

# Interactive Urban Synthesis

## Computational Methods for Fast Prototyping of Urban Design Proposals

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**Abstract.** In this paper, we present a method for generating fast conceptual urban design prototypes. We synthesize spatial configurations for street networks, parcels and building volumes. Therefore, we address the problem of implementing custom data structures for these configurations and how the generation process can be controlled and parameterized. We exemplify our method by the development of new components for Grasshopper/Rhino3D and their application in the scope of selected case studies. By means of these components, we show use case applications of the synthesis algorithms. In the conclusion, we reflect on the advantages of being able to generate fast urban design prototypes, but we also discuss the disadvantages of the concept and the usage of Grasshopper as a user interface.

**Keywords:** Procedural grammars · Artificial intelligence in design · Urban synthesis · Generative design · Grasshopper plugin · Cognitive design computing