

A SUBMISSION TO THE AUSTRALIAN LAW REFORM COMMISSION

# **COPYRIGHT AND THE DIGITAL ECONOMY: 3D PRINTING**



Makerbot – Makerbot Replicator 2.0 – Creative Commons Licence Attribution

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## BIOGRAPHY

I am an Australian Research Council Future Fellow, working on Intellectual Property and Climate Change. I am an associate professor at the ANU College of Law, and an associate director of the Australian Centre for Intellectual Property in Agriculture (ACIPA). I hold a BA (Hons) and a University Medal in literature, and a LLB (Hons) from the Australian National University. I received a PhD in law from the University of New South Wales for my dissertation on *The Pirate Bazaar: The Social Life of Copyright Law*. I am a member of the ANU Climate Change Institute. I have published widely on copyright law and information technology, patent law and biotechnology, access to medicines, clean technologies, and traditional knowledge. My work is archived at *SSRN Abstracts* and *Bepress Selected Works*.

I am the author of *Digital Copyright and the Consumer Revolution: Hands off my iPod* (Edward Elgar, 2007). With a focus on recent US copyright law, the book charts the consumer rebellion against the *Sonny Bono Copyright Term Extension Act* 1998 (US) and the *Digital Millennium Copyright Act* 1998 (US). I explore the significance of key judicial rulings and consider legal controversies over new technologies, such as the iPod, TiVo, Sony Playstation II, Google Book Search, and peer-to-peer networks. The book also highlights cultural developments, such as the emergence of digital sampling and mash-ups, the construction of the BBC Creative Archive, and the evolution of the Creative Commons. I have also also participated in a number of policy debates over Film Directors' copyright, the *Australia-United States Free Trade Agreement* 2004, the *Copyright Amendment Act* 2006 (Cth), the *Anti-Counterfeiting Trade Agreement* 2010, and the *Trans-Pacific Partnership*.

I am also the author of *Intellectual Property and Biotechnology: Biological Inventions* (Edward Elgar, 2008). This book documents and evaluates the dramatic expansion of intellectual property law to accommodate various forms of biotechnology from micro-organisms, plants, and animals to human genes and stem cells. It makes a unique theoretical contribution to the controversial public debate over the commercialisation of biological inventions. I edited the thematic issue of *Law in Context*, entitled *Patent Law and Biological Inventions* (Federation Press, 2006). I was also a chief investigator in an Australian Research Council Discovery Project, 'Gene Patents In Australia: Options For Reform' (2003-2005), and an Australian Research Council Linkage Grant, 'The Protection of Botanical Inventions (2003). I

am currently a chief investigator in an Australian Research Council Discovery Project, 'Promoting Plant Innovation in Australia' (2009-2011). I have participated in inquiries into plant breeders' rights, gene patents, and access to genetic resources.

I am a co-editor of a collection on access to medicines entitled *Incentives for Global Public Health: Patent Law and Access to Essential Medicines* (Cambridge University Press, 2010) with Professor Kim Rubenstein and Professor Thomas Pogge. The work considers the intersection between international law, public law, and intellectual property law, and highlights a number of new policy alternatives – such as medical innovation prizes, the Health Impact Fund, patent pools, open source drug discovery, and the philanthropic work of the (RED) Campaign, the Gates Foundation, and the Clinton Foundation. I am also a co-editor of *Intellectual Property and Emerging Technologies: The New Biology* (Edward Elgar, 2012), with Alison McLennan.

I am a researcher and commentator on the topic of intellectual property, public health, and tobacco control. I have undertaken research on trade mark law and the plain packaging of tobacco products, and given evidence to an Australian parliamentary inquiry on the topic.

I am the author of a monograph, *Intellectual Property and Climate Change: Inventing Clean Technologies* (Edward Elgar, September 2011). This book charts the patent landscapes and legal conflicts emerging in a range of fields of innovation – including renewable forms of energy, such as solar power, wind power, and geothermal energy; as well as biofuels, green chemistry, green vehicles, energy efficiency, and smart grids. As well as reviewing key international treaties, this book provides a detailed analysis of current trends in patent policy and administration in key nation states, and offers clear recommendations for law reform. It considers such options as technology transfer, compulsory licensing, public sector licensing, and patent pools; and analyses the development of Climate Innovation Centres, the Eco-Patent Commons, and environmental prizes, such as the L-Prize, the H-Prize, and the X-Prizes. I am currently working on a manuscript, looking at green branding, trade mark law, and environmental activism.

