

# Discrete Heuristics

## Digital design and fabrication through shapes and material computation

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**Abstract.** In the case of designers, architects and arts, tools are part of a repertoire of cognitive, symbolic, and semiotic artifacts with which each explores and learn about design problems. Nonetheless, when using digital fabrication tools, a dichotomy between what is ideated and what is made appears as an evident problem since many of the perceptual aspects of sensing and thinking about new things in the making are neglected. It is argued that this establishes a dichotomy between what is ideated and what is executed as an outcome from that idea. How designers can think, learn and augment their creativity by using digital tools in a more relational, exploratory, interactive and creative way? Furthermore, how can we teach design using contemporary fabrication tools beyond its representational capabilities? This paper explores the richness of using digital fabrication tools through the lens of shapes grammars as a design paradigm in order to extend computational making including digital fabrication tools, gestures and material behavior as crucial actors of the design process. Through the use of discrete heuristics - that is, the elaboration of deictic rules for computation with physical objects, materials and fabrication tools in a precise yet perceptual way- this paper shows experiments inside a third year design studio to overcome the hylomorphism present in the digital design and make dichotomy.

**Keywords:** Digital fabrication · Computational making · Human computer interaction · Shape grammars