• Paper / Proposal Title:
Using generative design in the rehabilitation of favelas in waterfront areas

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• Abstract (300 words):
Fitting within the field of generative design, specifically shape grammar and conditional design methods, this paper focuses on design strategies for the rehabilitation of precarious housing settlements known as favelas in waterfront areas of two neighborhoods in Recife, the ninth most populated city in Brazil with 1.6 million inhabitants. It showcases design proposals for social housing by undergraduate architecture students using methods that focus on the emergence of different spatial conditions based on prescriptive design rules. Stiny and Gips created shape grammar in 1970s to interpret and evaluate artworks, consisting of a form-generating system that operates according to algorithmic rules, similar to the systemic approach of the mathematician Emil Post and the linguistic grammar of Noam Chomsky. Conditional design was developed by Anthony Di Mari at the GSD Harvard University, centered on the idea that, as shapes are manipulated through specific actions (add, move, subtract, etc), different spatial conditions emerge, such as connecting one volume to another or opening it for natural light exposure, facilitating the composition of form and arrangements as a system of options that takes in consideration program, site, scale and structure. Through combination of both methods
morphological configurations relating closely to informal urban fabrics were created, establishing a positive dialogue with the preexisting diversity of spatial arrangements, dwelling layouts, and strong interaction between buildings and river, far more interesting conditions than those of existing social housing complexes built in the country, predominantly based on the outdated model of mass production that favors repetitive units and monotonous spatial arrangements. In general, design proposals that made use of both analog and digital development of three-dimensional grammars and parametric modeling of some of its rules seem to indicate that it is possible to achieve compositional diversity even if employing a reduced number of shapes and additive rules.

• Author(s) Biography (200 words each):

Ana Rolim has a Bachelor's degree in Architecture and City Planning and a Master of Science degree in Urban Development, both from UFPE, Brazil. Former visiting professor at her alma mater, she has been Assistant Professor II at UNICAP since 2009. Currently a PhD student at UFPE with a thesis research on the connection between neuroscience and space syntax utilized towards the understanding of the way museum visitors engage with the building and the artwork, Ms. Rolim has combined professional practice in New York City and Brazil, and teaching experiences, which have encompassed design studios and architecture theory. Besides several awards in architecture competitions through her practice, such as a honorable mention in the 2017 Modern Collective Living Challenge with the design of a housing settlement for dislocated farmers in China, her students have also won important awards, including Faith & Form 2016 International Awards Program for Religious Art & Architecture; Honorable mention, AIA Detroit, 2012 and 3rd place at Spiritual.d 2012 Spiritual Space Design in a Contemporary World. She has been the author and co-author of two books, and several papers, including presenting and publishing in the 11th Space Syntax Symposium Proceedings, Lisbon, July 2017.