I also have a research interest in intellectual property and traditional knowledge. I have written about the misappropriation of Indigenous art, the right of resale, Indigenous performers' rights, authenticity marks, biopiracy, and population genetics.

## EXECUTIVE SUMMARY

This submission draws upon a number of pieces of research on copyright law and 3D printing – including the opinion editorials:

1. Matthew Rimmer, 'Creation and Copyright Law: The Case of 3D Printing', *The Conversation*, 8 November 2012, <https://theconversation.edu.au/creation-and-copyright-law-the-case-of-3d-printing-10305>
2. Matthew Rimmer, 'Inventing the Future: Intellectual Property and 3D Printing', *Edward Elgar Blog*, 19 October 2012, <http://elgarblog.wordpress.com/2012/10/18/inventing-the-future-intellectual-property-and-3d-printing-by-matthew-rimmer/>

## RECOMMENDATIONS

The Australian Law Reform Commission poses a number of questions on the defence of fair use in *Copyright and the Digital Economy*.

**Question 52.** Should the *Copyright Act 1968* (Cth) be amended to include a broad, flexible exception? If so, how should this exception be framed? For example, should such an exception be based on ‘fairness’, ‘reasonableness’ or something else?

**Question 53.** Should such a new exception replace all or some existing exceptions or should it be in addition to existing exceptions?

The case study of 3D printing highlights how Australia would benefit from a defence of fair use.

### **Recommendation 1**

**The narrow, limited and purpose-specific defence of fair dealing is rigid and inflexible in dealing with emerging technologies in the digital economy – such as 3D printing.**

### **Recommendation 2**

**The Australian Government should adopt a defence of fair use in order to promote innovation, competition and trade, in the digital economy, and to enable consumers to participate in a remix culture. The case study of 3D printing highlights how Australia would benefit from a defence of fair use.**

### **Recommendation 3**

**Such a defence of fair use should be modelled upon the United States defence of fair use. It should consolidate existing fair dealing defences under Australian law.**

**INVENTING THE FUTURE:  
INTELLECTUAL PROPERTY AND 3D PRINTING  
DR MATTHEW RIMMER**

3D Printing is the latest in a long line of disruptive technologies – including photocopiers, cassette recorders, MP3 players, personal computers, peer to peer networks, and wikis - which have challenged intellectual property laws, policies, practices, and norms. As [\*The Economist\*](#) has observed, ‘Tinkerers with machines that turn binary digits into molecules are pioneering a whole new way of making things—one that could well rewrite the rules of manufacturing in much the same way as the PC trashed the traditional world of computing.’

Established in 2009, the Brooklyn company [MakerBot ®](#) is a leader in desktop 3D printing – with its technology, the [MakerBot Replicator™](#). The company explains the technology field in these terms:

3D printing, also called additive manufacturing, means making things layer by layer according to a 3D design file. This differs from traditional manufacturing, such as machining, which often involves subtracting a material in order to achieve a certain shape. 3D printers have a history of being very large and expensive; however, MakerBot sells top-of-the-line 3D printers that are made, priced, and sized for the desktop. The [MakerBot Replicator 2](#) Desktop 3D Printer measures 38 x 49 x 32 cm (14.7 x 19.1 x 12.8 in), making it ideal for a workspace or tabletop at home or in the office.

The company emphasizes: ‘Personalized manufacturing using a MakerBot Replicator™ opens up a world of innovation, customization and creativity’. MakerBot recommends: ‘Create your own 3D designs or download one of the thousands of

models from Thingiverse.com, and turn your ideas into real, physical objects’. The company envisages: ‘With the MakerBot Replicator™, you can invent the future and also be a hero around the house’. The company suggests to its customers: ‘Design it, MakerBot it and give it away’. With breathless excitement, the company rhapsodizes: ‘With a MakerBot Replicator™, you’ve got an inexhaustible supply of awesome.’

Moreover, the company has established an intellectual commons: ‘At MakerBot’s website [Thingiverse](#), MakerBot owners can access and contribute to a “universe of things”.’ The company explains [the Thingiverse](#) in these terms:

Thingiverse is a place for you to share your digital designs with the world. We believe that just as computing shifted away from the mainframe into the personal computer that you use today, digital fabrication will share the same path. In fact, it is already happening: laser cutters, cnc machines, 3D printers, and even automated paper cutters are all getting cheaper by the day. These machines are useful for a huge variety of things, but you need to supply them with a digital design in order to get anything useful out of them. We’re hoping that together we can create a community of people who create and share designs freely, so that all can benefit from them:

Thingiverse has a strict [intellectual property policy](#), which emphasizes that the ‘company respects the intellectual property of others and asks that users of our Site and Services do the same’. Thingiverse emphasizes: ‘In connection with our Site and Services, Company has adopted and implemented a policy respecting intellectual property and other rights that provides for the removal of any infringing or unauthorized materials and for the termination, in appropriate circumstances, of users of our online Site and Services who are repeat infringers of intellectual property rights or who repeatedly submit unauthorized content.’

