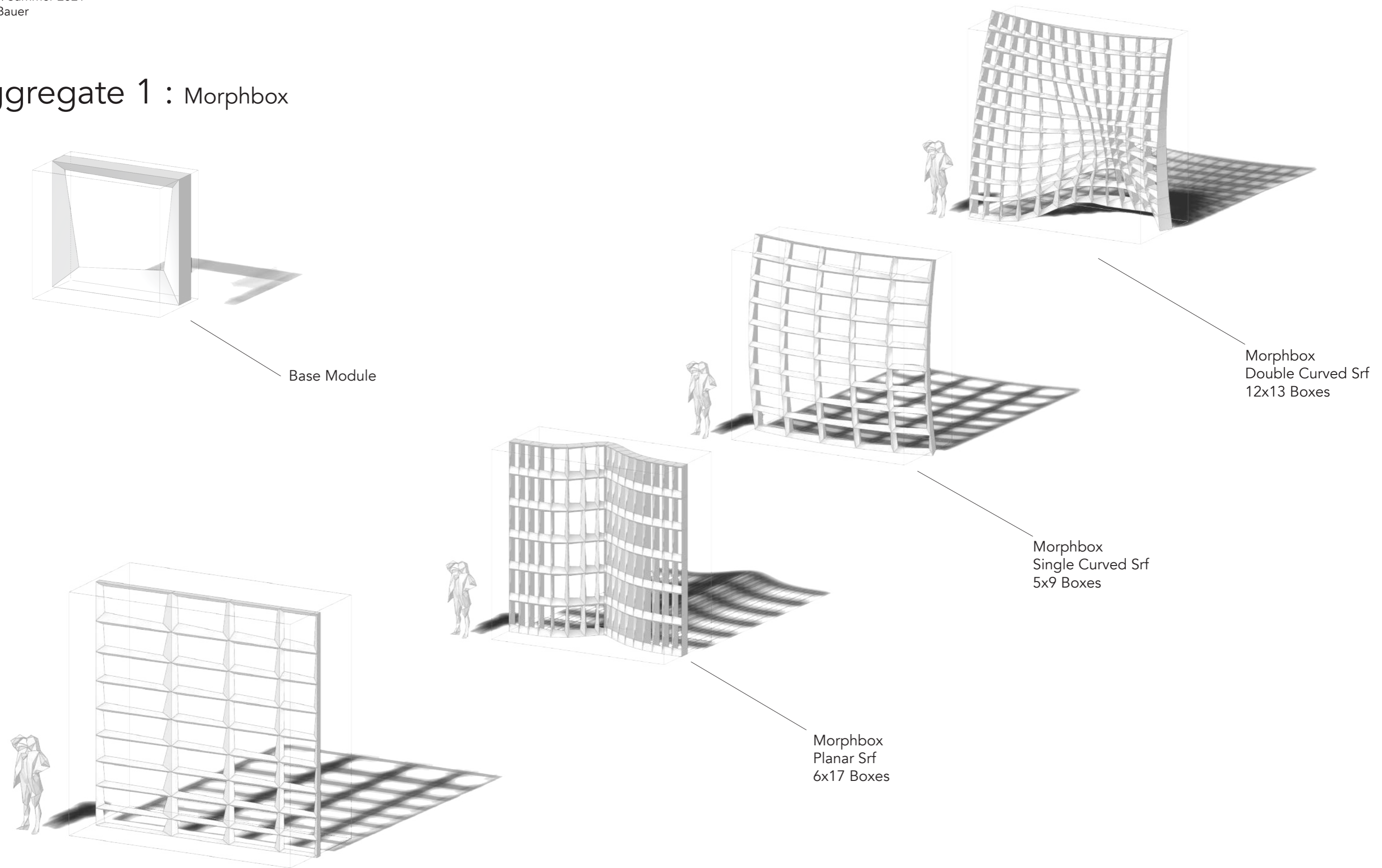


Aggregate 1 : Morphobox

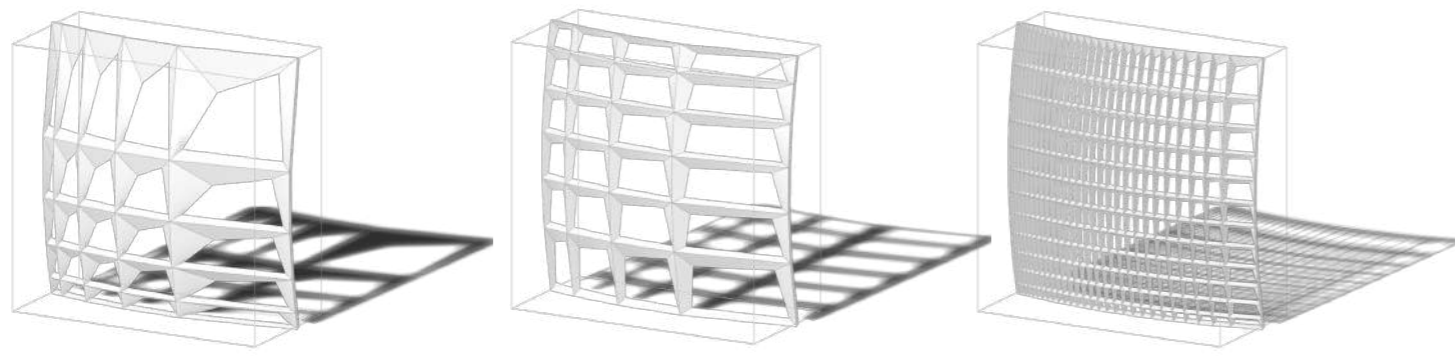


Base Module

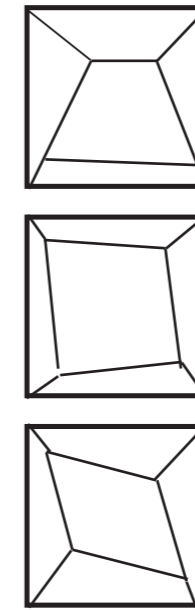
Morphobox
Double Curved Srf
12x13 Boxes

Morphobox
Single Curved Srf
5x9 Boxes

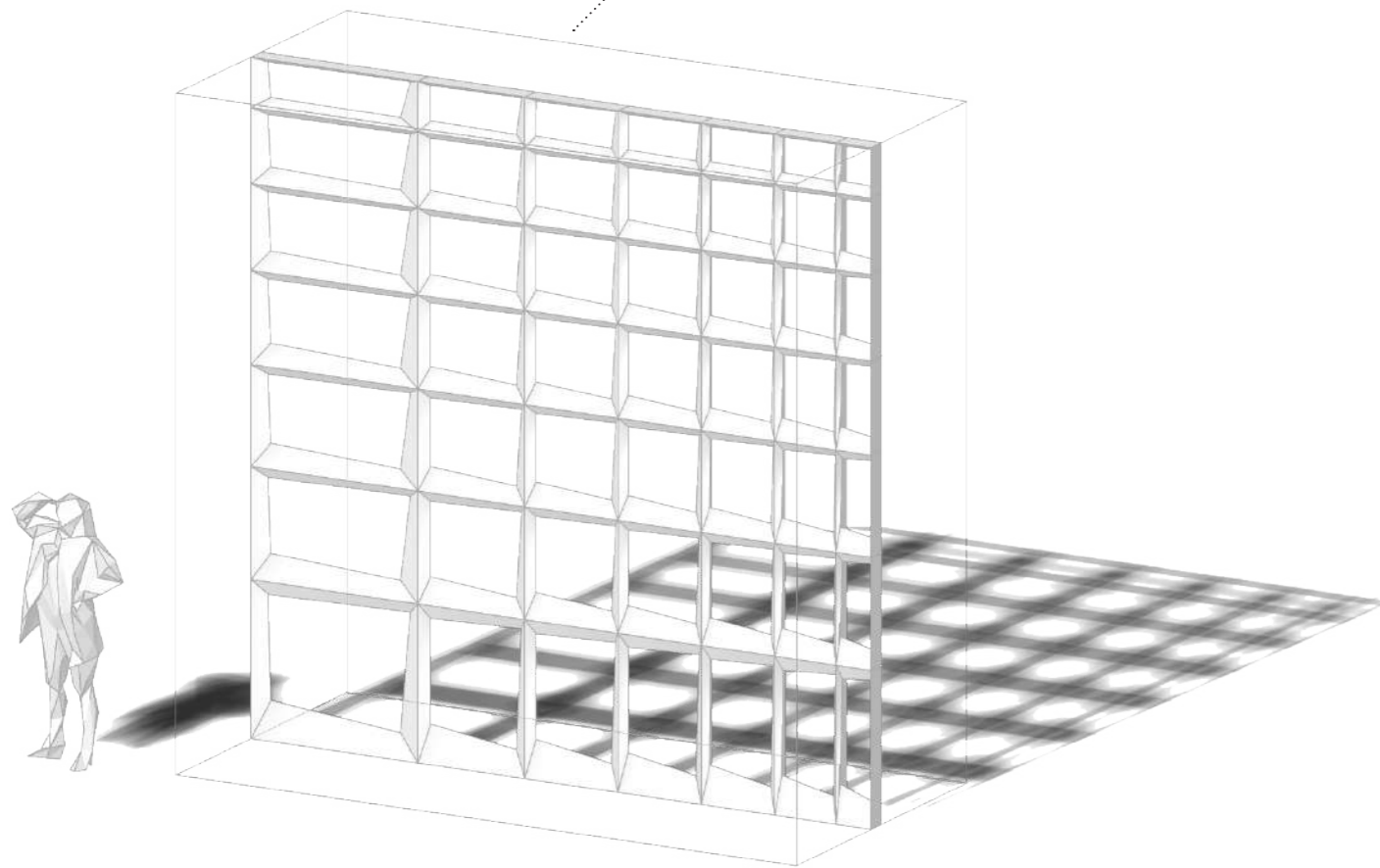
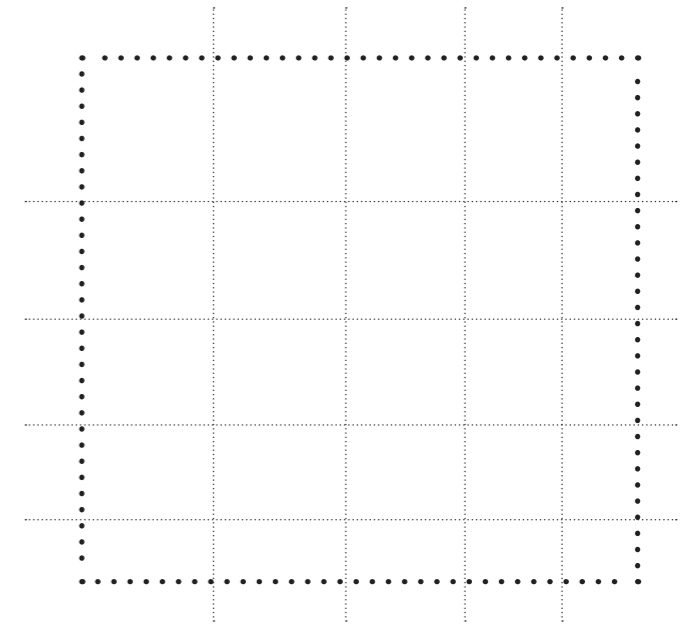
Morphobox
Planar Srf
6x17 Boxes



