

CONFERENCE PAPER

NZAAR-ALBE-16-93 ICALBE 2016

Intelligent Alive Architecture with Biological Approach to Dynamic Design, Role of Computation and Parametric Techniques as Smart Ways of Controlling Architecture

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PUBLISHED IN

The First NZAAR International Event Series on Natural and Built Environment, Cities, Sustainability and Advanced Engineering
International Conference on Architecture, Landscape and Built Environment (ICALBE 2016)

Pages	55-56 of the volume
Held	26 June 2016, Shangri-La Hotel, Putrajaya, Malaysia
ISSN	2463-5979 (online) 2463-5960 (print)
Publisher	New Zealand Academy of Applied Research Ltd, Auckland

ABSTRACT

Intelligent Architecture is the idea of utilizing computation design techniques for achieving smart responsive dynamic design solutions that has been inspired by biological behaviour patterns. This research is analysing a series of case studies and prototypes that has been designed and fabricated within the same principles. The idea of architecture of change, agility, responsiveness and computational design in architecture refers to the problem of adapting built environment to its surrounding natural platform and evolving architecture in the same way that natural systems has.

Keywords: intelligent architecture; biomimicry; computational design; biology in design; architecture of change

HOW TO CITE

Mahdiar Ghaffarianhoseini and Roxane Fallah (2016). Intelligent Alive Architecture with Biological Approach to Dynamic Design, Role of Computation and Parametric Techniques as Smart Ways of Controlling Architecture. In *The First NZAAR International Event Series on Natural and Built Environment, Cities, Sustainability and Advanced Engineering*, Putrajaya, Malaysia, 26 June 2016 (pp. 55-56). Auckland: New Zealand Academy of Applied Research. ISSN 2463-5979 (online), 2463-5960 (print).

INTELLIGENT ALIVE ARCHITECTURE WITH BIOLOGICAL APPROACH TO DYNAMIC DESIGN, ROLE OF COMPUTATION AND PARAMETRIC TECHNIQUES AS SMART WAYS OF CONTROLLING ARCHITECTURE

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Abstract

Intelligent Architecture is the idea of utilizing computation design techniques for achieving smart responsive dynamic design solutions that has been inspired by biological behaviour patterns. This research is analysing a series of case studies and prototypes that has been designed and fabricated within the same principles. The idea of architecture of change, agility, responsiveness and computational design in architecture refers to the problem of adapting built environment to its surrounding natural platform and evolving architecture in the same way that natural systems has.

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In recent years, there have been versatile socio-cultural, ecological and environmental issues emerging in our cities, starting from 20th century where the loss of regional difference began to undermine the uniqueness of place, removing us from understanding what local region and climate have to offer and the buildings were predominantly seen with the emergence of engineering and technological solutions as their dominant factor in design. In that regard, numerous green movements and environmental concerns have emerged to lead toward environmentally benign solutions for the built environments. To address architecture in that regard, the most effective solution embraces a movement on which buildings will be read as living forms and cities as organic systems.

Today, with the global target to promote environmentally responsive buildings, various studies draw attention to the promising role of passive design strategies. However, considerably less attention has been paid to the circumstances of creating highly responsive and regenerative buildings that are equipped with interactive

building fabrics towards ensuring dynamic potentials for responding to the surrounded environment. In this line, this research explores the biomimicry design principles which are characterized as an inspirational source with practical potentials towards designing regenerative built environments. [1]

One may discuss that we should first decode the rules of nature and obey them in the future design, and one may argue the similarity of those rules to the ones for human life. Nature is creative as people are, and the creativity of the nature in its own context and the symbiotic relation between its members should become an inherent source of inspiration for human in order to form his artificial natural environment that embody dynamic potentials to respond to the surrounded context. [2][3]

This research theorizes that the natural world encompasses an immense database of design initiatives that can inspire creative thoughts. In this research, using computational design techniques such as generative, parametric and responsive

design, the focus is on the exploration of the advance design tools to employ biomimicry essence in architectural design following the principles of architecture of change. According to Branko Kolarevic 'the architecture of change' refers to buildings, which can be adapted in some way or other to the dynamic process of habitation.

Methodology for exploring this idea is to test a series of case studies and prototypes that has been designed and fabricated in various scales and applications within the same principles. Any of these prototypes explores interactive installations, motion in built form, responsiveness to environments and use of computation as a smart technique for understanding, designing and behaving with respect to biological studies.

The idea of architecture of change, agility, responsiveness and computational design in architecture refers to the problem of adapting built environment to its surrounding natural platform and evolving architecture in the same way that natural systems has. Indeed, these concepts and devices are better defined as tools than goals. Beyond the ideas of organic forms, archology, sustainable architecture and nature-friendly buildings, it can be argued that the goal should be designing buildings as living forms and cities as infrastructural natural systems. In that sense architecture of change plus biomimicry will be the mean and computation will be the tool for that biological evolution of man-made environment.

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