

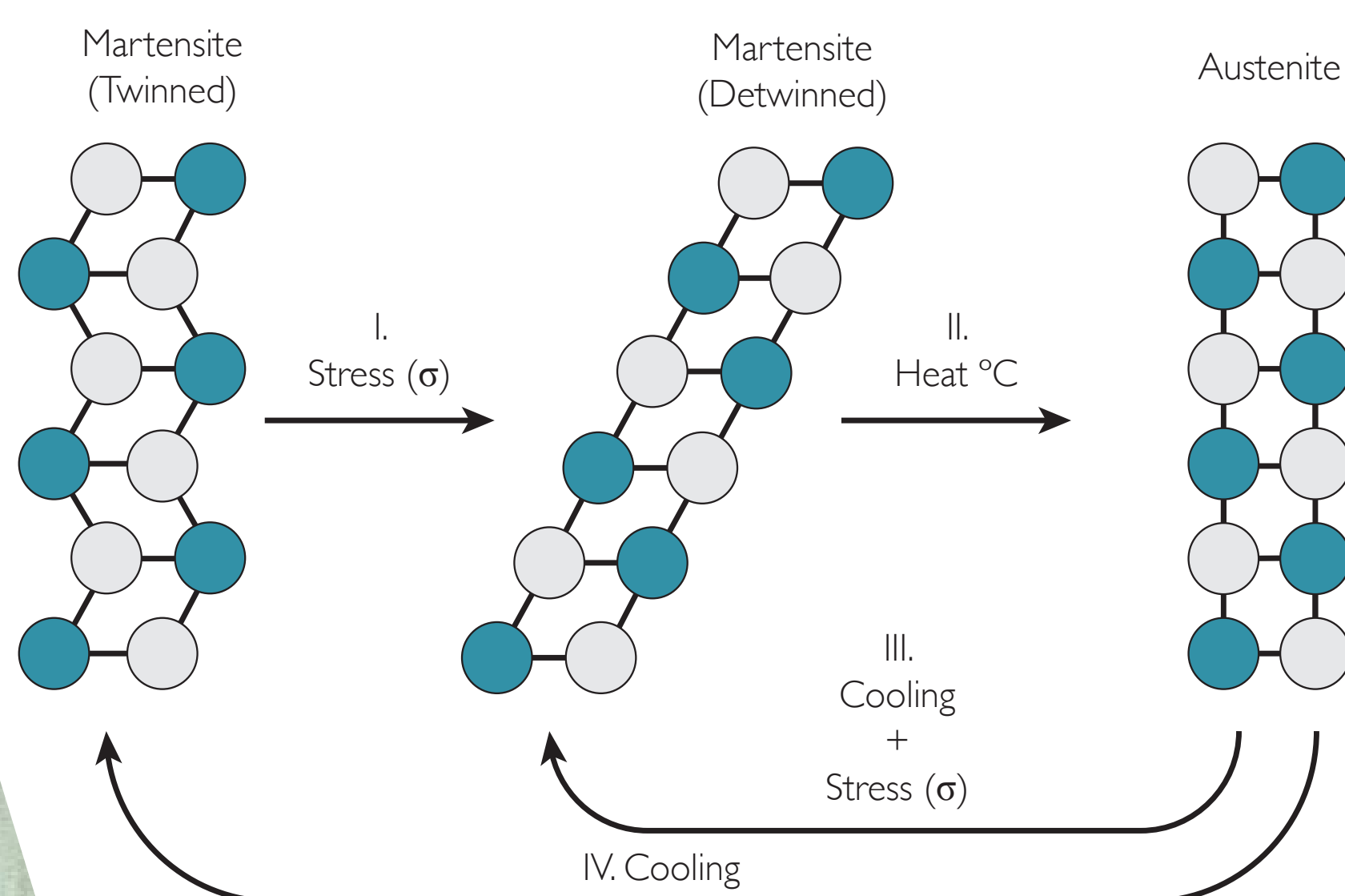