Varianten Parameterraum



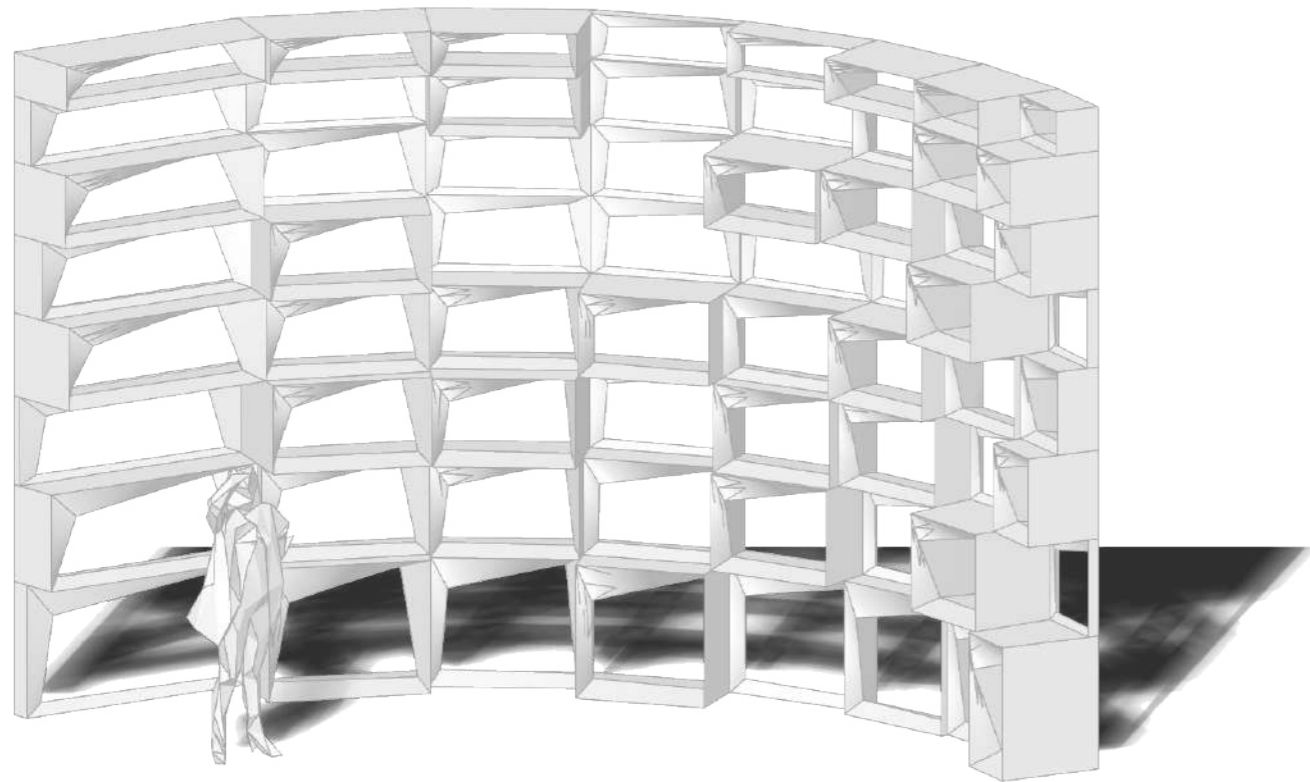
Modulvarianten



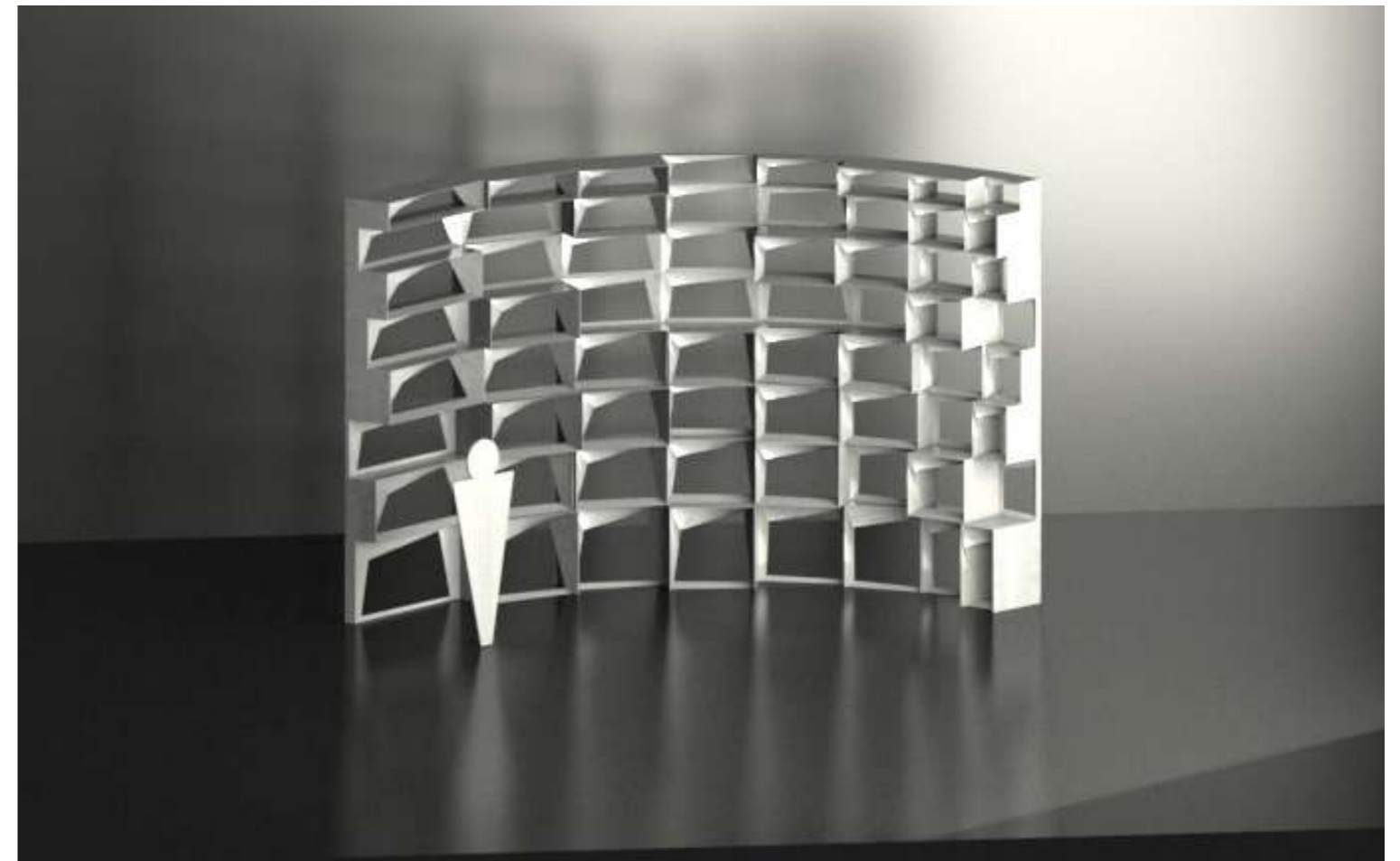
Angelehnt an des Harward Laborgebäude von Behnisch Architekten in Boston. Entschied ich mich für eine Lochfassade als Modulares Fassadenelement. Das Modul setzte sich aus einem Extrudierten Rechteck mit abgezogenen Zylindern an den Ecken zusammen. Ich schob den ganzen Körper 0.2m über die Bezugsebene. Um dem Körper mehr Spannung und Raumgefühl zu geben zog ich 2 Seiten des Volumens wieder zurück auf die Bezugsebene. Als Referenz für die Fassade und zum Beginn meiner Parametrisierung erstellte ich eine neue Fläche. Ich verknüpfte die Grasshopper Surface mit der Fläche und hängte eine Divided Domain um den Befehl zu erteilen 2 Domäne auf dem gleichen Segment zu platzieren. Um den gedachten Boxen auf der Fläche eine Höhe

zu geben erstellte ich eine Surface Box. Eine Varianz der Anzahl und Abmessung der Fassadenelemente ermöglichte ich durch einem Number Slider an der Divided Domain und der Surface Box. Das gezeichnete Fassadenelement wurde in Grasshopper als Brep angelegt und mit einer Bounding Box verknüpft. Die Bounding Box wird als Referenz genutzt um das Element auf den Referenz Boxen der Fläche zu platzieren. Um den Befehl auszuführen das Fassadenelement auf die Fläche zu legen verknüpfte ich eine Box Morph. Ich gestaltetet eine Varianz an Fassadenooptionen indem ich mein Ausgangsmodul durch Subtrahieren modellierte und die Box Morph in ihrer Anzahl veränderte.

