

A close-up photograph of a 3D printer's nozzle printing a red object on a blue surface. The nozzle is positioned above the red material, which is being deposited in a circular pattern. The background is a blurred blue and white, suggesting a laboratory or industrial setting.

# 3D printing: IP issues and innovation

Jia Li and Ed White write about the growing concern  
around the impact of 3D printing on IP rights

**3**D printing used to be an expensive product design tool for companies, but it is quickly becoming an affordable and accessible technology. Emerging in the 1980's - largely for industrial application - the availability of low-cost, high-performance 3D printers has put the technology firmly within reach of consumers. While the quality of a consumer-grade 3D printer may not typically meet the quality of an industrial product, the technology is improving rapidly. New mid-level 3D printers now offer advanced system features at lower price points and will print up to 500 times faster than today's top machines. On a micro level, this means any consumer can purchase a 3D printer and produce custom products or copy existing ones. While this provides a number of opportunities for designers and manufacturers, there is growing concern around the impact of 3D printing on IP rights.

### **3D printing in a nutshell**

The 3D printing process starts with a digital file. The file is exported to a 3D printer using dedicated software, which transforms the digital model into a physical object through a process in which molten material is built up layer upon layer until the finished object emerges. This process is also referred to as additive manufacturing.

### **The 3D printing rush**

Developing and improving 3D printing technology – and printers – is of major interest to innovators. According to Russell Slifer, Deputy Secretary of Commerce for Intellectual Property and Director of the USPTO, patent filings relating to 3D printing have increased 23-fold over the last five years, and trademark filings for businesses involved in 3D printing have increased 300% during the same time.

Increased patent activity has resulted in 3D printing technology being more accessible than ever before. According to research by Wohler Associates, publishers of the annual *Wohlers Report*, there are now hundreds of 3D printing companies – including more than 100 start-ups in the space, 40 established technology companies and many service bureaus. The industry itself has grown 26% in revenue since 1989, reaching \$2.1 billion in 2016.

As the popularity of 3D printing grows – what does it mean for IP infringement?

### **To print or not to print**

3D printing technology makes it easy to copy and reproduce products – even if they are protected by a patent, trademark or copyright. It is as simple as downloading a computer-aided design (CAD) file, which can instruct the printer to reproduce a 3D object. CAD files are digital, meaning they can be shared across the internet, just like movies and music.

The commercialisation of 3D printing leading to many small-scale manufacturers will make policing IP increasingly complex. Each printed copy of an invention represents the loss of a potential sale to its patent holder. As the man-

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ufacturer is ultimately the end user, it is harder to prove infringement. To sue, the patent owner would need to be aware that a manufacturer is using a 3D printer to reproduce their patented invention – a tall order given that 3D printers are increasingly common in households and businesses.

### **Protecting your IP assets**

The 3D printing of goods is a considerable risk to brand value. However, as with many emerging technologies, a legal standard is still to be set for managing 3D printing infringement. Rights owners need to consider carefully whether to pursue infringements or consider offering new and affordable licencing models for individuals that wish to use their brands on a non-commercial basis.

IP owners need to establish a robust portfolio of copyrightable files - such as design files - and idea maps that are essential to the products that they are trying to protect. Traditionally it is more important to have patent claims that protect products, components of products, arrangements of products, etc. Intellectual property is likely to weigh more heavily on ideas and designs, rather than implementation methods. These files will serve as proof of an owners' pre-established rights, and could prove to be a significant source of profit in the future. And while copyrights are susceptible to fair use claims in a way patents are not, copyrights last for an extremely long time (eg. 70 years beyond the death of the authors).

There is often no retrievable evidence of manufacturing or sales following the 3D printing of copied items. However, even if evidence of infringement was available, suing numerous infringers would be expensive.

Alternatively, patent owners could target the people facilitating the infringement. The Patent Act permits a patent holder to sue parties who induce others to infringe. For example, potential inducers of patent infringement could be the sellers of the 3D printers, someone providing CAD files of the patented product, or websites that sell or share

the CAD files that instruct 3D printers to make the patented invention. However, enforcing patents in an era of distributed manufacturing could prove more difficult than enforcing copyright in the current era of digital information.

Customs authorities have faced the issue of counterfeiting for decades, seizing reproductions before they go on sale. However, 3D printing uses digital files so physical goods cannot necessarily be seized. A CAD file can be sent to anyone with a 3D printer and the recipient could instantly create counterfeit goods for their own use or for sale. In addition to current laws relating to copyright, design rights, trademarks etc., future legislation will be needed to address counterfeit items created by 3D printing.

