Adaptive 3D-Printed Textiles: Flexibility and Rigidity On Demand

Negar Kalantar + Alireza Borhani

Email: negarkalantar@gmail.com
Website: thetranslab.com

Date Created: 2014
Dimensions: variable
Materials Used: P12

Description

In our artwork, we explore the dynamic relationship between flexibility and rigidity through 3D-printed textiles. Using innovative design techniques, we have created a material that can transform its shape when force is applied and maintain that shape once the force is removed. This unique characteristic allows the textile to be both flexible and rigid, adapting to different forms as needed.

We employ 3D printing technology to fabricate these textiles, using precise geometric designs to achieve the desired properties. The process involves meticulously designing each cell to ensure the assembly holds together through kinematic constraints, enabling the material to return to its original form when reversed forces are applied. Our focus is on how geometry can alter material properties, creating a responsive, adaptable textile from traditionally rigid substances. This work challenges conventional design discourses by merging scientific investigation with creative exploration, offering new possibilities for material innovation.

Statement

As artists and designers, we embrace the opportunities that new tools bring to our creative process. 3D printing, in particular, has revolutionized our approach, allowing us to achieve unprecedented levels of complexity and accuracy in our designs. This technology enables us to create textiles that do not need to be stitched to form three-dimensional structures; instead, they can be printed flat and transformed into 3D shapes upon applying force.
Our work focuses on manipulating rigid materials into flexible, responsive textiles, harnessing the power of geometry to redefine their properties. This innovative approach challenges conventional perceptions of rigidity and flexibility, merging scientific investigation with artistic creativity. Each piece we create is a testament to the potential of design to innovate and inspire, inviting viewers to rethink the possibilities of the materials surrounding us. Our work aims to spark curiosity and encourage a deeper appreciation for the fusion of art and science.

Designer(s) Biography:

Negar Kalantar, Ph.D., is an associate professor of Architecture and the Co-director of the Digital Craft Lab at California College of the Arts in San Francisco. Her research focuses on materials exploration, robotic and additive manufacturing technologies, and the integration of architecture, science, and engineering.
Alireza Borhani is an innovator, architect, educator, and co-principal of transLAB. His interdisciplinary experience has broadened his career across a diverse range of projects at the intersection of design computation, emerging material systems, additive manufacturing workflows, and robotics. Leading in kinematic and lightweight structures, ranging from architectural-scale shelters to small products.

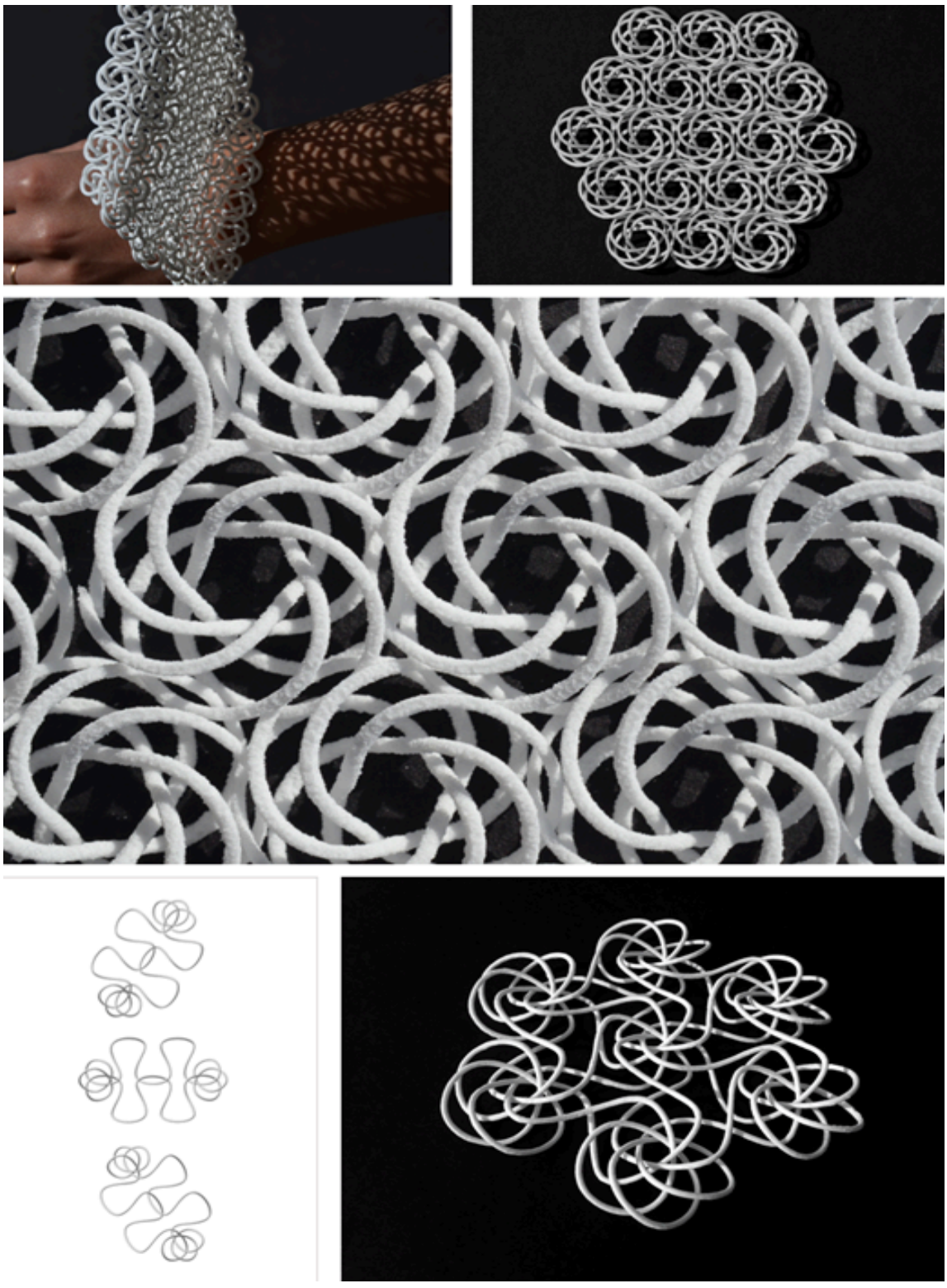

Figure Description: Parametrically designed textiles for 3dprinitng