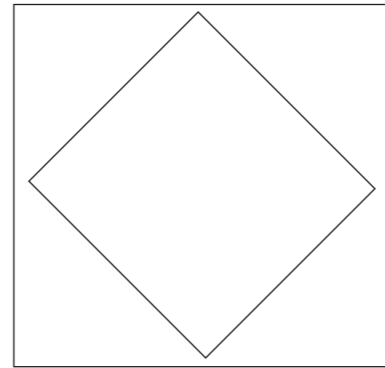
Aggregate 1 : Morphobox + Graphmapper (Selbstversuch)



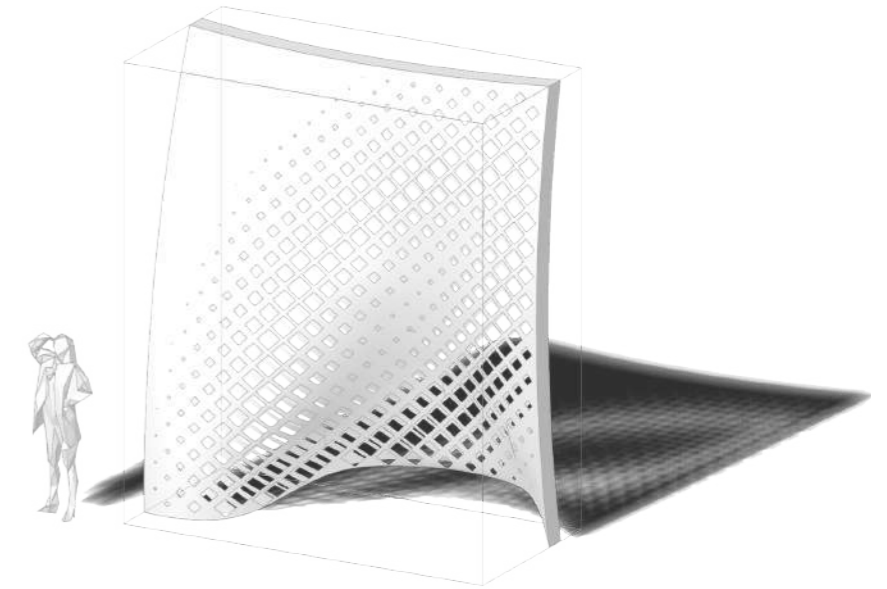
Single Curve Surface
Random Extrusions
Graph Mapper



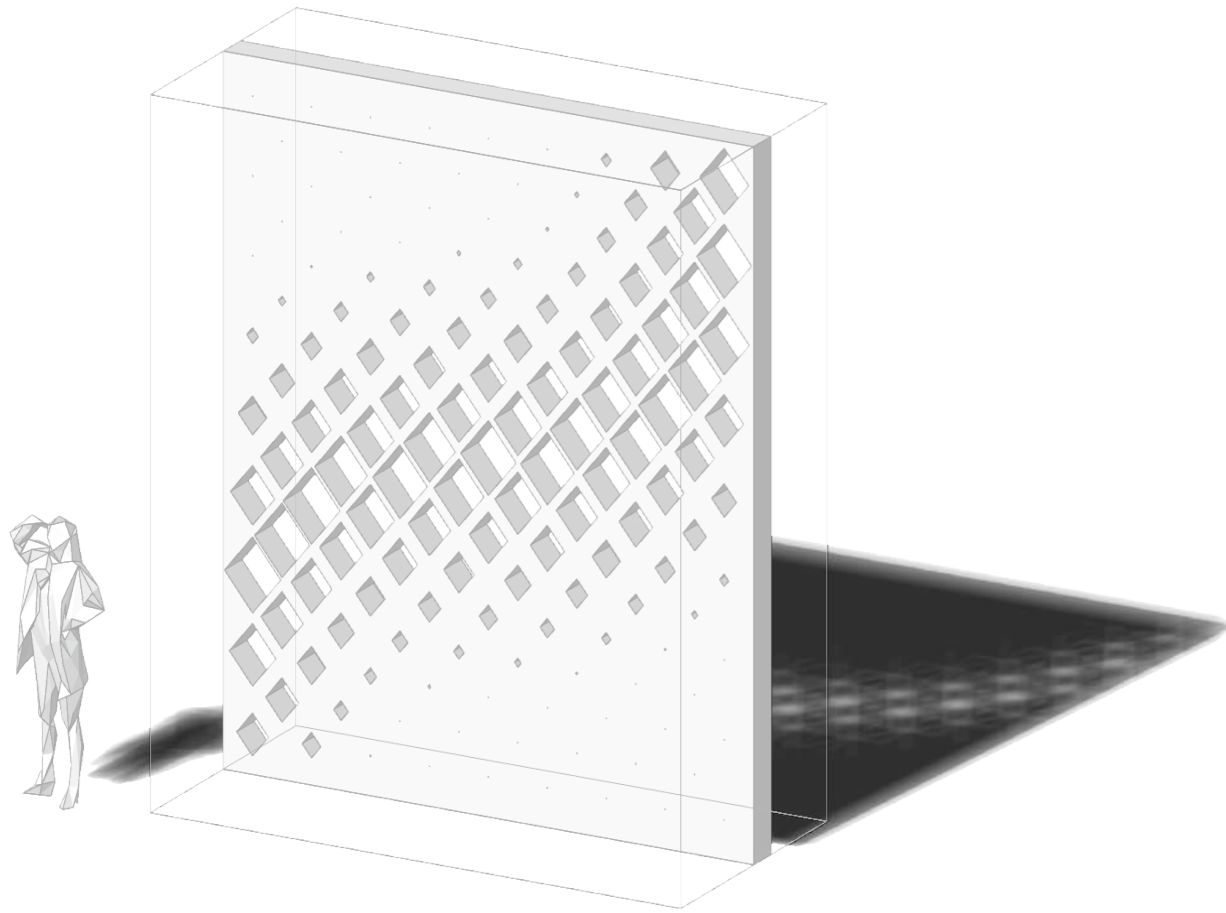
Aggregate 2: Attractor



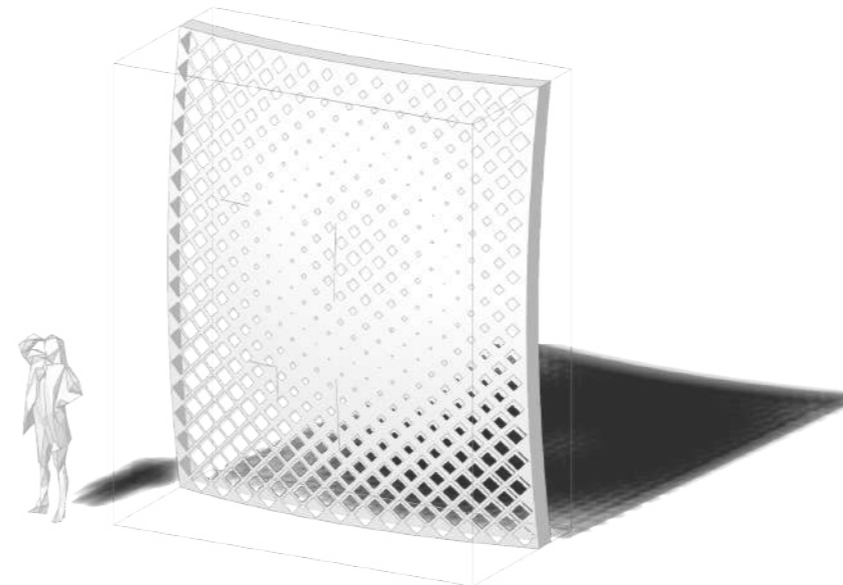
Modul Pattern



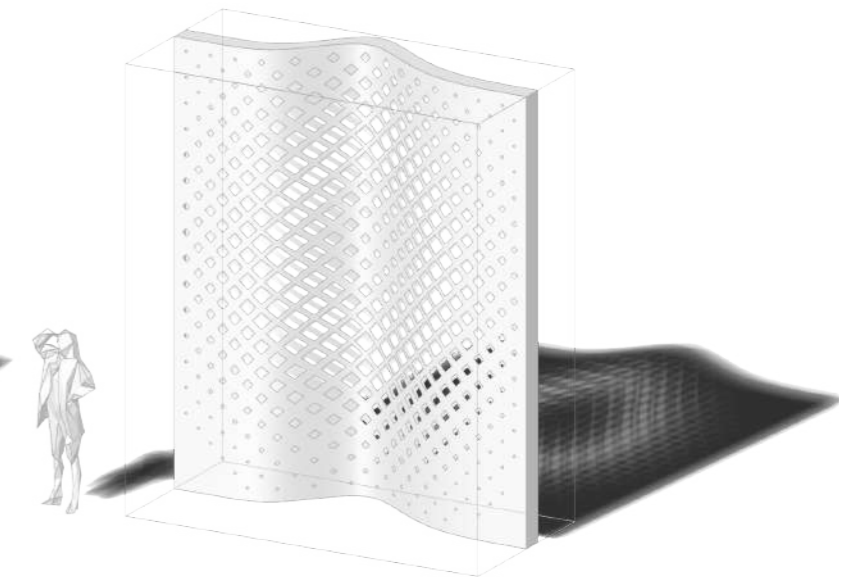
Double Curve
Curve Attractor Oval
(big on Curve)