### **The sound of infringement**

As an industry still in its infancy, prosecuting cases of IP infringement in 3D printing is proving complex. However, digitalisation has impacted a number of other sectors. Lessons around digital file sharing – including CAD files – can be learnt from the piracy that overwhelmed the entertainment industry in the 1990's.

Consider the internet file sharing services Napster and Grokster. Both of which enabled millions of users to share digital music files – infringing the copyright for those songs. More than 35,000 lawsuits were launched against people downloading music 'illegally' during the 1990s and 2000s – but this amounted to just a fraction of the people sharing copyright protected music. When it comes to 3D printing, it is similarly difficult to identify IP infringers. There is often no retrievable evidence of manufacturing or sales following the 3D printing of copied items.

However, copyright law also prohibits the inducement of infringement. Grokster did not make infringing digital music copies itself, but enabled other people to make and distribute the infringing files. Following the filing of a number of lawsuits, the Supreme Court held that Grokster likely induced copyright infringement and Grokster was forced to fold. Grokster closed its site on November 7, 2005. A note on its home page cited the United States Su-

preme Court ruling that copying copyrighted material using “*unauthorised peer-to-peer services is illegal*” and while legal download services exist, “*this service is not one of them.*” The website continues to threaten visitors that their actions can get them caught, displaying the visitor’s IP address.

### **From the silver screen to the computer screen**

The sharing of digital CAD files is one concern facing patent owners, but what manufacturers do with a product once it has been printed, is equally pressing.

In July 2015, the *Wall Street Journal* reported on the trend for hobbyists to create 3D printed objects based on Hollywood franchises such as Iron Man and Star Wars. Creations inspired by LucasFilm were being sold commercially and the hobbyists were asked to share design blueprints with a wider community. For the owners of big film franchises, this constitutes a threat to revenues. In 2012 Disney paid George Lucas \$4 billion for the Star Wars franchise. The Star Wars franchise is estimated to have generated \$30 billion in revenues, of which a little more than \$6 billion is box office revenues. The rest is games, toys, DVDs, books and licencing – merchandising at risk of reproduction.

### **3D printing’s place in the future of IP**

The issue goes wider than entertainment as anyone can pirate design files, and now they can turn files into tangible objects without owning the IP. Unlike music and movies, the relationship between copyright and physical objects is not always straightforward.

This may mean that in the future copyright could merge with patent rights - or at the very least overlap with it - as it has become much easier to transform between tangible and intangible forms of products and ideas. Before IP law is revised to reflect this change, it is important for innovators to seek copyright protection in addition to patent protection for a new product.

IP owners should also consider 3D printing techniques in future patent applications. If it is foreseeable to use 3D printing to manufacture a product, it would be beneficial to have patent claims that protect a 3D printing method for the product.

### **The good with the bad**

Despite the legislative difficulties surrounding 3D printing, IP owners should also consider the opportunities afforded by the technology. In the pharmaceutical industry, drug research and development (R&D) can be drastically improved by 3D printing and the technology could even be used to print human organs and tissue. This would allow companies to test drugs cheaply without compromising safety and reduce outgoing development costs. Because of improved target selection, preclinical tests, clinical trials, chemical synthesis, and product management – research should become more efficient. Early adoption of operational analytics, bioelectronics medicine, gene editing, 3D printing, cloud-based computing and advanced biosensors are poised to ramp innovation efforts to a new level.

The pharmaceutical industry relies on innovation to create medical treatments. Through the adoption of technology, the pharmaceutical industry is producing innovative new medical offerings, improving its internal R&D processes and cutting costs. If pharmaceutical companies embrace the benefits of technology investment they will reduce unnecessary outgoings and the future of biotechnology will reap the rewards.

Take the recent decision by the US Food and Drug Administration (FDA) to approve SPRITAM - an anti-epilepsy medication. SPRITAM employs 3D printing methods to produce its *“porous formulation that rapidly disintegrates with a sip of liquid.”* Thought to be the first 3D-printed pharmaceutical on the American market, SPRITAM allows epileptic patients with swallowing difficulties to medicate themselves.

It is important that IP owners see 3D printing as not only a threat but a revenue opportunity. As technology evolves, 3D printing will not be the last innovative trend to disrupt the future of IP. Efficient management of IP will become

increasingly important to maintain reputation and IP ownership. The history of infringement in the film and music industry does not need to repeat itself. The key to moving forward successfully with 3D printing is to look at the opportunity to lead businesses into a new age of technology. Companies now have the opportunity to learn from what did not work in the past and apply other means of creating new income streams to help develop the future of IP and 3D printing. ■

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