Supplementary material

Computational analysis of hygromorphic self-shaping wood gridshell structures

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Movie S1: Caption: Exemplary gridshell self-shaping process in computational and physical model. FE simulation of self-shaping process of a 5x5 gridshell made out of beech wood and physical reconstruction. U3: Out of plane displacements in mm. Parameters: Strip geometry: 600 mm length, 12 mm width, 2 mm passive layer thickness (radial orientation), 5 mm active layer thickness (longitudinal orientation). Boundary conditions: Change in moisture content from 14% to 21%, physical sample relocation from 65% to 95% relative humidity climate at 20°C.

Figure S2: Framework for parametric FE analysis. Analysis parameters such as FE model geometry or boundary conditions (BCs) can be automatically sampled via Matlab scripts and passed for FE analysis to parametric Python scripts. FE model material parameters can be directly passed to user material subroutines (UMAT) written in Fortran 77 (not used in this study, displayed for the sake of interest). The framework is based on a black box approach and, therefore, facilitates parametric analyses such as phase diagrams, optimizations, or uncertainty quantification, which can be conducted in frameworks decoupled from the FE analyses. (The authors state not to be associated or sponsored by any of the organizations whose logo is appearing in this figure).
Figure S3: *In-plane bending of a border strip from configuration A visualized in the 1-2 plane.*

**a:** Maximal principal nominal strains of deformed FE model configuration. It can be recognized that at the crossing between middle and border strips, the in-plane bending strain takes over the self-shaping (out of plane) strains as the maximal principal strain components of the strain tensor.

**b:** Image of Experimental configuration A.