposing this prior restraint becomes even more untenable under strict scrutiny.

c. The Regulation of Information

Cody Wilson, the creator of the Liberator, views the debate in similar terms. On a now-removed FAQ page, Cody Wilson described

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351. *N.Y. Times*, 403 U.S. at 726–27 (Brennan, J., concurring).

352. *See Holder*, 561 U.S. at 39 ("All this is not to say that any future applications of the material-support statute to speech or advocacy will survive First Amendment scrutiny. It is also not to say that any other statute relating to speech and terrorism would satisfy the First Amendment. In particular, we in no way suggest that a regulation of independent speech would pass constitutional muster, even if the Government were to show that such speech benefits foreign terrorist organizations. We also do not suggest that Congress could extend the same prohibition on material support at issue here to domestic organizations.").

353. *See* District of Columbia v. Heller, 554 U.S. 570, 629 (2008) ("There are many reasons that a citizen may prefer a handgun for home defense: It is easier to store in a location that is readily accessible in an emergency; it cannot easily be redirected or wrestled away by an attacker; it is easier to use for those without the upper-body strength to lift and aim a long gun; it can be pointed at a burglar with one hand while the other hand dials the police.").

354. *Bernstein*, 176 F.3d at 1144 n.19.

the blueprints in terms of speech.[355] "Since its inception, it has been legal in the USA to fashion your own firearm, and to talk about doing so . . .. Everything else is free speech, ladies and gentlemen."[356] Wilson commented on the fact that ITAR controls not only "actual arms, but technical data."[357] He added, "I don't like it—but I do think that it actually ends up helping the message of the project a little more, that, look, in the end we're going to be having a fight about what it means to be controlling information."

At issue here are the First and Second Amendments. "This is about the future of the freedom of information and regulation of the Internet," Wilson explained.[358] Or, as columnist Brian Doherty put it, "The State Department didn't say for sure that this information (*some might call it speech*) fell under its jurisdiction."[359] Guns were not the point of Wilson's project. "This is a fight about two competing visions of the future. I think my vision of distributed technology will win."[360] It is no longer possible to focus on policing the possession and distribution of actual products. Now, the information that creates these products must be censored. Efforts to stifle 3D printing is the next chapter in suppressing information and data on the internet.

CONCLUSION

3D printing holds great potential to revolutionize the way that people invent, create, and use innovative new products. For prudential reasons, the government should resist the siren call of incumbents to regulate and shackle this technology. But more importantly, any efforts to regulate the distribution and use of 3D blueprints must be done with respect for the Constitution. Instituting a flat ban on 3D gun blueprints constitutes a prior restraint, and is a content-based restriction on speech that promotes Second Amendment rights. Though the government has countervailing interests in promoting security, an overbroad ban on all firearm blueprints cannot withstand constitutional scrutiny. In

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355. *See* Josh Blackman, *1, 2, 3: The First and Second Amendments Meet Third Dimensional Printing*, JOSH BLACKMAN'S BLOG (Oct. 22, 2012), http://joshblackman.com/blog/2012/10/22/1-2-3-the-first-and-second-amendments-meet-third-dimensional-printing/.

356. *See id.*

357. Murphy, *supra* note 198.

358. Preston, *supra* note 37.

359. Doherty, *supra* note 12.

360. Preston, *supra* note 37.

the end, this technology should flourish, out of respect for innovation, and the Constitution.

As an aside, I was tempted to include the actual source code for The Liberator 3D gun in this Article. However, because this journal will certainly be shared outside the United States, I would likely be required to register it with the State Department as a prohibited munition. Think about that for a moment. There is some irony in the fact that ITAR has chilled my free speech, because I want to discuss how ITAR infringes on free speech. Though, this Article published in print *and* a digital format would have made one heck of a test case.