

# The geometry of Chuck Hoberman as the basis for the development of dynamic experimental structures

Márcia Anaf and Ana Lúcia Nogueira de Camargo Harris

<sup>1</sup>University of Campinas

marciaanaf@uol.com.br, luharris@fec.unicamp.br

**Abstract.** The cognitive-theoretical foundation referring to teach drawing as a way of thinking, as well as the construction of the environment by means of drawing using transforming geometries and the formal and para-formal computational process, creating unusual geometries through generative design processes and methodologies, can be seen as some of the main possibilities in exploring dynamic experimental structures for an Adaptive Architecture. This article presents the development of a model for articulated facades, inspired by Hoberman's Tessellates, and his Adaptive Building Initiative (ABI) project to develop facades models that respond in real time to environmental changes. In addition, we describe an experiment based on the retractable structures, inspired by Hoberman's work and experimentations. Solutions for responsive facades can offer more flexible architectural solutions providing better use of natural light and contributing to saving energy. Using Rhinoceros and the Grasshopper for modeling and test the responsiveness, the parametric model was created to simulate geometric panels of hexagonal grids that would open and close in reaction to translational motion effects, regulating the amount of light that reaches the building.

**Keywords:** Parametric architecture, Hoberman's Tessellates, Adaptive Building Initiative (ABI), Articulated Facades, Complex Geometries, Retractable structures, Retractable polyhedra.