

New European Bauhaus



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From data to design in large-scale additive manufacturing

As part of the New European Bauhaus (NEB), this research project investigates large-scale additive manufacturing using fused granular fabrication (FGF) to produce parametrically designed, structurally optimized furniture. The chair, TectoMorph, made from a bio-based PLA-cellulose composite, illustrates how agent-based modeling and FEM analysis guide virtual agents to follow force paths and form "tectonic protrusions" that reinforce load-bearing areas. The Table, Weavium, investigates a branching, self-supporting lattice column, focusing on how controlled toolpath manipulation within FGF can generate structurally active surface articulation at the scale of furniture. In addition to this case, the project also explores advanced printing techniques and sustainable composite systems, expanding the possibilities for digital craftsmanship that balances resource efficiency, structural performance, and aesthetic innovation.

Results, Checkpoints, Next Steps

This study demonstrates the potential of large-scale additive manufacturing using bio-based and recycled materials for parametrically optimized furniture. Next steps focus on hybrid and non-planar printing methods to enhance resource efficiency, structural performance, and design diversity while advancing sustainable and circular design practices.

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Reallabor ZEKIWA Zeitz

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