Technology writer [Chris Anderson in \*Wired Magazine\*](#) has written an appreciative piece entitled ‘The New MakerBot Replicator Might Just Change Your World.’ He notes: ‘You might think of 3-D printing as bleeding-edge technology, relevant only to geeks or high-end design workshops’. Nonetheless, Anderson contended that 3D printing is on the cusp of being a revolutionary technology – which will have a general application. He is full of optimism that the MakerBot Replicator will reach and wide audience, and offer desktop manufacturing:

Last year MakerBot raised \$10 million from investors, including Amazon founder Jeff Bezos, to fund its expansion. It will need all that and more to compete with a host of other emerging low-cost 3-D printers, including Chinese devices and emerging copycat clones. The money is going into R&D, engineering, manufacturing, and a new corporate HQ—everything necessary to take a business that creates kits for hobbyists and scale it into a corporation whose products sell at Target. This is MakerBot’s Macintosh moment. Just as nearly 30 years ago Apple made desktop publishing mainstream, the aim with the Replicator 2 is to take something new to the masses: desktop manufacturing.

Anderson argues that ‘3-D printing has reached its inflection point, when it moves from the sophisticated early adopters to people who just want to print something cool.’ He envisages: ‘Soon, probably in the next few years, the market will be ready for a mainstream 3D printer sold by the millions at Walmart and Costco’ and ‘a 3D printer will cost \$99, and everyone will be able to buy one.’ Others have been somewhat more sceptical, and have suggested that 3D printing is just a novelty; a fad; an over-hyped piece of new technology.

[Solidoodle is another leader in 3D printing.](#) The founder of Solidoodle, Sam Cervantes, observed: "Now 3-D printers will enable our customers to let their minds run wild, printing bigger parts, and its heated build platform allows users to create complex components without warping". He noted: "From architectural firms creating 3D models to do it yourselves who want to easily complete projects around their homes, our new printer enables people to create like they never have before." Cervantes commented: "Printing has really reached the next dimension—literally, affordably and usability."

There is also [RepRap - an open source community](#) initiative designed to develop a 3D printing, which can replicate its own components.

Intellectual property owners have been anxious about 3D printing, because they fear that it will enable the unauthorised reproduction of work protected by a variety of rights – such as copyright, patents, designs, and trade marks. [The Economist](#) has commented that such a reaction to the emergence of a new disruptive technology is entirely natural: 'As with any disruptive technology—from the printing press to the photocopier and the personal computer—3D printing is going to upset existing manufacturers, who are bound to see it as a threat to their traditional way of doing business.'

## **1. Copyright Law**

Over the ages, [copyright law has been confronted by the emergence of a range of disruptive, new technologies](#), such as the printing press; the pianola roll; the

photocopier; the fax machine; the video cassette recorder; the personal computer; the MP3 player; and the internet. There has often been moral panics about the impact of new inventions, which can facilitate the reproduction and the dissemination of copyright works. The history of copyright law, though, has long involved a process of accommodation of new technologies.

[Cory Doctorow](#) has warned against moral panics being invoked in respect of 3D printing - focusing on such apocalyptic threats as piracy, organised crime, and terrorism.

The civil society group [Public Knowledge](#), though, have become concerned that the technology of 3D printing will be the subject of lawsuits by intellectual property owners. The NGO observes: 'Like the Internet before it, 3D printing has the potential to be a revolutionary, disruptive technology'. Public Knowledge recognises: 'Because it allows people to create, copy, and modify objects, it will also have a large impact on our existing intellectual property laws.' The group has sought to discourage the United States Congress from passing laws that would restrict or curtail 3D printing. Public Knowledge has sought to 'work on connecting the entrepreneurs behind the incredible innovations of 3D printing to policymakers in DC so that their voice is heard and this exciting new technology has the chance to flourish without being stifled.' Public Knowledge's researcher Michael Weinberg has published a 2010 white paper on the topic [\*It Will Be Awesome If They Don't Screw It Up: 3D Printing, Intellectual Property, and the Fight over the Next Great Disruptive Technology.\*](#)

Thinking about application of copyright law, Michael Weinberg notes: ‘While there are copyright implications for 3D printing, the fact that copyright has traditionally avoided attaching to functional objects – objects with purposes beyond their aesthetic value – may very well limit its importance.’ He comments: ‘Copyright law has long avoided attaching to functional objects on the grounds that patent law should protect them (if they should be protected at all).’ Nonetheless, Weinberg observes: ‘It is unavoidable that some functional objects also serve the types of decorative and creative purposes protected by copyright.’

