

FINANCIAL REVIEW

3D printing: why designers are taking this technology into a new dimension

Despite heady expectations, 3D printing hasn't changed our everyday lives – yet. But the designers embracing it could change all that, writes Stephen Todd.



Joris Laarman's 3D bridge project using robotics. Supplied

by **Stephen Todd**

If I could 3D print an elephant, it would be the one in the room. The behemoth we find it hard to get around, not knowing quite where to place it. The elephant that is 3D printing itself.

Since its invention in the mid-1980s, rapid prototyping – as 3D printing is more properly known – has been used by mega-industrials such as Boeing, Rolls-Royce and NASA to produce experimental prototypes in malleable plastics which, once perfected, would go into production and become metal components in their very, very expensive machines. When the original patents for this technology began to expire about 2013, the price of 3D printing machines dropped dramatically – and mass hysteria rose exponentially. Predictions came thick and fast that every home would be equipped with a 3D printer capable of whipping up an espresso machine, a typewriter, a gun.

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No, we're not there. Not yet, anyway. There's little doubt that additive layer manufacturing, of which rapid prototyping is one kind, will change the way designers think, what they produce and how they produce. But it's still in its infancy. 3D printing equipment is still relatively expensive and notoriously fallible. Only a limited spectrum of materials is feasible, predominantly plastics, although composite forms are being used to approximate wood, metals and stone.

No surprise, then, that 3D printing still exists predominantly in the geekosphere, the realm of bedroom adventurers hooked up to high-speed Wi-Fi, high-resolution scanners and megapixel printer units. Not the kind of stuff that's available in every home, nor even in every corner store. Unlikely even at your local library.



Renderings of the robotically constructed Museum of Contemporary Art and Planning Exhibition in China, by Coop Himmelb(l)auSupplied

A start-up in Sunnyvale, California offers to 3D print a figurine of your unborn baby from ultrasound images. The result looks like a pile of inert, flesh coloured Play-Doh. MakerBot proposes you make mini garden gnomes as a fun way to get your mind around rapid prototyping. And yes, you could possibly 3D print an electric car, as was done for the first time last year by Jay Rogers of Local Motors in Chicago. "You could think of it like IKEA, mashed up with Build-A-Bear, mashed up with Formula One," Rogers said at the time. And yes, that's pretty much what it looks like: mashed up. I'm reminded of a line by French philosopher, Paul Virilio: "The invention of the ship was also the invention of the shipwreck." And the wreckage engendered by 3D printing is potentially immense.

That said, there are some interesting designers pushing 3D printing into fascinating territory. The invitation to Finnish designer Janne Kytanen's Design Miami exhibition last December pictured him

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wearing a doughnut-shaped, gold-plated light around his neck. Yes, he 3D printed it. He looked much like a life buoy and won't be sinking any time soon. Kytanen has created a table by marrying 3D printing with explosive welding, the latter used to bond material together that wouldn't otherwise stick, in this case volcanic obsidian and copper. The effect is not only spectacular but unforeseeable heretofore

Another designer actively exploring the full potential of additive layer manufacturing is Joris Laarman. A 2003 graduate cum laude from the Netherlands' Design Academy Eindhoven, he launched Joris Laarman Lab in Amsterdam the following year as "an experimental playground to study and shape the future".

HAMSTER CELLS, FIREFLY GENES



Janne Kytanen's explosion-welded Metsidian table. Supplied.

Laarman works collaboratively with craftsmen, scientists and engineers to create objects of radical beauty. Pieces such as his Bone Chair, developed in partnership with Opel car manufacturer's International Development Centre, uses automotive software to simulate optimal bone growth. The chair's struts are thicker where necessary and thinner where there is less load to bear, without a loss of strength. A case of form following a most curious function, to very beautiful ends. His Branch free-standing shelf system replicates vegetal growth, its vertical limbs ending in elegant plateaux. The model was 3D printed as a lightweight structure, then coated in solid brass. His Half Life lamp uses bioluminescence by harvesting live hamster cells, boosting them with firefly genes and housing the resultant material in a lovely, domed glass lamp.

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At 36, Laarman operates at the intersection of design, science, art and craft, each of his projects the result of an in-depth interrogation of a new process. As such, they test new parameters, proposing new ways of thinking about the objects and structures that surround us. While the end results are unfailingly spectacular, it's the way he arrives at them that is truly compelling.

Right now, Laarman is 3D printing a bridge to go over the Oudezijds Achterburgwal canal in the red light district of Amsterdam. This is perhaps his most exciting advance to date, as it aligns the potential of 3D printing with giant mobile robots. In so doing, it frees the production process from the physical limitations of the small 3D printer. The implications for design and architecture are enormous. Previously unthought-of forms are now not only thinkable but realisable – and at low cost – by robots programmed by 3D printing tools.

A similar process to that employed in Laarman's bridge is being used by Coop Himmelb(l)au to create the Museum of Contemporary Art and Planning Exhibition in Shenzhen, China. Computer technology has allowed them to conceive a massive, globular steel volume to anchor the centre of the museum; robotics have enabled them to construct it. Wolf D. Prix, founder and principal of Coop Himmelb(l)au speaks categorically: "The combination of robotic construction and 3D printing is the future of the building industry."

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