

# parametric urbanism

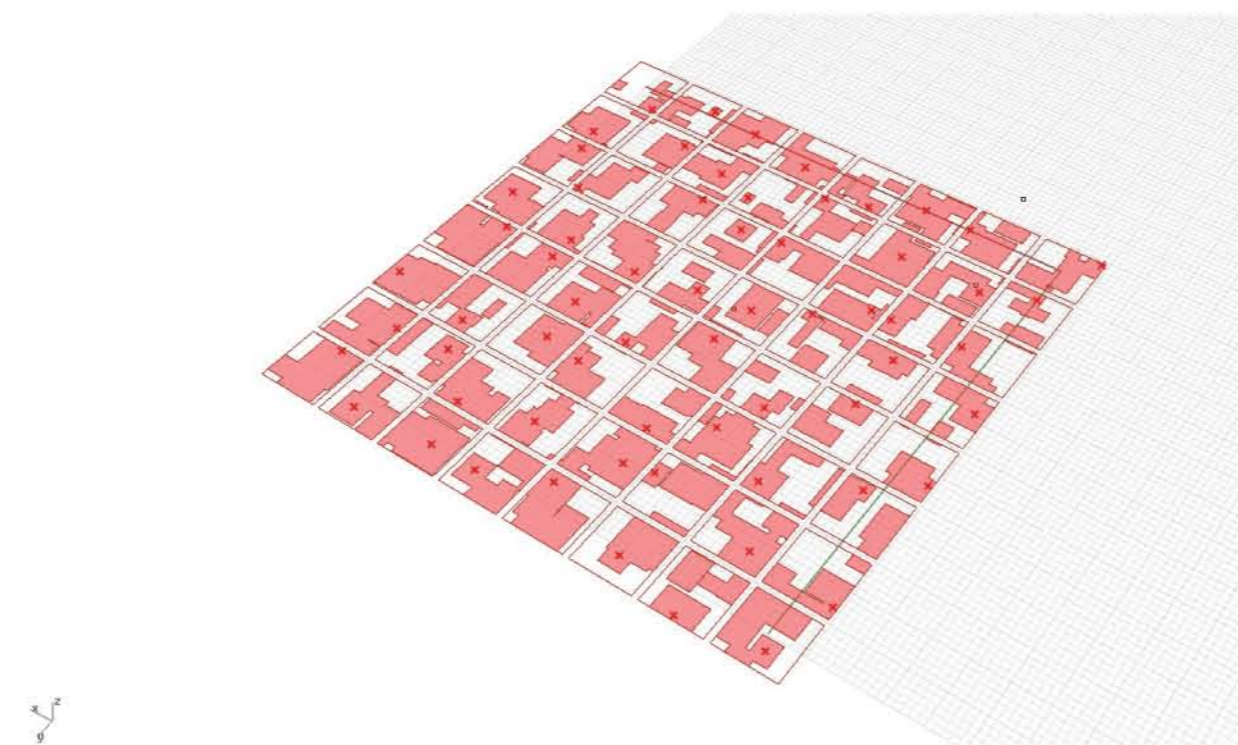
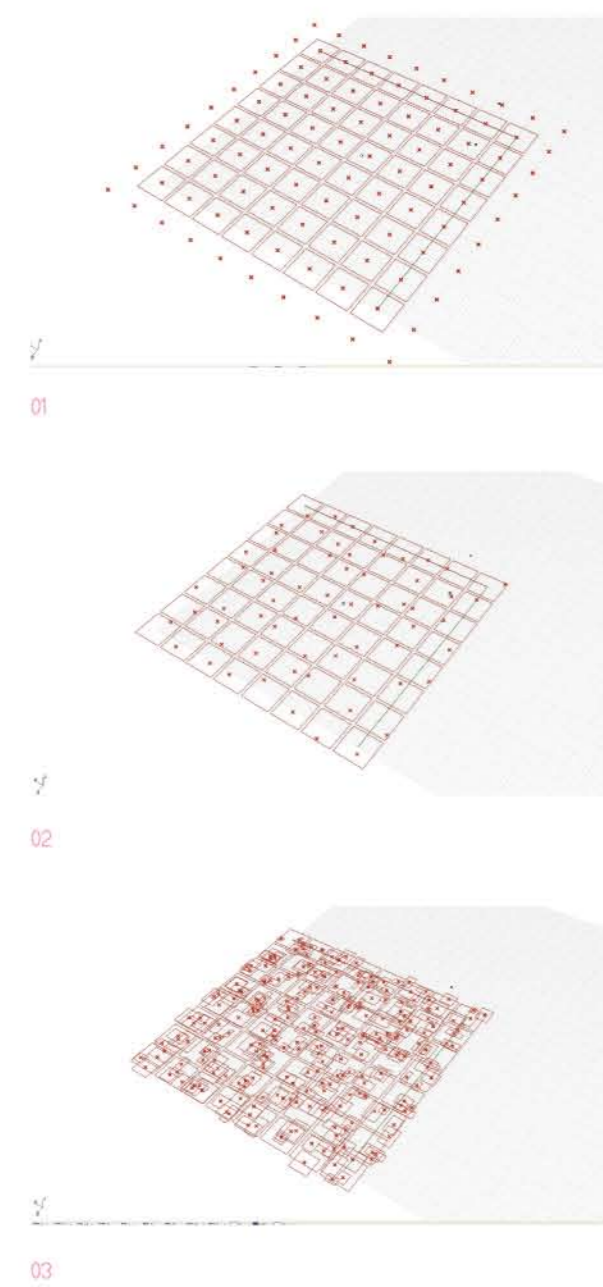
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Parametric Urbanism is an approach used in urban design to create complex hierarchies and/or relationships of compiled data into design solutions that exhibit highly differentiated patterns of an urban fabric based on the parameters (the mathematical data) plugged into the definition.

