

# When Will It Be Possible to 3-D Print Functional Components?

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Source: University of Nottingham

Currently, 3-D printers are used in medical device manufacturing mainly to produce structural components made from a single material, such as in a prosthesis. The next step would be to refine the technology until it can print functional parts or entire working systems in a single process step.

At this year's MEDTEC UK, Ricky Wildman, professor at the University of Nottingham, outlined the pathway to the next phase of the 3-D printing revolution. "Where is 3-D printing going in the next 10 to 15 Years? We believe the future is multifunctional, multimaterial additive manufacturing," he described his work at the

Additive Manufacturing and 3D Printing Research Group. "By multifunctioning I mean, [the component] will have another function in addition to a structural purpose such as sensing or drug delivery."

Printing such complex parts in a single step has many challenges, but work at Nottingham has shown the possibilities and how it may become a commercial reality in the next five to ten years, according to Wildman.

In order to demonstrate future applications, Wildman gives the example of their current attempts to come up with a method to print electric circuits in a single step. There are several problems, including the fact that the conductive ink needs to be suspended in a solvent and then go through postprocessing, resulting in height mismatches when printing alongside other types of material. Each material has different requirements, but common to all is that they need to be transformed to the liquid state, squeezed out in form of a droplet, and cured in the right way so that they have the desired properties.

"Material sciences offers a way of getting control over the material properties at the micron scale, which then allows you to design the whole object to behave in the way that you want," Wildman explained.

While there is still a long way to go until we see multifunctional objects in full production, Wildman thinks that the most likely method to achieve this is inkjet printing. "With inkjet printing, you can basically stack up as many print heads as you want," he said. "We are at the moment at two, but beyond that we going to get to six, and then we are going to go on from there. You can start to print materials of different types selectively exactly where you want."

By [Thomas Klein](#), Managing Editor, EMDT