Planar Surface
Curve Attractor Spline
(Big on Curve)

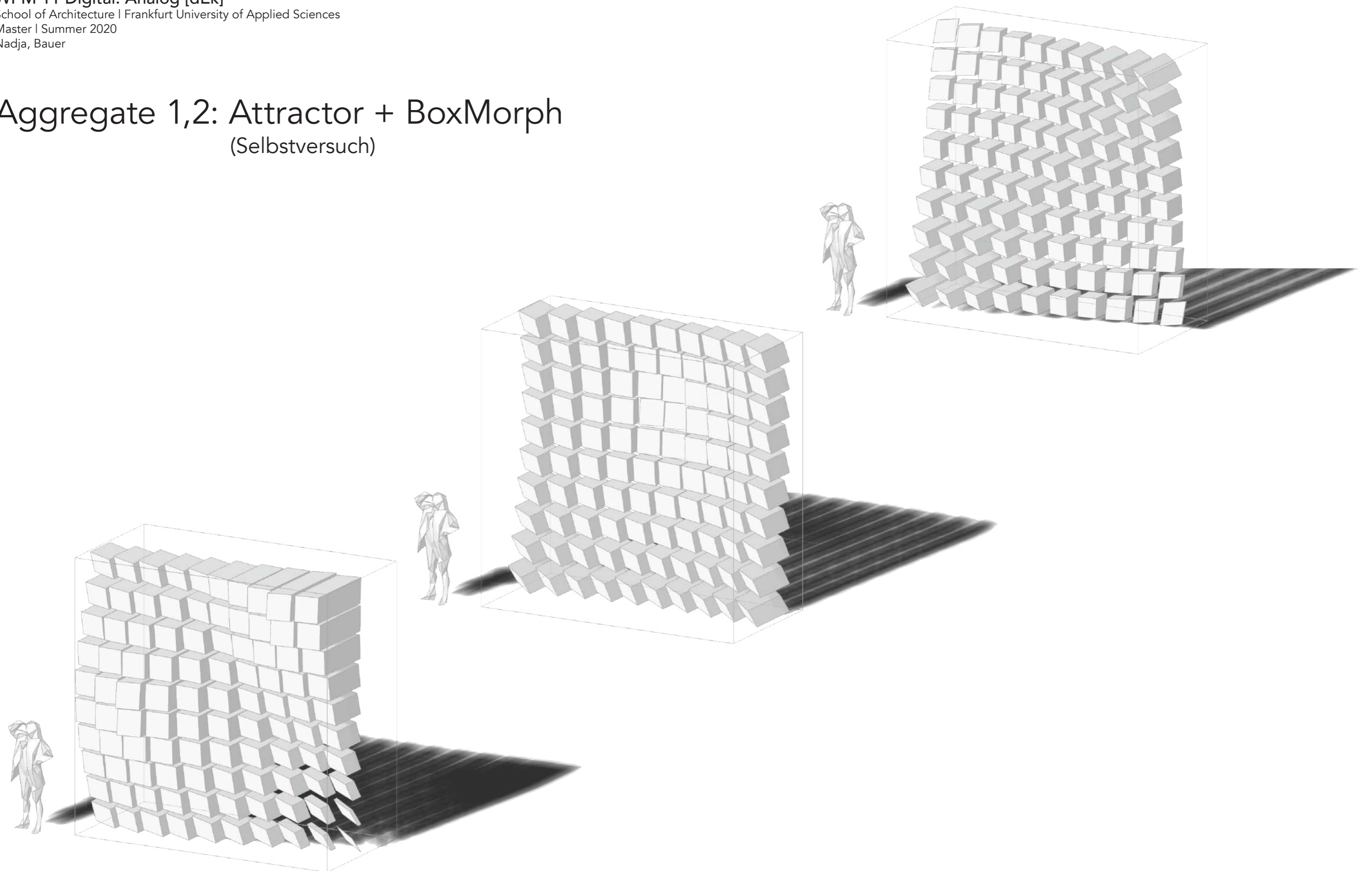


Single Curve
Curve Attractor Circle
(small on Curve)

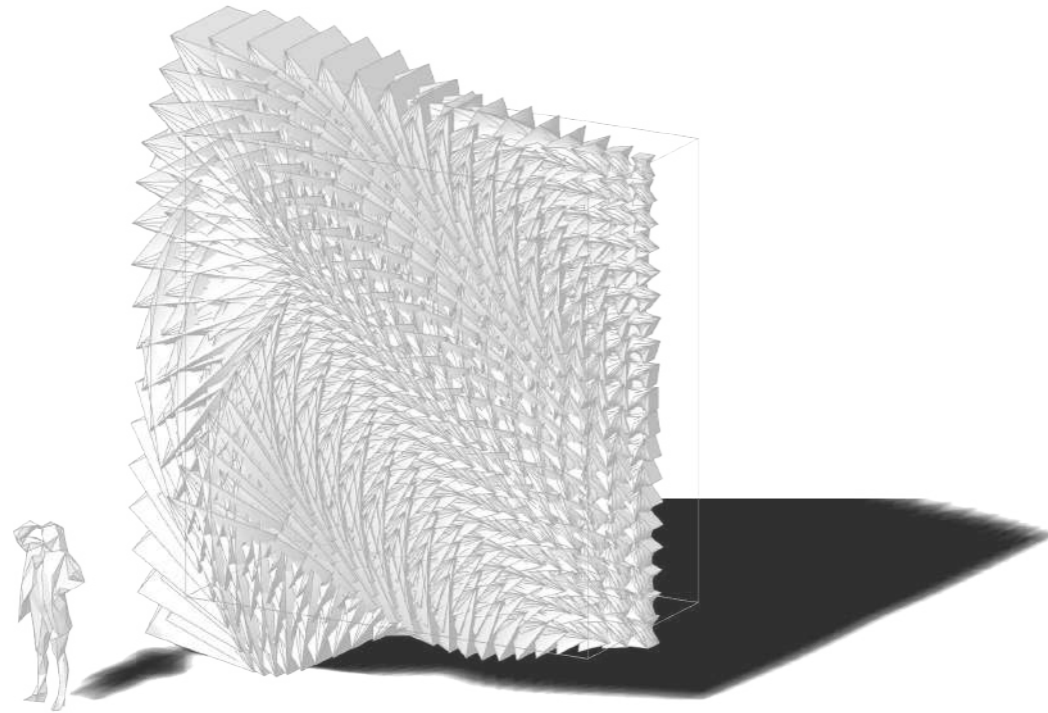


Single Curve
Curve Attractor Circle
(big on Curve)

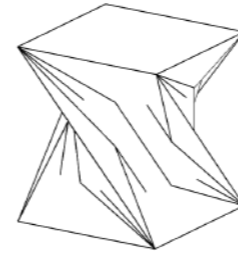
Aggregate 1,2: Attractor + BoxMorph (Selbstversuch)