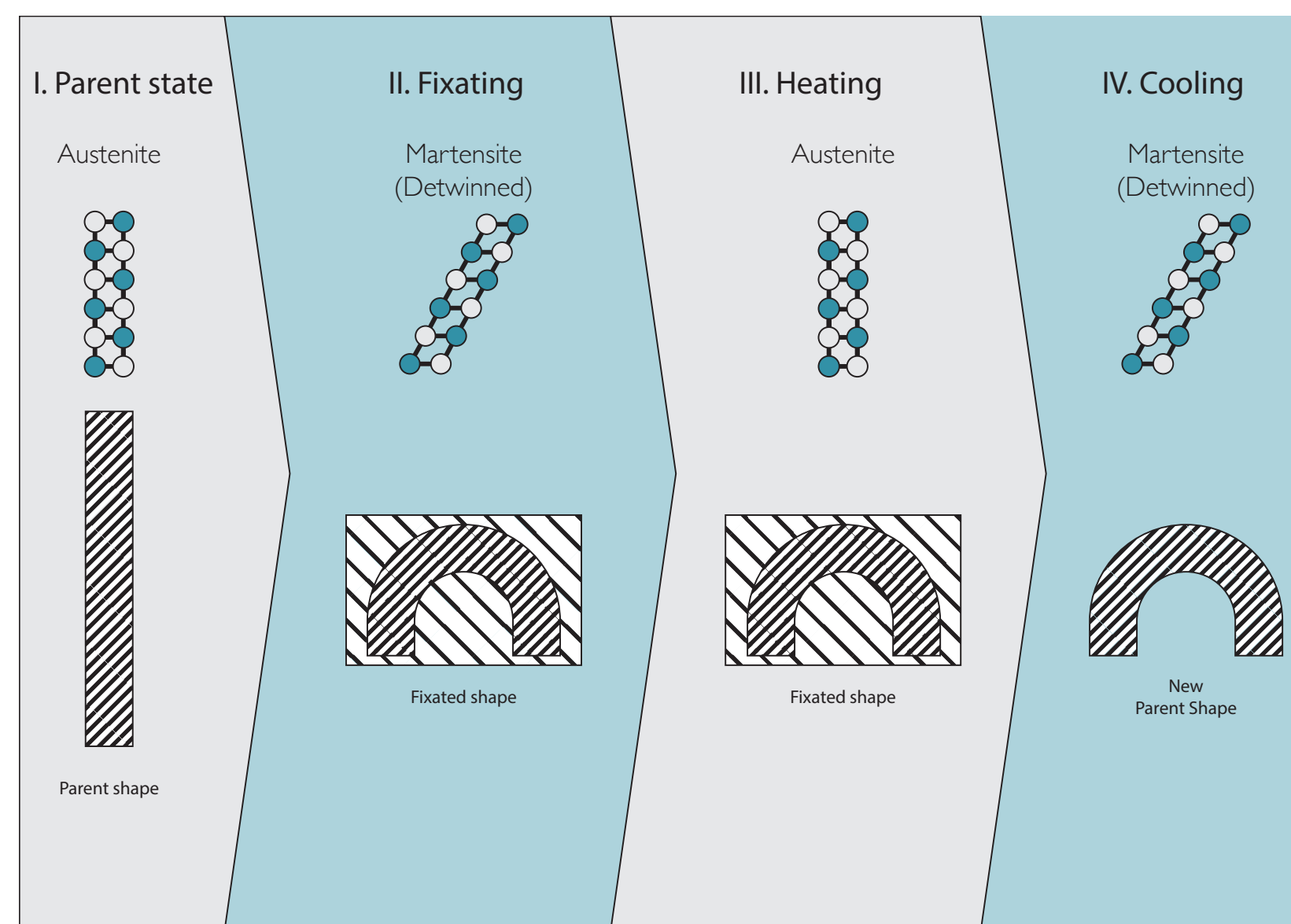
SHAPE MEMORY ALLOY IN 3D PRINTING