There have, though, already been controversies over copyright law and the MakerBot. In 2011, [Thomas Valenty used a MakerBot](#) to design figurines - a war mecha and a tank for use in the game *Warhammer 40,000*. He posted the files on Thingiverse, which allowed other fans to share the instructions for printing these 3D objects. Noting the files, the Games Workshop – the maker of *Warhammer 40,000* – sent a take-down notice to Thingiverse under the *Digital Millennium Copyright Act 1998* (US). [Clive Thompson](#) observed of the conflict: ‘Thingiverse removed the files, and Valenty suddenly became an unwilling combatant in the next digital war: the fight over copying physical objects.’ The [creator objected](#) that the takedown of the files was unjustified, observing: ‘The models are mine. I created them from scratch... This was “fan-art”.’ Valenty noted: ‘I believe the issue was with the distribution of the files that carry the likeness of their IP.’ This dispute between Thomas Valenty and the Games Workshop is a forerunner to future conflicts over copyright law, and 3D printing.

The case of 3D printing raises a range of copyright issues. There are, of course, threshold questions about copyright subsistence – particularly in respect of whether functional items might constitute copyright works, such as works of artistic craftsmanship. 3D printing and the sharing of files on sites such as Thingiverse raises fundamental questions about economic rights – such as the right of reproduction, and the right of communication to the public. There could be issues with respect to direct and secondary copyright infringement. The developers of 3D printing will need to take care to ensure that they do not ‘authorise’ copyright infringement – to use the language of the High Court of Australia in the [iiNet case](#) – or ‘induce’ copyright infringement – to use the formula of the Supreme Court of the United States in the [Grokster case](#). There is a need to ensure that the net of secondary copyright liability is not cast too widely or indiscriminately. As Justice Breyer noted in the *Grokster* case, ‘copyright laws are not intended to discourage or to control the emergence of new technologies, including (perhaps especially) those that help disseminate information and ideas more broadly or more efficiently.’

The operation of safe harbours will be important for intermediaries – such as Makerbot. Copyright exceptions are also critically important. 3D printing technologies have been allowed to flourish in the United States under the broad protection provided by the defence of fair use. 3D printing technology developers in other jurisdictions with limited copyright exceptions – such as Australia – risk the threat of lawsuits for copyright infringement. That is why the Australian Law Reform Commission inquiry into [Copyright and The Digital Economy](#) is of critical importance. The question of remedies is also significant. Start-up ventures like

MakerBot may have only limited capacity to withstand the costs of litigation, and remedies, such as damages and injunctions.

In my book, [\*Digital Copyright and the Consumer Revolution: Hands off my iPod\*](#), I argued that there is a need to provide proper recognition of consumer rights under copyright law. In this context, it is worthwhile acknowledging that consumers – whether they be amateurs or professionals - could benefit from 3D printing in a variety of ways. 3D printing is open to a variety of uses. [MakerBot](#) notes: ‘The combination of high-resolution, massive build volume, increased build speed, and user friendly hardware and software make it the perfect machine for modeling, quick prototyping, tooling, short-run production applications, and just having fun making three-dimensional “things”.’ [14 year old student Murray Rosenbaum](#) gives a sense of this potential in an enthusiastic piece in the *Huffington Post*:

I believe the MakerBot 3D printer is going to change the way people fix things, but also how they think. The MakerBot opens up a world of opportunity for children, adults, creators, thinkers, and overall anybody who is interested in creating something that want to see physically. I have this image that one day everyone is going to have three basic copying machines in a room, one replicator type device for repairs, one automatic sewing machine for clothing and such, and one organic paste/flavoring machine which will "print" food. A machine such as the MakerBot will change the entire world in such a way that has never happened before. The MakerBot will open peoples' imaginations to a world that had never been available to them before it.

[Michael Weinberg](#) also wonders whether ‘3D printing may usher in a new golden age of remix culture.’ In this context, there is a need to ensure that consumers

experimenting with 3D printing are able to make authorised and fair uses of copyright work.