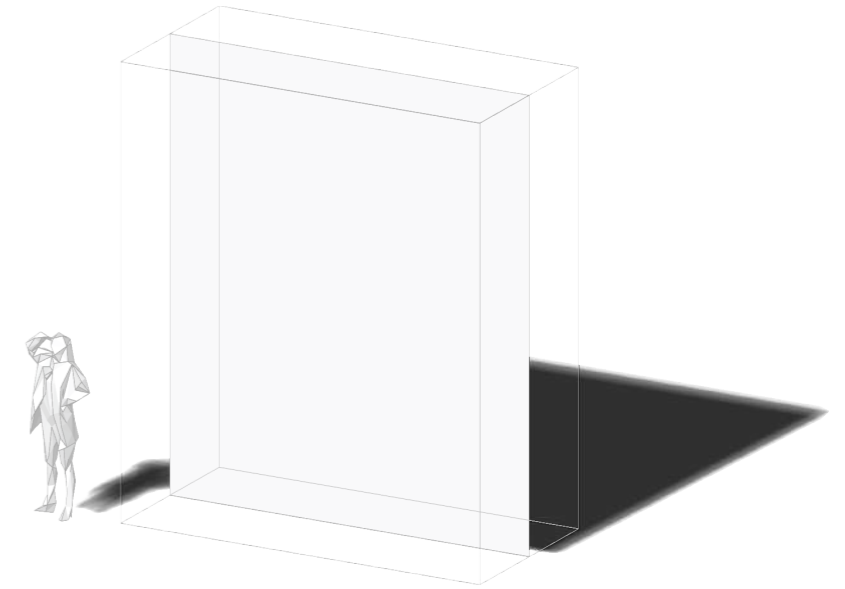
Aggregate 3: Vector 2Point



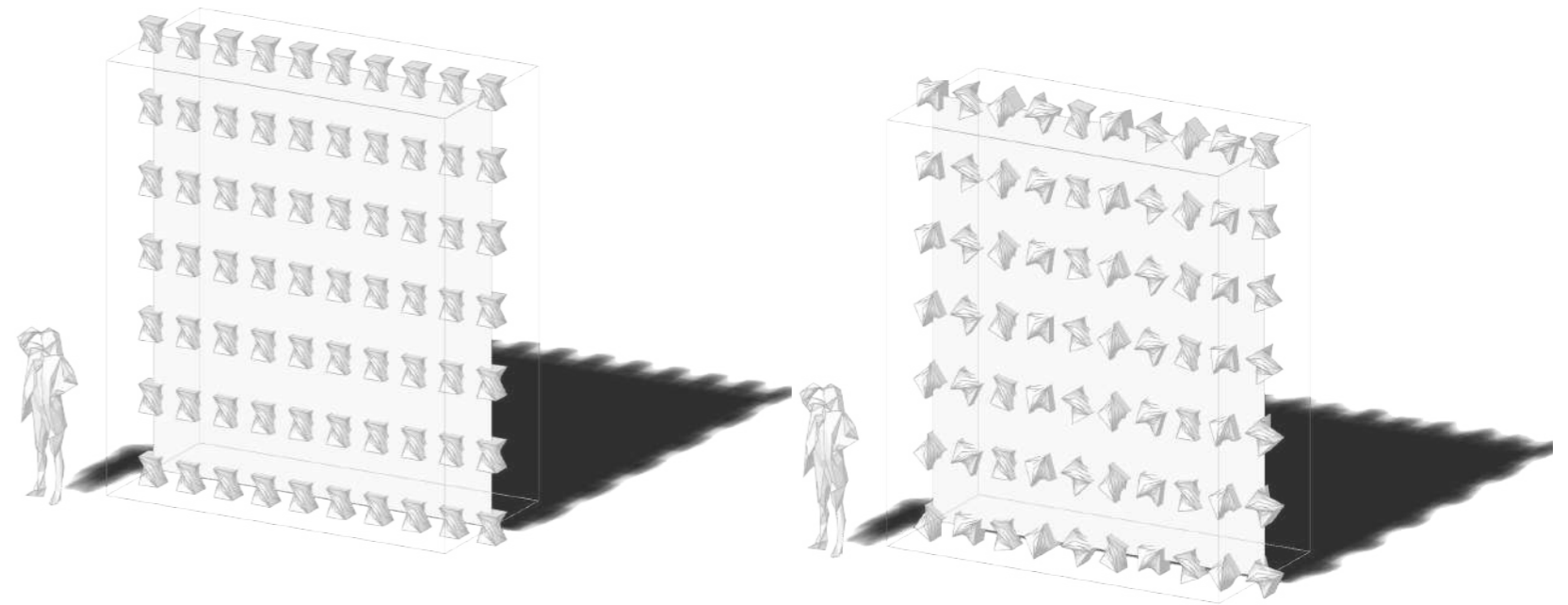
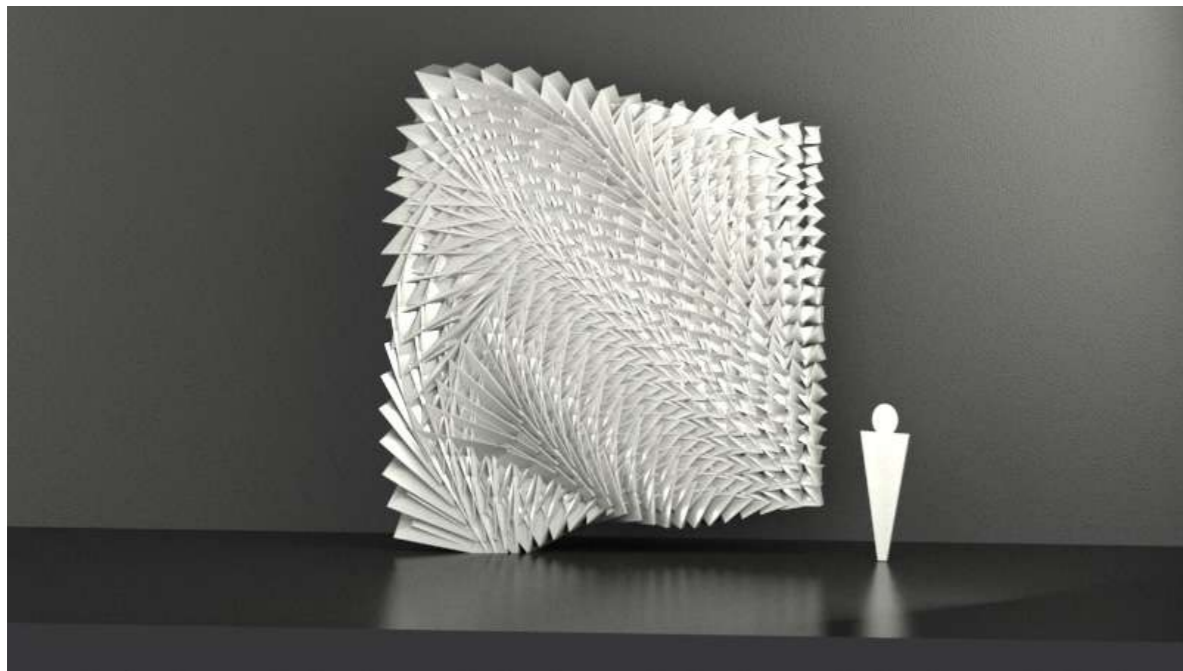
Scale Module



Modul Pattern

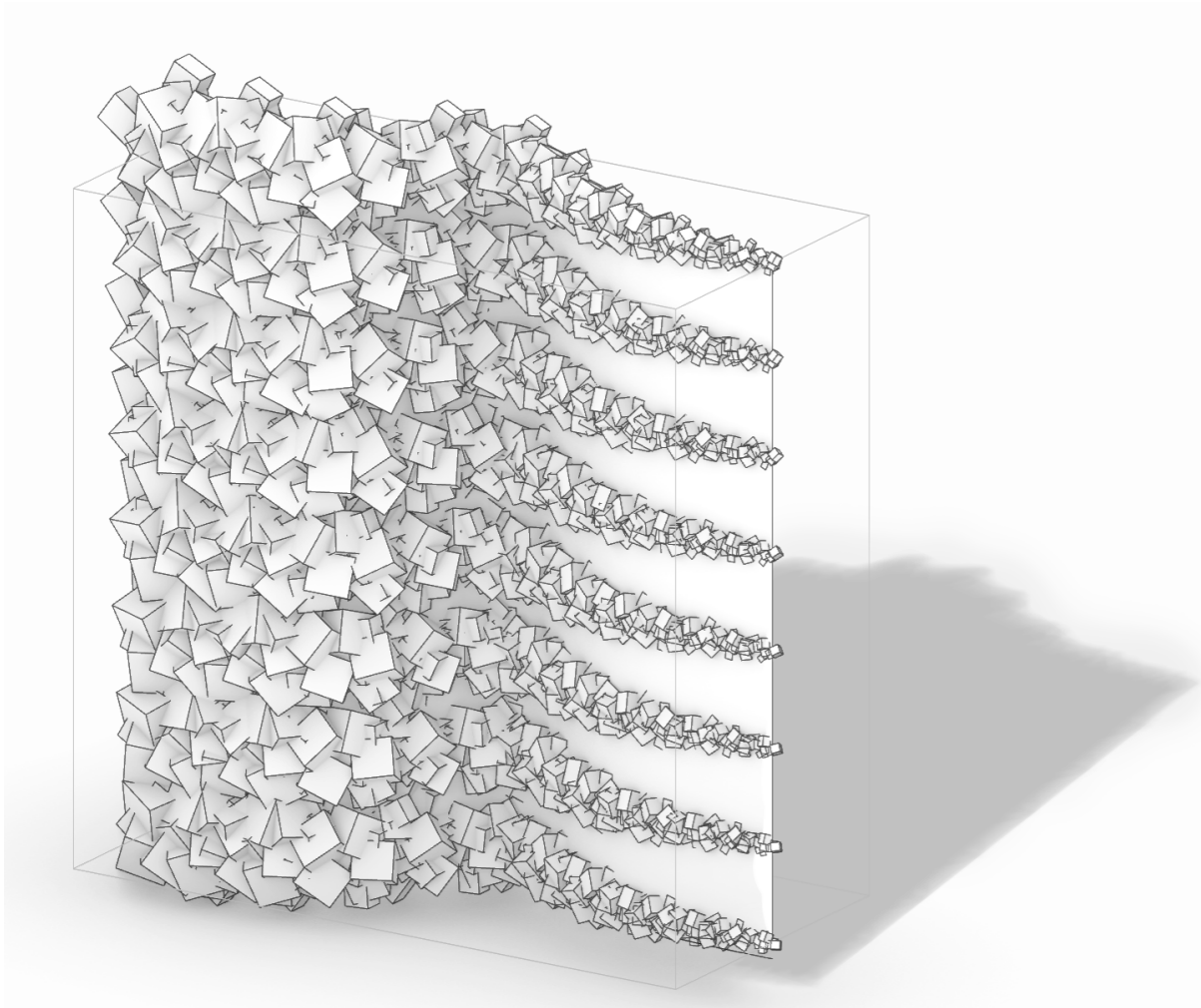
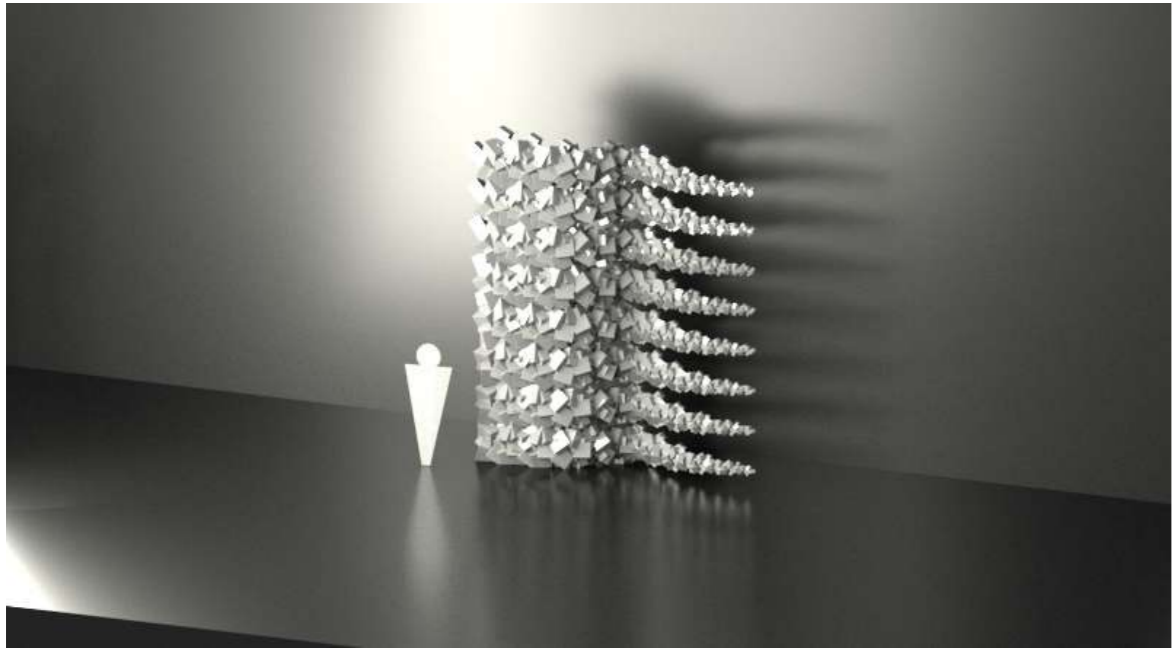


