

MAGNETCALLY ACTIVATED SHAPE MORPHING OBJECTS

M O R E T H A N M E E T S T H E E Y E

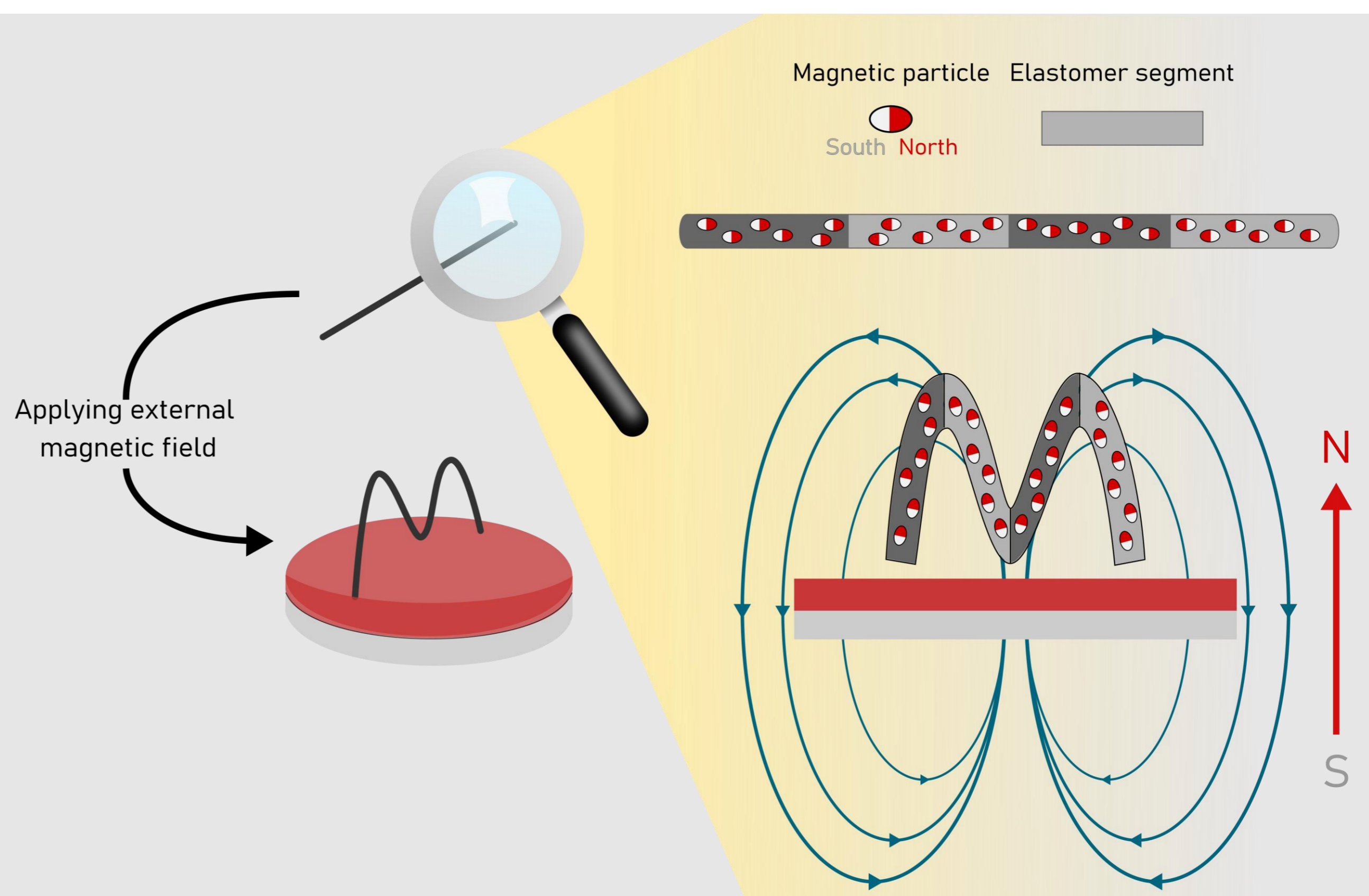
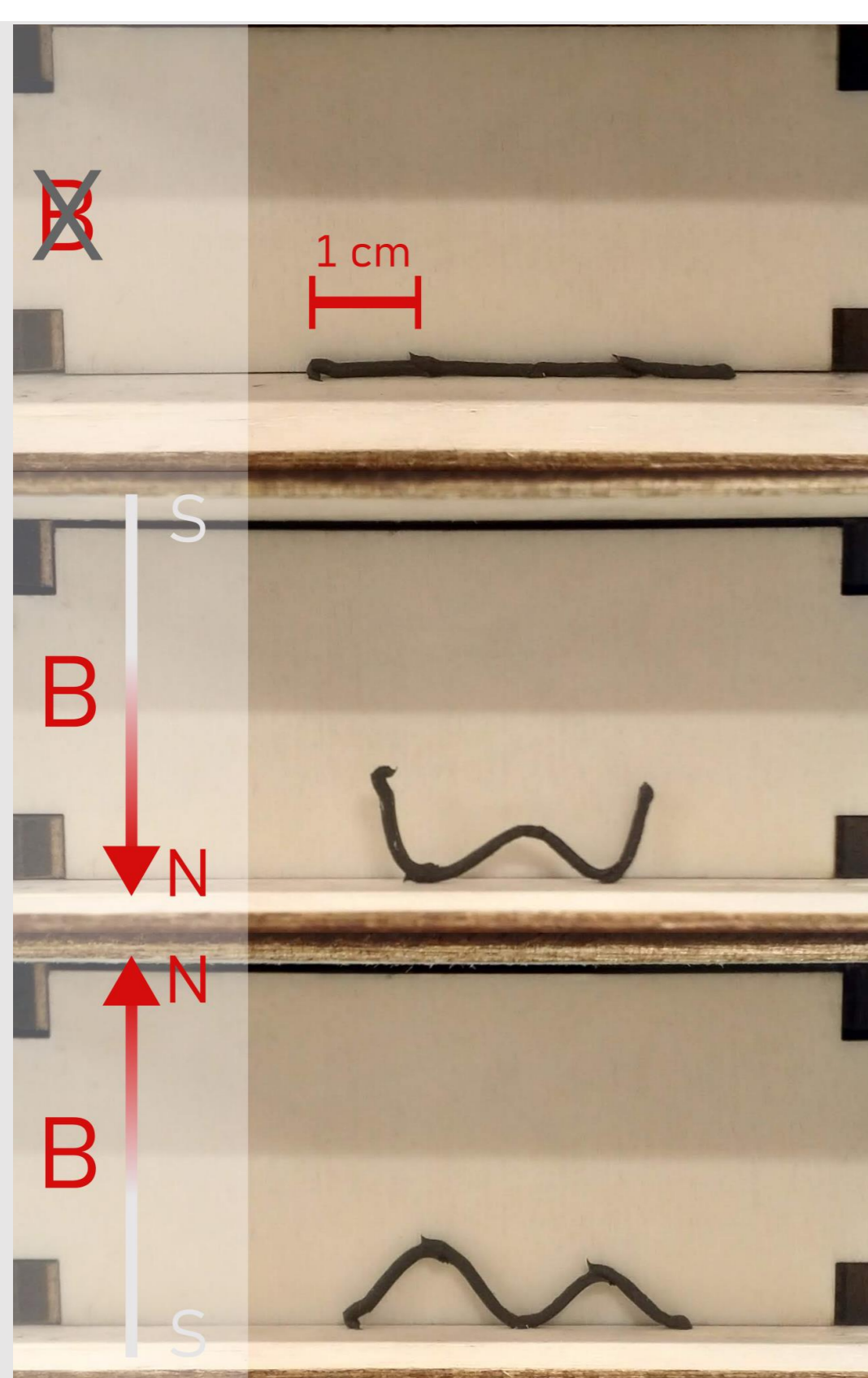
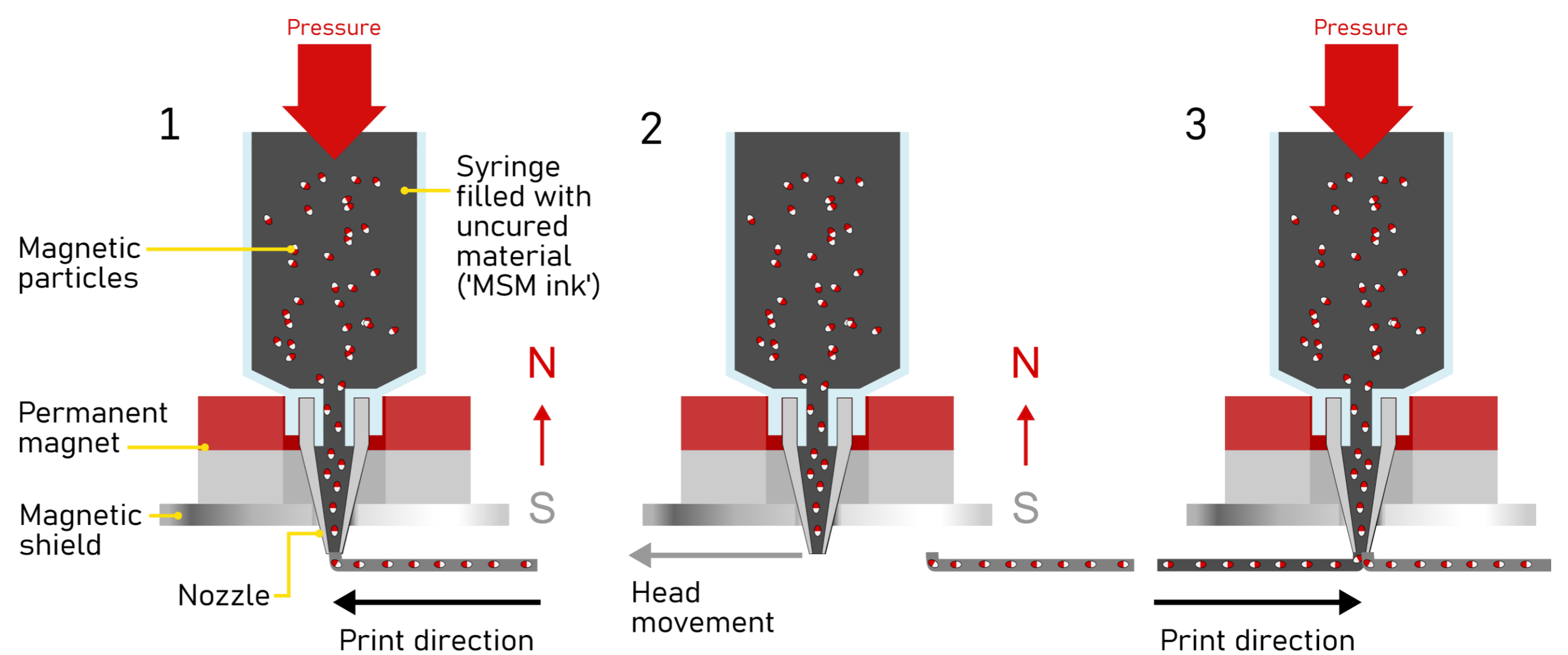
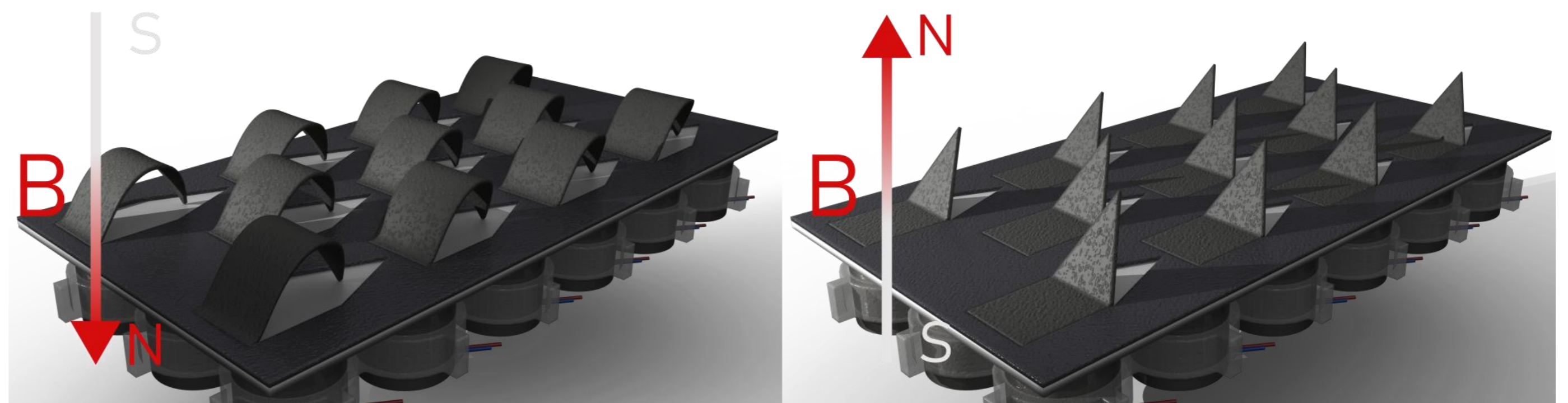
Magnetic Soft Shape Memory Material

is a form of shape memory hybrid in which the shape change is initiated by magnetic particles embedded in an elastomer matrix. When an external magnetic field is applied, these magnetized particles will align themselves to this magnetic field, straining the elastomer in a specific shape. Once the magnetic field is removed, the elastic properties of the elastomer pull the object back to its original shape.

The shape change is programmed during 4D printing: 3D printing while incorporating time or stimuli dependent properties. A magnet attached to the nozzle is used to orientate the magnetic particles and deposit them into specific patterns. Characteristics of the resulting **shape morphing objects** are fast, untethered and multi-directional shape change when exposed to an external magnetic field.

This project is the second time this material is researched at the Faculty of Industrial Design Engineering. Progress has been made on the development of a 4D printing system capable of printing the highly viscose two-component magnetic 'ink'.

The Material Driven Design method was used to come up with a novel application of this material not yet described in literature. The resulting idea is that of a changing texture which can have three states: neutral (no magnetic field); bumpy and spiky. Possible use cases for this texture are haptic feedback and human-robot interaction.



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4D printing magnetically activated
shape morphing objects
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