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Abstract

Magic of Shape Memory Objects

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Imagine we can design objects that can be altered in a variety of shapes by an external trigger and that this shape can be designed in a programmed and controlled way, not by using added sensors or actuators but by the very constitution of the material itself so that it autonomously responds to changing conditions. Shape Memory Alloys (SMAs), as one of the most paramount members of the shape memory materials family, areas yet not well-known and established in the world of designers. Hence by stimulating the design of innovative products, which adapt their shapes to different user needs, the potential of these materials is demonstrated to designers in an inspiring and meaningful way. In this research, we describe the design process of developing several SMA-based composites, including shape morphing objects consisting of SMA wires embedded in various types of substrates. By making such composites which integrate both active and passive elements, we were able to create a two-way memory effect, which is of crucial importance for obtaining a closed loop cyclic actuation. A number of examples of designed objects are presented such as a locomotive device inspired by the caterpillar movement, a self-regulating wearable garment, wearable "hugging" garments, self- deployable furniture and self-fastening shoes.

Biography:

Sepideh Ghodrat has completed her PhD in Materials Science in 2013 from Delft University of Technology (TU Delft) added with 4 years of postdoctoral studies in the same university. She is now assistant professor in emerging materials of sustainable design engineering in the Industrial Design Faculty of TU Delft. She has published more than 20 papers in reputed journals and presented her work at numerous international conferences.

Publication of speakers:

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