Base Surface

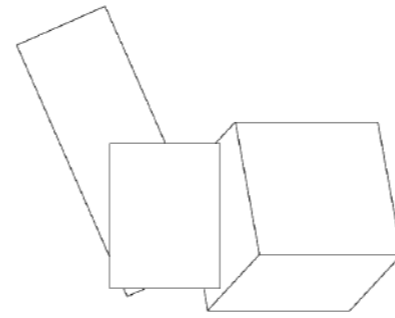


Moduled mapped on Grid

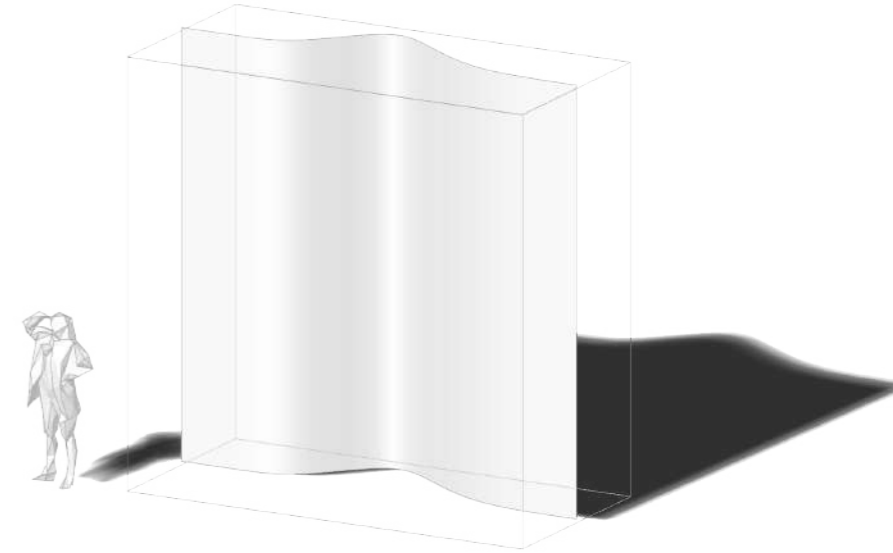
Rotate Modul



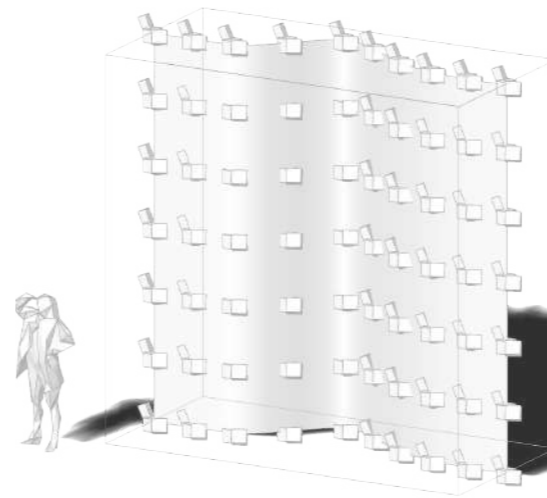
Base Surface



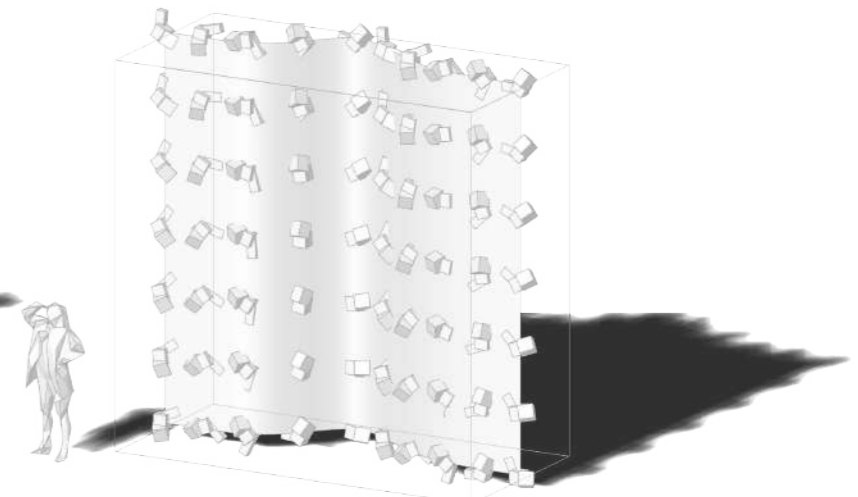
Modul



