MATERIAL FORM-FINDING OF MODULAR TEXTILE STRUCTURES

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Proposed research aims at providing novel applications for lightweight textile structures in the building industry. As construction becomes more digital and design increasingly physical, the objective is to re-introduce craftsmanship and materiality into architectural design with the help of computation.

The need of more eco-friendly and lighter materials, more flexible designs and substantial cost reduction create new possibilities for textiles as construction material. New digital fabrication technologies such as 3D printing as well as development of highly engineered, programmable fibers allow for re-introducing textiles into the build environment as lightweight, efficient and sustainable solution.

This paper explores potentials of self-forming textile structures generated through 3D printing on pre-stressed fabrics. It focuses on potential architectural applications of that system while looking into modularity, variation and scalability. By introducing hierarchy into the 3D printed elements, various degrees of shrinkage are possible within one printed sample. Variable height and geometry of the printed filament allows local influence on the deformation of the fabric. This method enables precise control over the geometry and aims at minimizing the material needed for fabricating three-dimensional textile modules.
Looking into potentials and limitations of the 3D printing process, further topics are tested such as modularity and connection details. As additive manufacturing becomes increasingly affordable and textiles more and more robust, proposed methodology has a lot of potential for future applications in the architectural scale.