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# 3D print on fabric

Take clothing design to a new level with 3D art



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@neurogenerator

Jen is a technology and DIY enthusiast with a passion for making. She is excited about the use of 3D printing, because it propels so many new ideas in art, science, renewable energy, and medicine.



**Right** ♦  
Decorate your clothes in a new way by 3D printing directly onto fabric

## YOU'LL NEED

- ♦ **Fabric for testing**
- ♦ **Item of clothing to decorate**
- ♦ **8 bulldog clips** (available in office supply shops)
- ♦ **3D Printer or access to one**
- ♦ **3D printing filament** (we recommend you start with PLA)

**3** D printing is becoming ubiquitous – it's being used for everything from building houses to chocolate creations to the next generation of space rockets.

But in fashion especially, 3D printing has given unprecedented freedom to create and experiment with new shapes, materials, and ideas. The creativity spurt from fashion designers has inspired us to try applying 3D printing to our own clothing. Directly onto clothing that is.

Printing directly onto fabric is perhaps the fastest way to get your 3D design onto clothing, but it requires some best practices to avoid damaging your fabric.

Here, we show you our safe method to print directly onto a garment of your choice using a standard desktop 3D printer – so get your fabrics ready, and let's get started!

## PART 1 DESIGN

The first step, as with all 3D printing, is obtaining a digital model of your 3D design. For this tutorial, we used Fusion 360 modelling software to write the text 'Make it Yourself', and extruded it to a height of 2 mm. We also used open source models from Thingiverse of a heart ([hsmag.cc/hTxzNp](http://hsmag.cc/hTxzNp)), and spikes ([hsmag.cc/ZDNHSp](http://hsmag.cc/ZDNHSp)).

Whether you decide to make your own design or use an existing model, you will end up with an STL file that is now ready for slicing.

## PART 2 SLICE

Slicing your STL is the step where you tell the 3D printer exactly how you want to print the model. You will do this with slicing software such as Simplify3D,

## FASHION DESIGNERS 3D PRINT EVERYTHING, SO CAN YOU!

- Order a custom 3D-printed jacket by Danit Peleg. Globally known for her graduate work on fully 3D-printed outfits, Danit now has a customiser where you can create and order your own jacket. Find it here: [hsmag.cc/ApDxBG](http://hsmag.cc/ApDxBG)
- Designers like XYZBag 3D print unique bags, as designed by you: [xyzbag.com](http://xyzbag.com)
- Adidas launched their custom shoe Futurecraft 4D, with a 3D-printed sole made of liquid resin material, which they plan to mass customise and mass produce.

which we used to slice the models prior to printing on our Witbox 2 printer.

Tuning the slicer settings for your specific printer model can be a fine art. We used these settings for printing PLA onto fabric: nozzle temperature of 200, layer height of 200 microns, 50mm/sec print speed, 2 mm retraction (extruder specific).

Most slicing software will require you to enter these settings, but you may have to fine-tune them slightly if you are using a different 3D printer. This

can involve some trial and error. Once you have set the settings, export the sliced file as gcode, which will be read by your 3D printer.

### PART 3 PREPARE THE PRINTER (IMPORTANT!)

The trick to 3D printing directly onto fabric is preparing your 3D printer for the task. Everything depends on the nozzle of the printer being just the right height above the fabric. Too close, and it will scratch the fabric; too far, and it won't lay down the first layer (and all following layers!) properly, resulting in a tangled mess and residue on your fabric.

Fabrics have some thickness, which will change based on the type of fabric, and throw off your printer's calibration. So, here is our general method for getting your model to print safely onto any fabric.

#### Step 1: Safety offset!

Before you do anything with the fabric, first and foremost, adjust the offset on your printer. Think of it like this: typically, your printer is 'zeroed' at the point where the tip of the nozzle just about touches the print bed. If your thick fabric were on the print bed at this point, the nozzle would come down and press into it, likely damaging the fabric with a hole. So firstly, we will lower the offset ('the zero point') →

### TOOLS

- ◆ One sheet of regular A4 copy paper
- ◆ 3D Slicing software (such as Simplify3D)
- ◆ 3D modelling software (such as Fusion 360, to make your own designs)



**Above** ◆ These edgy spikes could easily be used for cosplay. The printer had no trouble printing high 3D shapes directly onto fabric



**Left** ■ We attached the fabric securely with clips on all sides. It must be as taut as possible