A few examples of parametric urbanism can be demonstrated by, but not limited to, massing, programming, and density models. These three characteristics of urban design are dependant upon one another. This is the basis of parametric modeling to create an associative model that can create an endless amount of solutions based on the data you enter.

These diagrams highlight an approach to control the location of a building footprint on a specific block within an urban context. This locale is designated by an attractor point.

01\_rectangular grid  
02\_attractor points moved  
03\_multiple attractor points



01

Above is the final result for the building footprints. This city grid was constructed by first setting up a rectangular grid; then by finding the "area" you find the center of each rectangle in

the grid. We then randomly moved these points four different times and constructed rectangles around them, unioning them together to create one building footprint.

01\_building footprints

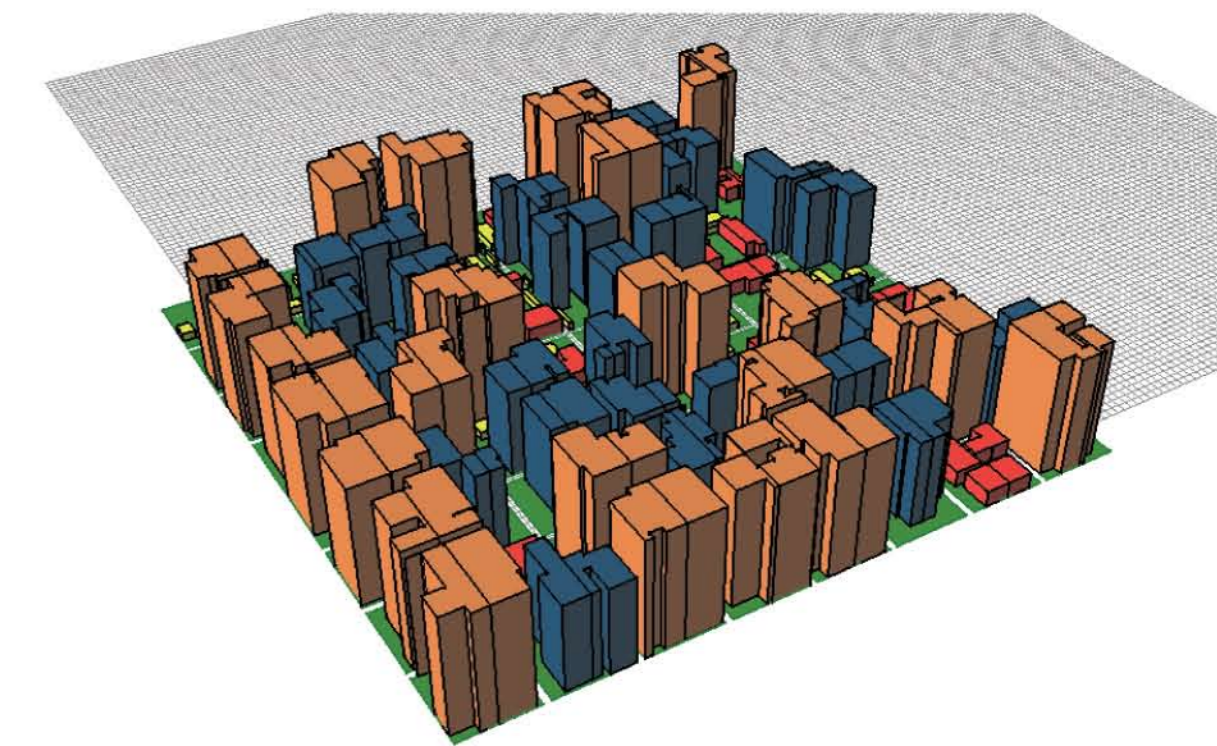


03

We then set up parameters controlling the heights of the buildings within our city grid based on the area of the building footprints. We set up four different ranges of areas that determine

the designated heights of the buildings. Above you can see they yellow buildings are 1 story high, the red buildings are 2 stories, and the blue buildings are 15 stories all based on area

01\_building area < 15 = 1 story  
02\_13-building area < 35 = 2 stories  
03\_35-building area < 45 = 11 stories

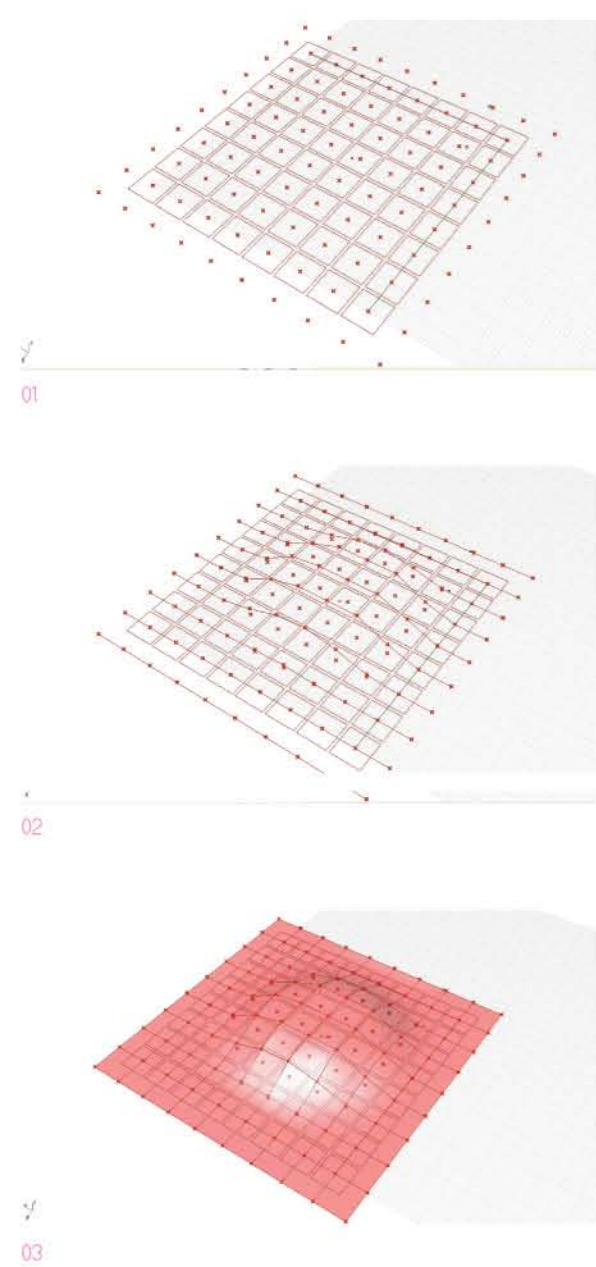


01

Here is the final urban fabric we created with the four different building heights:

yellow buildings - 1 story  
red buildings - 2 stories  
blue buildings - 11 stories  
orange buildings - 15 stories

