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## University of Trento: Leonardo's catapult model inspires new robotics



A flexible robotic arm inspired by the elastic catapult designed by Leonardo da Vinci is the new idea conceived by a team of Italian researchers from the ERC Instabilities (<http://erc-instabilities.unitn.it/>) laboratory of the **University of Trento**, which deserved the cover of the February issue of the British Proceedings of the Royal Society A journal.

The traditional catapults for launching objects use gravity force, like trebuchets, or the elastic energy of an external object. The genius of Leonardo da Vinci was to design an **"elastic catapult"** that would transform elastic energy stored in the arm into kinetic energy, to improve the launch performance leveraging the deformability of structural elements.

Leonardo's drawings inspired the recent scientific article authored by **Davide Bigoni**, full professor of Construction Science at the Department of Civil, Environmental and Mechanical Engineering of the University of Trento, and researchers **Costanza Armanini**, **Francesco Dal Corso** and **Diego Misseroni**.

In this article, the authors show a mechanical model developed at the laboratory of the University of Trento to describe the behaviour of **robotic arms** which are extremely deformable. The system shows different and unexpected behaviours according to the load that the arm must lift, switching from the behaviour of the elastic compass to the dynamic behaviour of the elastic catapult designed by Leonardo.

These achievements further confirm the applicability of theoretical models of solid mechanics to the design of so-called **soft robots**, to be used in delicate fields, such as medicine, or in sports, to maximize the performance of athletes in pole vault. The study is another recognition to for the team of researchers led by **Davide Bigoni**, which has deserved four covers of this scientific journal over 18 months.

**Source** Università degli Studi di Trento

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**Insights**