MAKING 3D PRINTED OBJECTS COME INTO MOTION

INTRODUCTION

In this project, the opportunities were investigated when combining **shape-memory alloy** material with **3D printing** technology. This combination has the potential to **create objects** that are able to **move on their own**.

Shape-memory alloys are as the name suggests material with a **Shape-Memory** this unique quality makes it possible to **program a shape** into the material that can be **called upon** using an external form of energy such as **heat** or **electricity**.



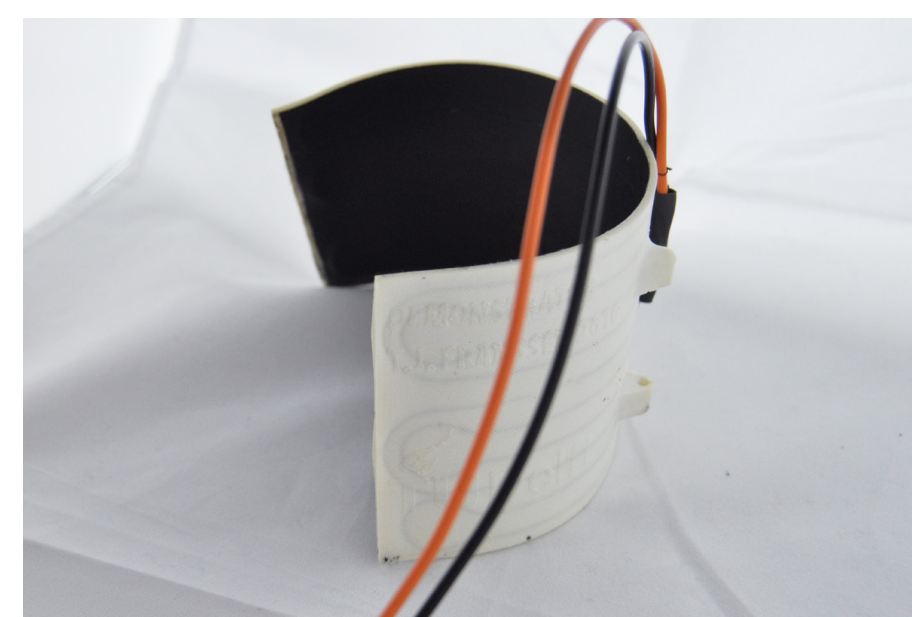
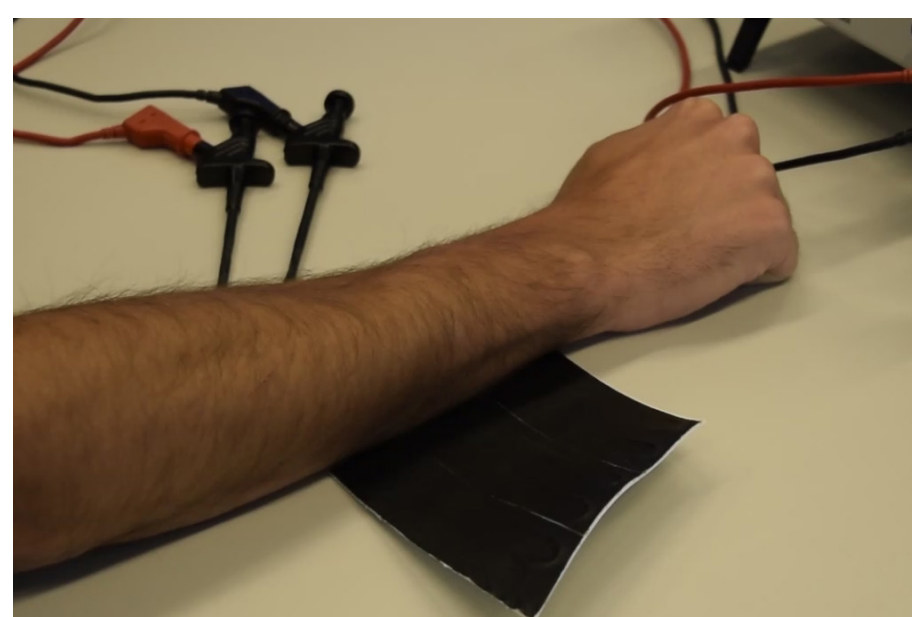
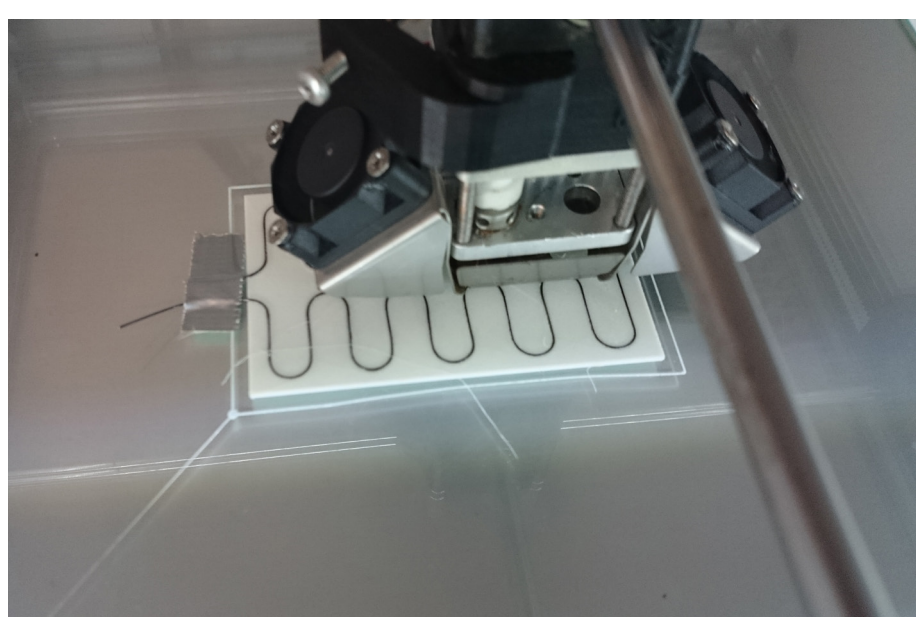
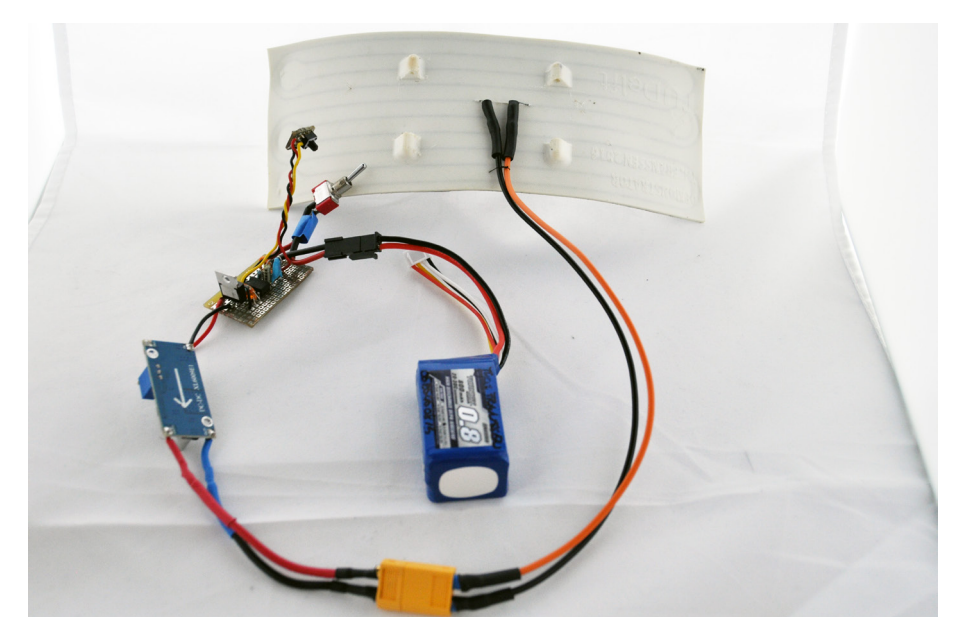
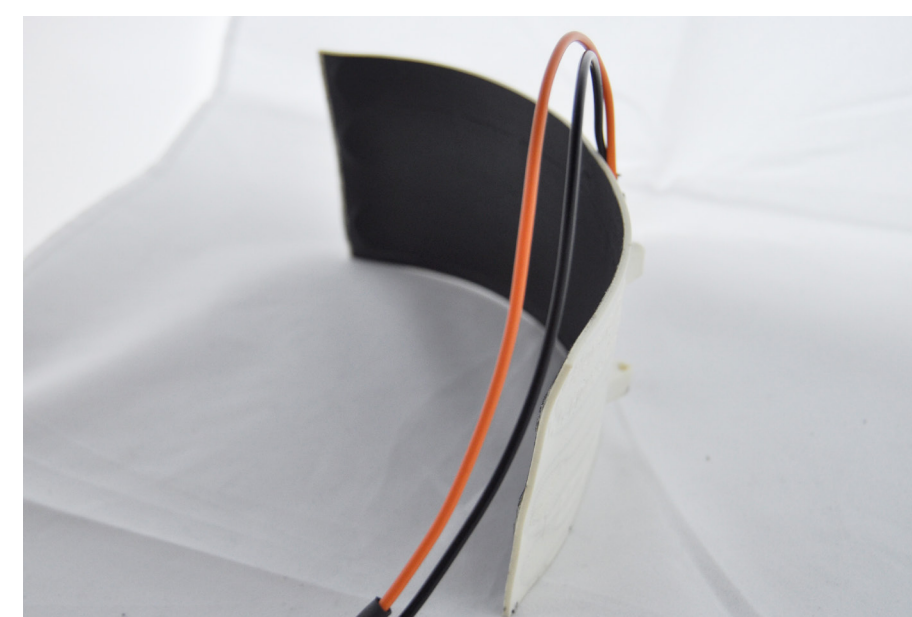
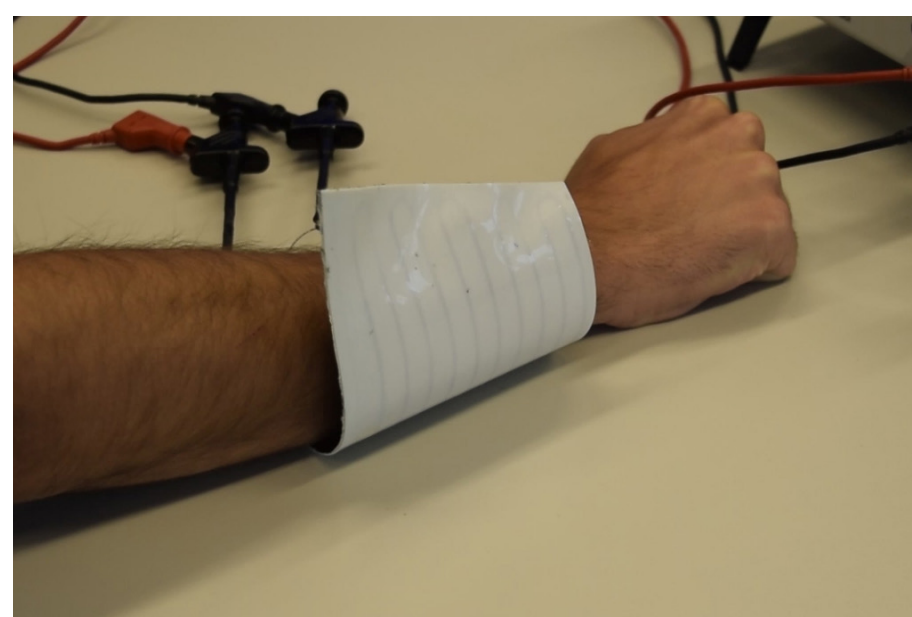
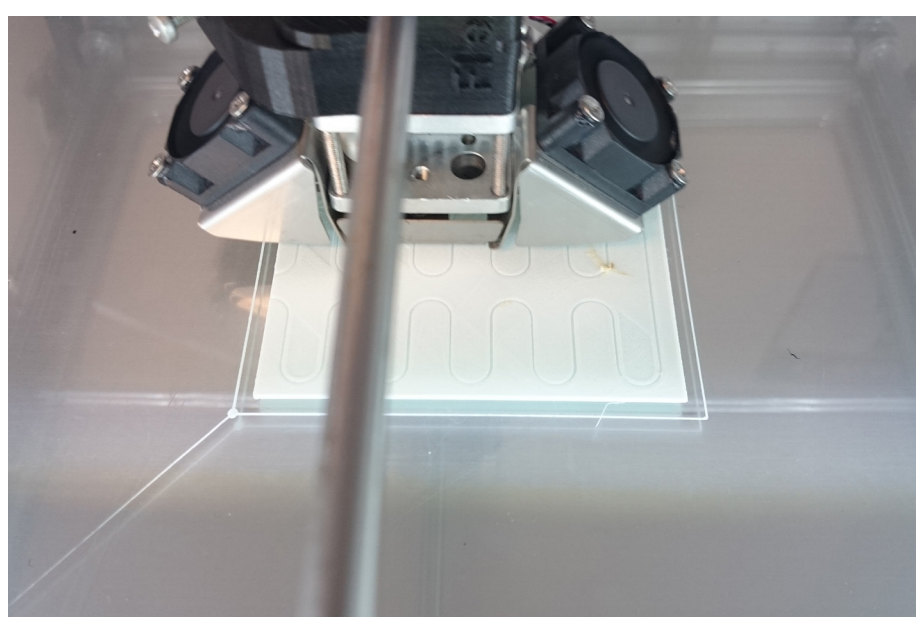
HOW DOES SHAPE-MEMORY ALLOY WORK?

A piece of **shape-memory alloy** can be **stretched** up to **8%** of its total **length** without damage, step I. This creates internal **forces** to be **stored** in the material, think of a **battery for mechanical energy**.

When you **heat** the material up, these **forces are released** and the **material relaxes** and reconfigures its internal structure to its **original** or programmed **shape**, step II.

When the **material** is **cooled** down again it can be **manipulated** once again, step IV. If the material is **cooled down fixated** the material can **not fully relax**, and a **new original shape** is programmed, step III.

WHAT CAN YOU MAKE WITH IT? - OBJECTS THAT MOVE!



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