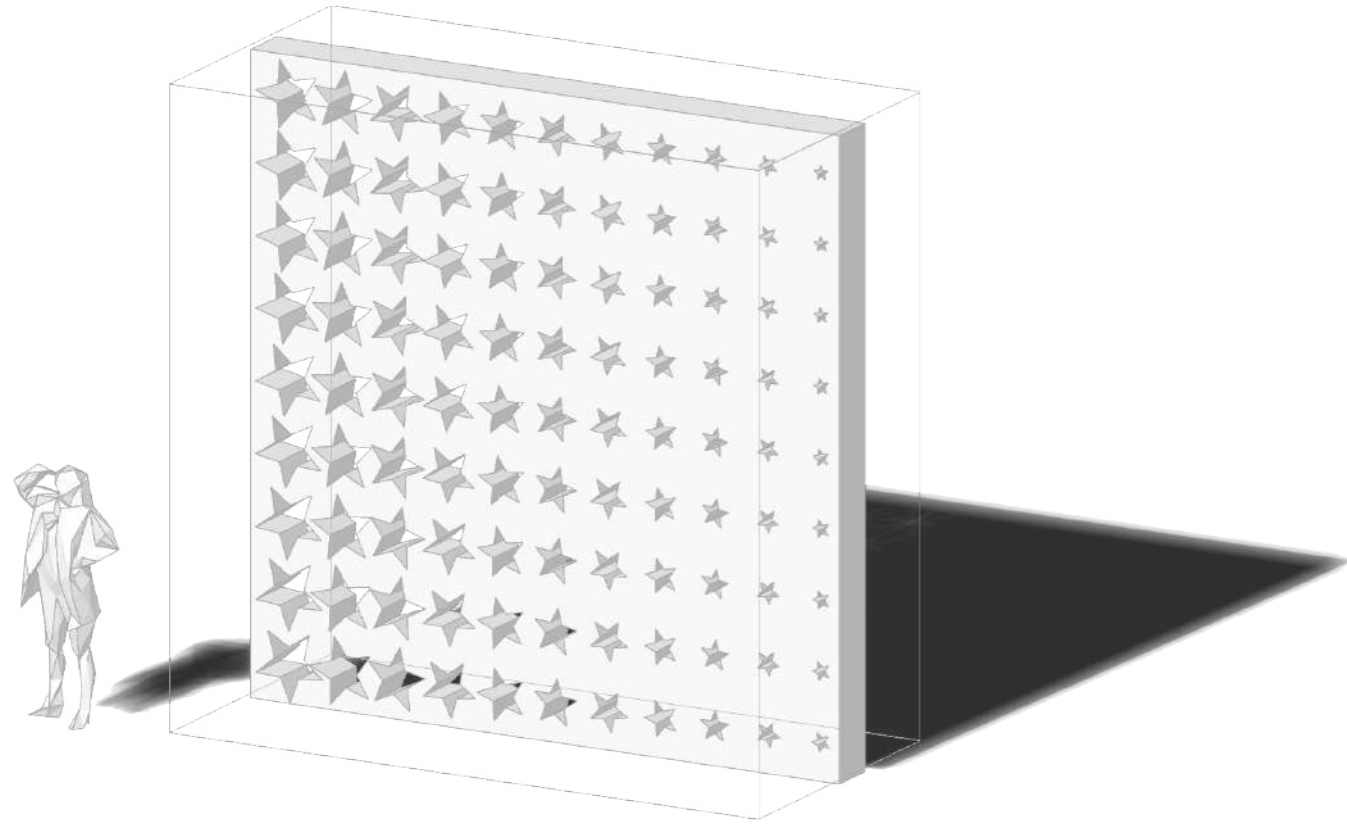
Base Surface



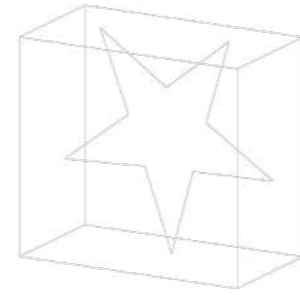
Moduled mapped on Grid



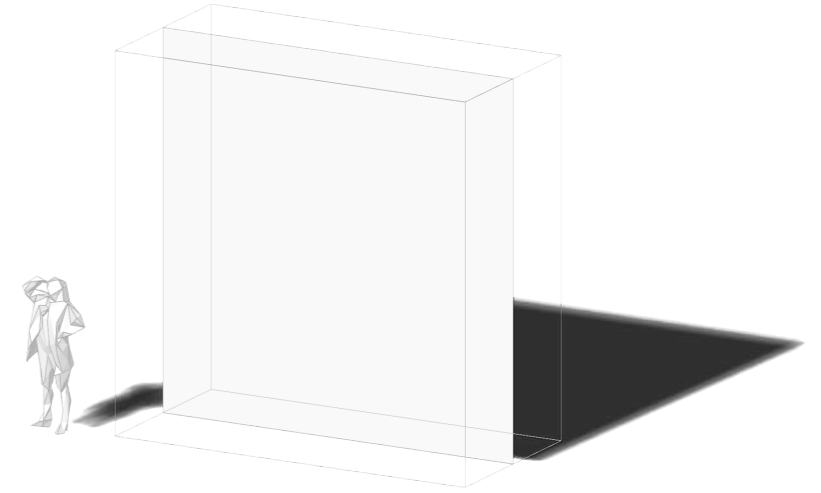
Rotate Modul



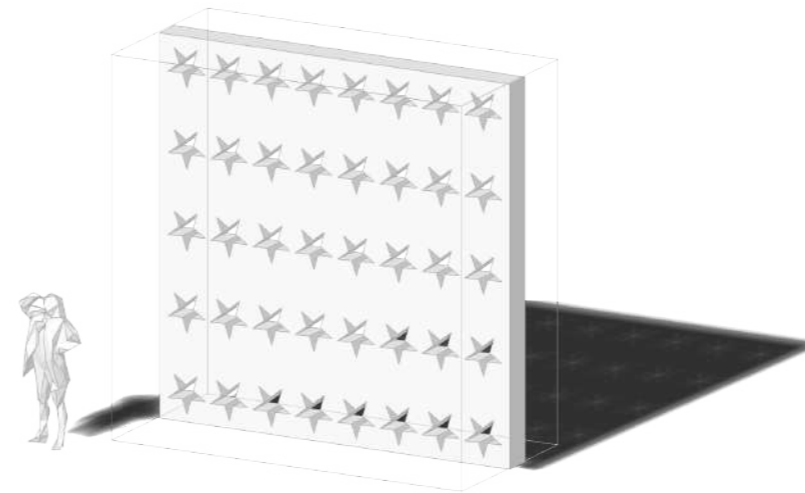
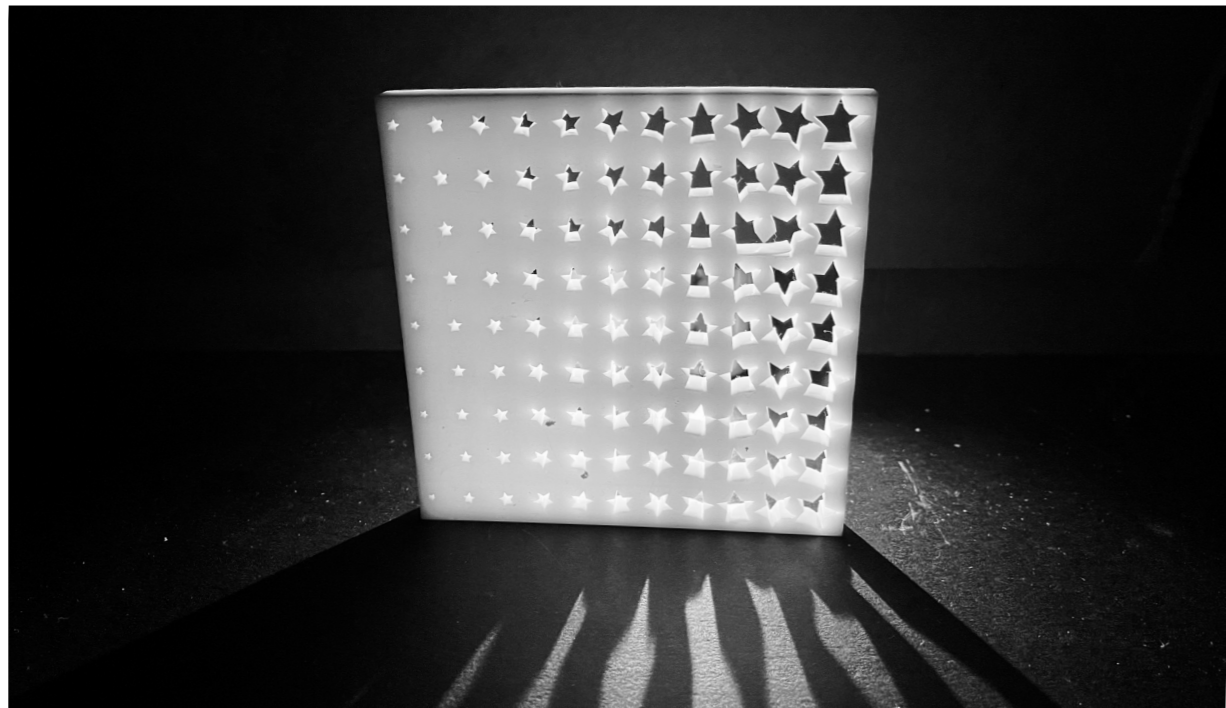
Rotate Modul