The Australian Law Reform Commission is conducting an [inquiry into copyright law and the digital economy in 2012 and 2013](#). The President, Rosalind Croucher, stated:

“While the Copyright Act has been amended on occasion over the past 12 years to account for digital developments, these changes occurred before the digital economy took off. The Australian Law Reform Commission will need to find reforms that are responsive to this new environment, and to future scenarios that are still in the realm of the imagination. It is a complex and important area of law and we are looking forward to some robust debate and discussion during the course of this very important Inquiry.”

In August 2012, the Commission published its issues paper, [Copyright and the Digital Economy](#). The Commission has posed the question: “Should the *Copyright Act* 1968 (Cth) be amended to include a broad, flexible exception?”

The Australian Law Reform Commission will have to consider the role of copyright law in light of the advent of new information technologies in the digital economy. One of the most notable emerging technologies is 3D printing, which presents both opportunities and challenges for copyright law.

The great hope is that the Australian Law Reform Commission will transcend the usual partisan politics of the “Copyright Wars”, and provide an independent, coherent blueprint for copyright law reform in Australia.

In Australia, the developers of 3D printing face certain risks and uncertainties in respect to litigation under Australian copyright law. Australia does not have a broad, open-ended, flexible defence of fair use, like the United States. Instead, Australia has the much more narrow defence of fair dealing. The permitted purposes for fair dealing include research and study; criticism and review; reporting the news; and parody and satire. The developers of 3D printing would struggle to obtain protection under the defence of fair dealing – outside educational applications within Australian universities.

As such, the developers behind 3D printing would be loath to establish their operations in Australia. They would be vulnerable to copyright law suits. Such entrepreneurs would be better off sheltering under the protection afforded by the defence of fair use in the United States. No wonder MakerBot and Solidoodle are based in Brooklyn, not Sydney.

Given our comparative disadvantage in the digital economy, with our strict and draconian copyright laws, Australia would be well-advised to revise its copyright laws and adopt a defence of fair use, which is flexible enough to accommodate the emergence of 3D printing.

## **2. Patent Law**

In the field of patent law, there has been much controversy of 3D printing. [Michael Weinberg](#) that observes that 3D printing could be used to create objects, which infringe patents:

Though patent protects fewer objects, and protects them for a shorter amount of time, in many ways it protects them more completely... There is no exception for independent creation in patent law. Once an object has been patented, all copies, regardless of the copier's knowledge of the patent, infringe upon that patent. Simply stated, if you are using a 3D printer to reproduce a patented object, you are infringing on the patent. Even using the patented device without authorization infringes on the patent.

As such Weinberg is concerned that both the developers of 3D printers and the users of the 3D printers will need to exercise caution and restraint, so as not to infringe upon patents, particularly in respect of inventions in the field of manufacturing.

There has been controversy over the firm [Intellectual Ventures](#) – maligned by its [detractors](#) for being a patent troll - acquiring [US Patent 8286236](#) in respect of a 'manufacturing control system'. The abstract notes that this patent relates to: 'Methods and systems for a manufacturing control system include but are not limited to identifying at least one object data file configured to produce an object by a manufacturing machine; confirming that an authorization code is associated with the object data file, the authorization code configured to be received by the manufacturing machine, the manufacturing machine adapted to receive the authorization code; and enabling the manufacturing machine to interface with the object data file only if the authorization code meets one or more predetermined conditions.' This patent has been promoted as a means of [addressing infringement of intellectual property rights](#).

There has been much concern that the patent will enable Intellectual Ventures to subject 3-D printing to strict controls, similar to Digital Rights Management. [Paul](#)

[Marks of the \*New Scientist\*](#) is fearful of the patent: 'One of the greatest benefits of 3D printing technology - the ability to make replacements or parts for household objects like toys, utensils and gadgets - may be denied to US citizens thanks to the granting of a sweeping patent that prevents the printing of unauthorised 3D designs.' [Iain Thomson in \*The Register\*](#) objects to the broad claims in the patent: 'Myhrvold's patent could throw a spanner into what is still largely an open source movement, particularly as its language is broad enough to cover not just printing, but also "painting, engraving and/or tattooing by the manufacturing machine".'

There has also be concern that a 'manufacturing control system' could be contemplated as a 'technological protection measure' under copyright law, and as such circumvention of such a measure would be subject to an arsenal of civil and criminal remedies.

