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Biomimetics and Additive Manufacturing for Industrial Design Innovation

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Abstract : Nature has always inspired the creative mind, to a lesser or greater extent. Introduced around the 1950s, Biomimetics served as a systematic method to treat the natural world as a 'pattern book' for technical solutions with the aim to create innovative products. Unfortunately, this technique is prone to failure when performed as a mere reverse engineering of a natural system or appearance. Contrary to that, a solution which looks at the principles of a natural design, promises a better outcome. One such example is the here presented case study, which shows the design process of three distinctive grippers. The devices have biomimetic properties on two levels. Firstly, they use a kinematic chain found in beaks and secondly, they have a biomimetic structural geometry, which was realized using additive manufacturing. In a next step, the manufacturing method was evaluated to estimate its efficiency for commercial production. The results show that the fabrication procedure is still in its early stage and thus it is not able to guarantee satisfactory results. To summarize the study, we claim that a novel solution can be derived using principles from nature, however, for the solution to be actualized successfully, there are parameters which are beyond reach for designers. Nonetheless, industrial designers can contribute to product innovation using biomimetics.

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