A SELF-FOLDING TULIP MADE FROM COMMON 3D PRINTING MATERIAL

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Combining origami techniques and 3D printing, researchers at the Technical University of Delft managed to create 3D printed, flat structures that self-fold into 3D structures, starting with a self-folding tulip. The new technique does not require any expensive printers or special materials. Rather, the researchers used only a common 3D printer and PLA, a ubiquitous material.

The material needs to be programmed beforehand, as some parts need to fold faster than others. This is called sequential shape-shifting. The team managed to do this by simultaneously printing and stretching the PLA in certain spots. This causes the stretching to be stored inside the material, like a memory. When the material is heated, the material wants to go back to its original state and thus folds. In addition, the thickness and

alignment of the filaments are alternated.

Using PLA has a lot of advantages. The material is biobased and biodegradable, common and fairly cheap. As the material is printed using an ordinary 3D printer (an Ultimaker, one of the most popular 3D printers, in this case), the price remains low. The process is fully automated and does not require any manual labour, the team says.

As a proof-of-concept, the researchers created a self-folding tulip.

The technique could be used to create bone implants or be used in printed electronics. However, the researchers hope that in the future it is possible to even make furniture out of it. This furniture could consist of a flat sheet, which, after applying certain stimuli, turns in a ready to use piece of furniture.

For other self-folding materials, click here.

Photos: TU Delft

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HOME / ARTICLES / A SELF-FOLDING TULIP MADE FROM COMMON 3D PRINTING MATERIAL
BACK TO TOP ▲