01\_building extrusion



01

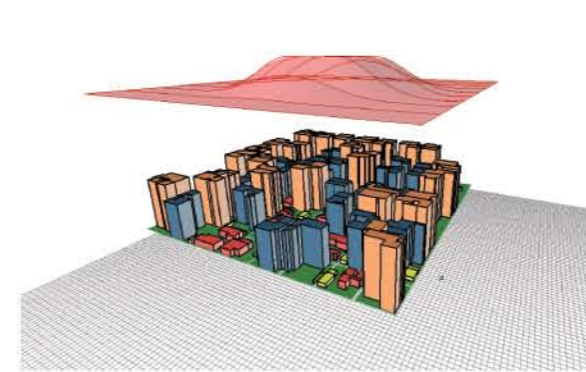
02

03

We used a surface to control the heights of the overall profile of the urban fabric. Controlled by an attractor point, once again, we were able to create a surface by lofting the curves

after the curves changed in amplitude to create a curved surface which was then used to set another height control for the urban grid, by trimming the buildings for the end result.

01\_rectangular grid  
02\_lines for surface  
03\_lofted surface for height control

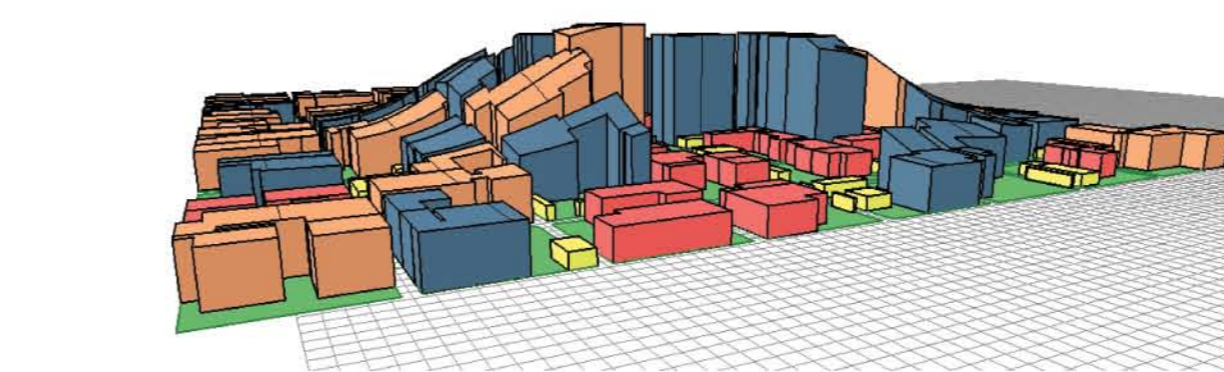


01

02

Above is the surface constructed to control the heights of the buildings of the urban fabric.

01\_height control surface  
02\_surface used as height control

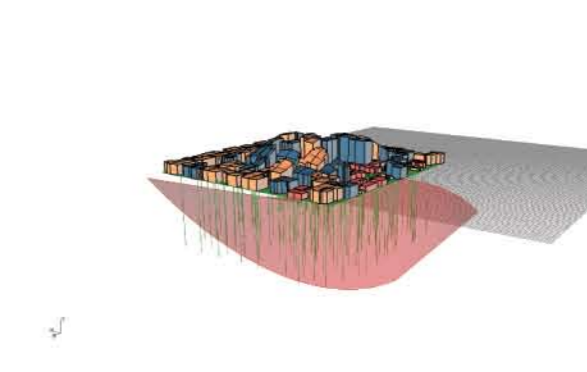


01

02

Here is the final urban fabric we created with the four different building heights then controlled by the surface we created.

01\_final urban fabric profile  
02\_final urban fabric



01

02

03

We then wanted to put the city on a more realistic topography, therefore we constructed lines from the bottom of the buildings to the surface representing the topography to measure

01\_lines to move down  
02\_projected footprints  
03\_city on lofted surface  
04\_city on lofted surface  
05\_city on lofted surface



04

05

and moved the building down in the Z direction to sit on the designated topographic surface.