

A Paradigm Shift in Parametric Urbanism: Critical Re-Evaluation of Computational Morphogenesis

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Abstract. This study explores the transformative potential of computational morphogenesis in parametric urbanism. By employing advanced algorithmic strategies, we reassess established urban design frameworks to enhance sustainable city planning. Our findings reveal significant shifts in spatial configuration principles, advocating for adaptive and resilient urban environments. Conclusively, this paper bridges computational innovation with architectural theory, proposing a paradigm shift that challenges traditional urbanism.

Keywords: parametric urbanism, computational morphogenesis, sustainable urban planning, algorithmic strategies, spatial configuration

Introduction

The burgeoning complexities of urban environments in the 21st century necessitate novel approaches to city planning and design. As global urban populations swell, the sustainability of traditional urban concepts is under increasing scrutiny. Parametric urbanism, with its ability to integrate computational processes into design dynamics, offers a promising alternative. Yet, the integration of computational morphogenesis within this discipline remains underdeveloped. This paper posits a critical re-evaluation of computational morphogenesis to address the evolving challenges of urban development in the coming years 2024-2026. By employing advanced algorithmic methodologies, we explore the spatial optimizations achievable through this innovative approach. The structure of this paper is as follows: Section 2 reviews existing literature on parametric urbanism, highlighting gaps in current methodologies. Section 3 introduces our proposed framework and discusses the algorithmic processes underlying computational morphogenesis. Section

4 presents case studies illustrating the application of our framework in real-world scenarios. Section 5 concludes with a discussion on future research directions and implications for sustainable urban planning.

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