

# **3D** printing 'will change the world'

November 16 2013, by Helen Rowe

From replacement kidneys to guns, cars, prosthetics and works of art, 3D printing is predicted to transform our lives in the coming decades as dramatically as the Internet did before it.

"I have no doubt it is going to change the world," researcher James Craddock told AFP at the two-day 3D Printshow in Paris which wraps up later on Saturday.

A member of the 3D Printing Research Group (3DPRG) at the UK's Nottingham University, Craddock nevertheless predicted that use of 3D printing would be limited.

"You wouldn't want to make a cup from a 3D printer because it would probably fall apart, leak or poison you, but you would use it for highvalue, beautiful items or <u>replacement parts</u>," he said.

"The real revolutionary factor is industrial use," he added.

Here is a selection of the potential future uses of 3D printing:

#### Arms

This is one of the more eye-catching prospects and has attracted a lot of publicity.

Californian engineering company Solid Concepts said earlier this month it had produced a metal replica of a classic 1911 shotgun.



US entrepreneur and inventor Brook Drumm, however, warned that the process of printing a gun would be slow, expensive and potentially dangerous, requiring lasers at high temperatures, lots of power and hazardous materials.

Drumm set up his firm Printrbot to produce printers costing from \$400 that print plastic items.

Metal printers can cost around \$250,000 (185,000 euros) and "the particulates are so fine that your skin could absorb them through the pores. The materials are not safe", he said.

The gun itself—unless made out of metal—would also be unreliable.

"There's a lot of moving parts in a gun and they need to be precise," he said, adding that he tried to print a plastic gun but gave up because it took so long.

"Time-wise, if I was going to print a plastic gun and you were going to go and buy a metal one, even if it took you two weeks to get approval I probably still wouldn't have it working first," he said.

#### Art

Fancy a replica of a Viking helmet or one of the Louvre's most famous sculptures on the mantelpiece?

American Cosmo Wenman has used thousands of photographs taken in some of the world's biggest museums to produce exact plastic copies.

Works he has produced include the ancient Greek statue Venus de Milo which is in the Louvre.



"If you look at the small print at museums in terms of taking photographs, they say that you cannot put them to commercial use," he said.

"But from a practical point of view that is not enforceable and for antiquities there is no intellectual property issue," he said.

## Cars

Canadian Jim Kor's 3D Urbee car is made out of plastic and stainless steel.

The futuristic-looking three-wheeler is electric but uses petrol at higher speeds.

Production designer Kor says if a car company mass produced the vehicle it would be possible to keep the price down to around \$16,000 (12,000 euros).

"We want it to be the Volkswagen Beetle for the next century, low cost and long-lasting too," he said.

"It should last 30-plus years. Our goal is that it should be 100 percent recyclable."

## Jewellery

Jewellery can made to ensure that each piece is slightly different, known as "mass customisation".

3D printing can also make the production process far less expensive and time consuming.



Dutch jewellery designer Yvonne van Zummeren produces a range of jewellery made out of lightweight nylon polyamide.

"All my designs are based on works of art," she said holding a bracelet that uses a Matisse motif.

"It enables me to be a jewellery designer much more easily. Otherwise I would have needed a factory in China and a minimum order of 20,000," she added.

"When you are producing something for the first time it means you can adapt and try again very easily until you get the result you want."

### **Prosthetics**

Prosthetics can be custom made to provide the perfect match.

Electronics could be built in allowing the recipient accurate control of the limb.

"It would all be printed out at the same time," said 3DPRG's Craddock.

## **Replacement parts**

One-off parts are needed by everyone from NASA to the person who loses an unusual jacket button.

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Citation: 3D printing 'will change the world' (2013, November 16) retrieved 27 April 2024 from <u>https://phys.org/news/2013-11-3d-world.html</u>



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