[Julie Samuels of the Electronic Frontier Foundation](#) comments: "Open hardware printers have been used for rapid prototyping of new inventions, to print replacement parts for household objects and appliances, by DIY scientists to turn a power drill into a centrifuge, for a game in which you can engineer your own pieces, and for thousands of other purposes by makers of all stripes." She has argued that there is a need to ensure that 3D printing is not stifled by patent litigation.

### **3. Trade Mark Law**

3D printing could also poses issues in respect of trade mark law. [Michael Weinberg of Public Knowledge](#) notes: 'If a 3D printer made a copy of an object and that copy

included a trademark, the copy would infringe on the trademark.’ There has been much debate over [trade marks in respect of shapes](#). Conceivably, 3D printing could pose particular issues in respect of potential infringement of shape trade marks – and other three-dimensional trade marks. For instance, Apple’s iconic products are protected, amongst other things, by [shape trade marks](#). There could also be issues in respect of passing off and misleading and deceptive conduct – if there is confusion between products manufactured by 3D printing and the original models.

#### **4. Designs Law**

Significantly, 3D printing also poses fundamental challenges for designs law. For instance, the [Designs Act 2003 \(Cth\)](#) in Australia provides exclusive rights to owners of registered designs – which relate to ‘the overall appearance of the product resulting from one or more visual features of the product’. A ‘visual feature, in relation to a product, includes the shape, configuration, pattern and ornamentation of the product.’ 3D printing of products may impinge upon registered designs related to the appearance of products. [Simon Bradshaw, Adrian Bowyer, and Patrick Haufe](#) have been hopeful that non-commercial 3D printing of designs would not be infringe design rights: ‘Purely personal use of a 3D printer to make items will thus not infringe a registered design, so long as the purpose for which the item was made was genuinely non-commercial.’

#### **5. Sui Generis Protection?**

Given the past evolution of intellectual property law, manufacturers may also push for sui generis intellectual property rights to protect themselves against the perceived threats of 3D printing, and call for the amendment and revision of existing fields of intellectual property.

## **Conclusion**

In conclusion, there is a need to consider the impact of 3D printing upon a wide range of forms of intellectual property. [Simon Bradshaw, Adrian Bowyer, and Patrick Haufe](#) comment upon the potential for the emerging technology:

Hitherto a technology limited to the production within industry of models or prototypes, 3D printing is, like the computer in the 1970s, becoming available to the domestic enthusiast. Like the home computer, personal 3D printing has the potential to radically change aspects of the way in which we live; we can even envisage a society where home manufacturing of many items is the norm. However, as with home computers, such developments may have wider effects. The convergence of the Internet, digitised music and media players has had dramatic consequences for music copyright. 3D printing technology may have similar implications for artistic copyright, design right, trade marks and patents, but in a rather more diverse legal framework.

Undoubtedly, in the future, there will be much litigation over 3D printing across a range of fields of intellectual property. The scale of such legal conflict will depend upon whether 3D printing is a breakthrough, revolutionary technology; a tool employed by professionals such as designers, engineers, and manufacturers; or merely a novelty.

There will be much pressure brought bear upon legislators and policy-makers to reform the various species of intellectual property laws in light of the emergence of the disruptive technologies of 3D printing. [Ralph Oman, a former United States Copyright Register](#), has taken the extreme position that ‘Commercial exploiters of new technologies should be required to convince Congress to sanction a new delivery system and/or exempt it from copyright liability’. Arguably, though, technology developers and entrepreneurs should be shielded in part from intellectual property litigation as they bring valuable new technologies to market. [Michael Weinberg of Public Knowledge](#) comments:

Policymakers and judges will be asked to weigh concrete losses today against future benefits that will be hard to quantify and imagine. That is why it is critical for today’s 3D printing community, tucked away in garages, hackerspaces, and labs, to keep a vigilant eye on these policy debates as they grow. There will be a time when impacted legacy industries demand some sort of Digital Millennium Copyright Act for 3D printing. If the 3D printing community waits until that day to organize, it will be too late. Instead, the community must work to educate policy makers and the public about the benefits of widespread access. That way, when legacy industries portray 3D printing as a hobby for pirates and scofflaws, their claims will fall on ears too wise to destroy the new new thing.

There is a need to ensure that the full potential of 3D printing is not unduly stifled or thwarted by aggressive intellectual property litigation, or reactionary intellectual property law reform. [Spencer Thomson](#) commented: "3D printing exists and, without an appropriate policy framework, we run the risks of repeating mistakes in dealing with online copyright and file-sharing that are only just now being addressed a decade on."