

## The Relevance of Bioinspired Architecture and Programmable Materials for Development of 4D Printing

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**Abstract :** Nature has long served as inspiration for humans, since various technologies present in society are a mirror of the natural world. This is due to the fact that nature has adapted for millions of years to possess the characteristics they have today. In this sense, man takes advantage of this situation and uses it to produce his own objects and solve his problems. This concept, which is known as biomimetics, is something relatively new, once it was only denominated in 1957. Nature, in turn, responds directly and consistently to environmental conditions. For example, plants that have touch sensitivity contract with this stimulus. Such a situation resembles a technology that has been gaining ground in the contemporary world of scientific innovation: 4D printing. 4D printing technology emerged in 2012 as a complement to 3D printing and presents numerous benefits since it provides a deficiency in the second kind of printing mentioned. This type of technology reaches several areas, since it is capable of producing materials that change over time, be it in its composition, form or properties and is such a characteristic that determines the additional dimension of the material. Precisely because of these factors, this type of impression resembles nature and is related to biomimetics. However, only certain types of 'intelligent' materials are generally employed in this type of impression, since only they will respond well to such stimuli, one of which is the hydrogel. The hydrogel is a biocompatible polymer that presents several applications, these in turn will be briefly mentioned in this article to exemplify its importance and the reason for choosing this material as object of study. In addition, aspects that configure 4D printing will be treated here, such as the importance of architecture, programming language and the reversibility of printed materials.

**Keywords :** 4D printing, biomimetic, hydrogel, materials

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