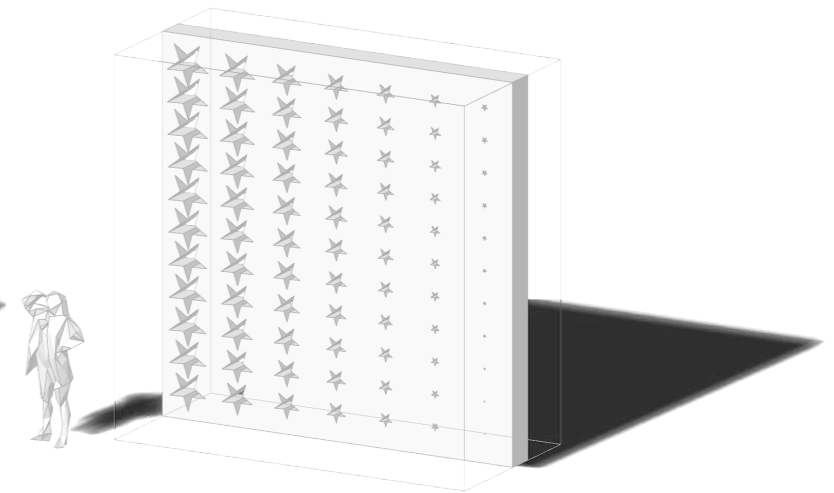
Modul



Base Surface

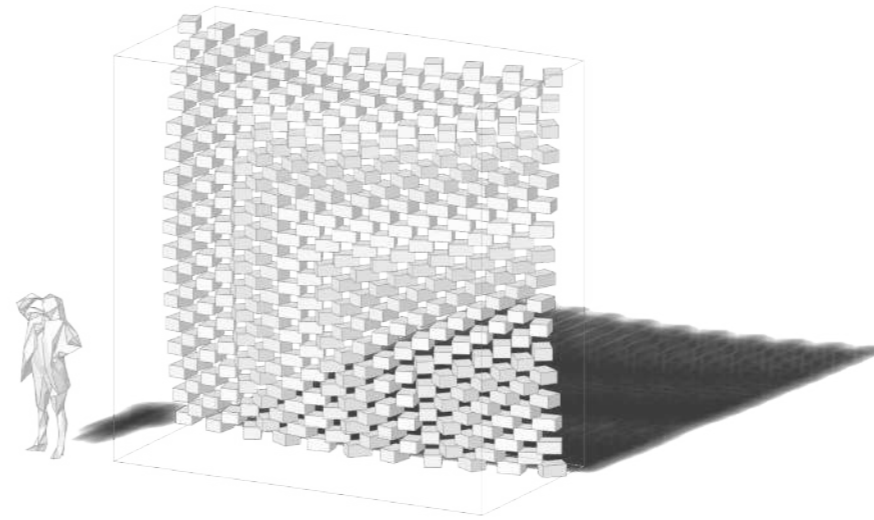
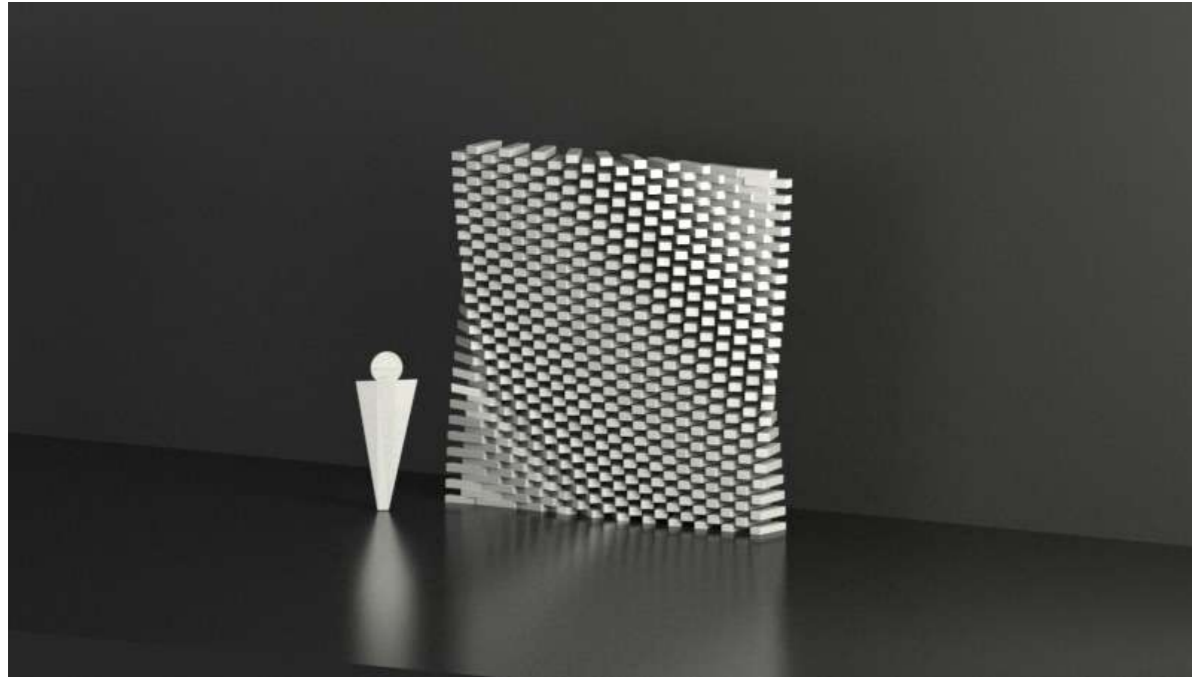


Moduled mapped on Grid

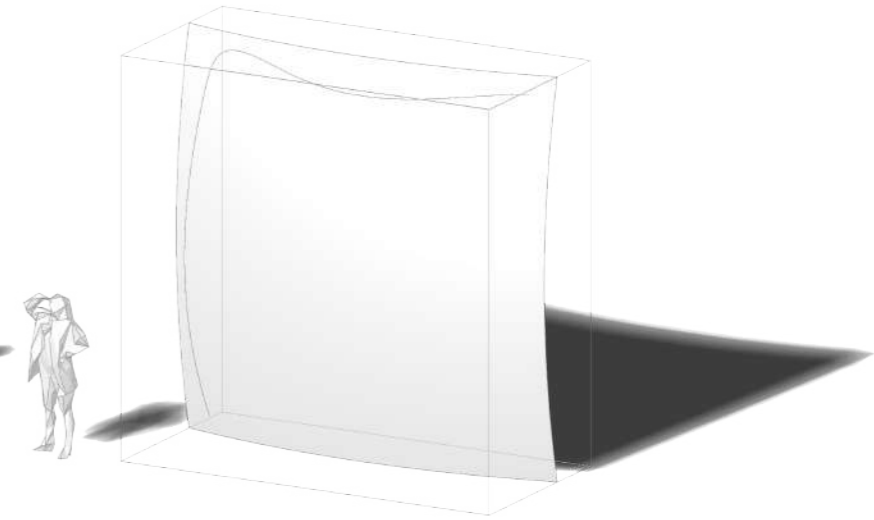


Scale Module

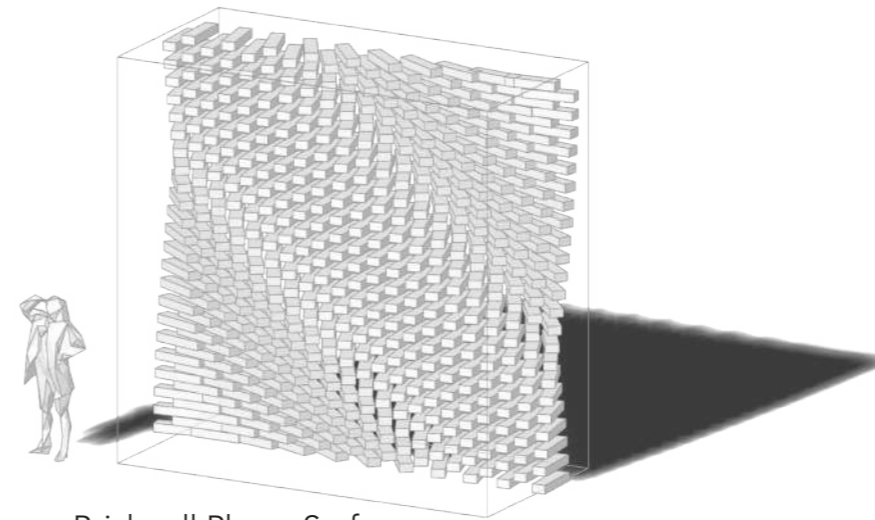
Aggregate 4 : Brickwall



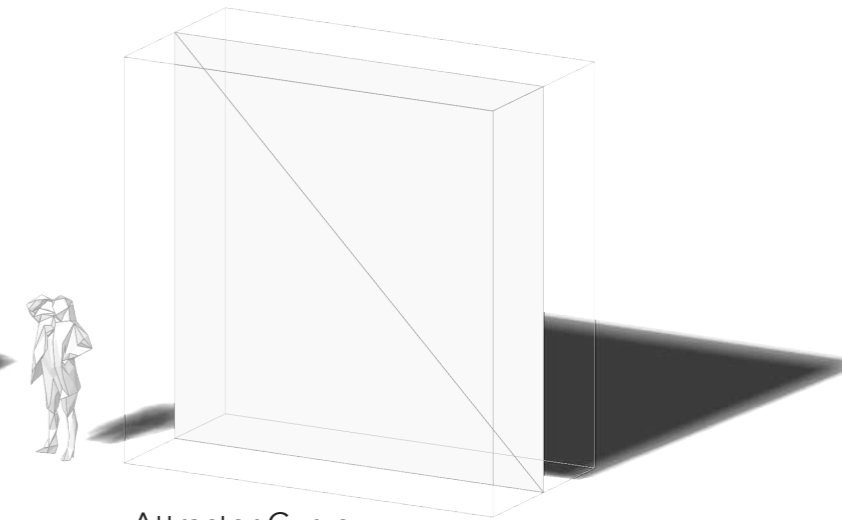
Brickwall Singel Curve



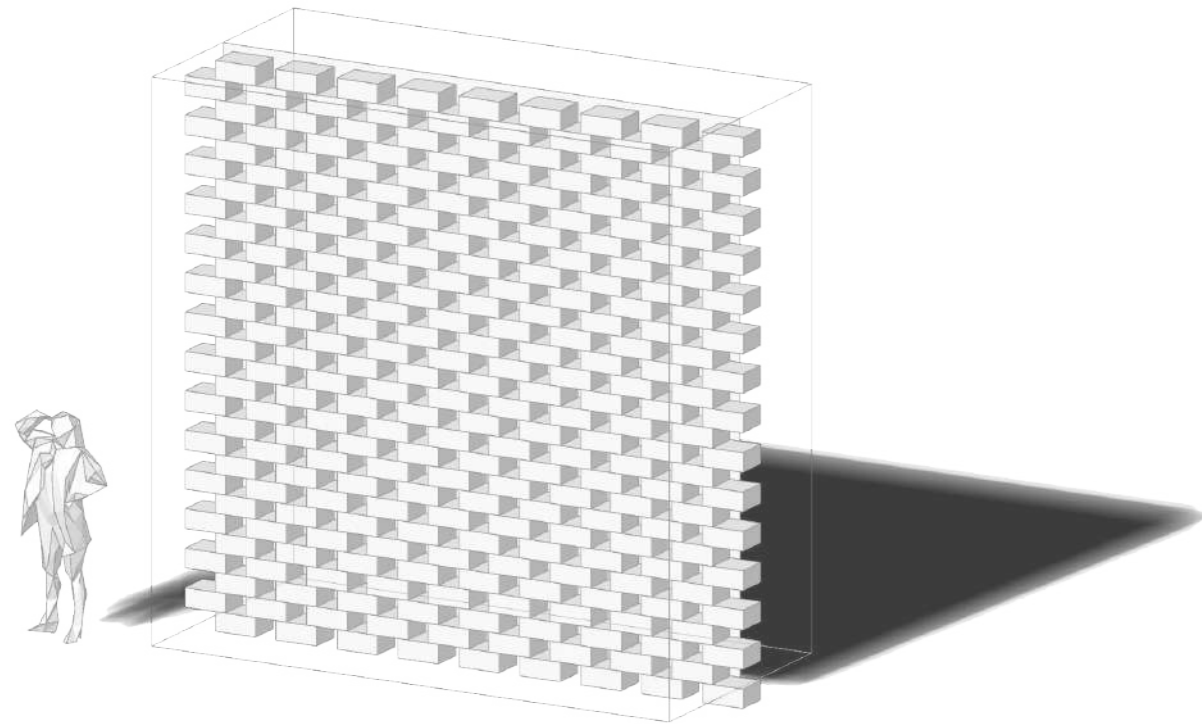
Attractor Spline



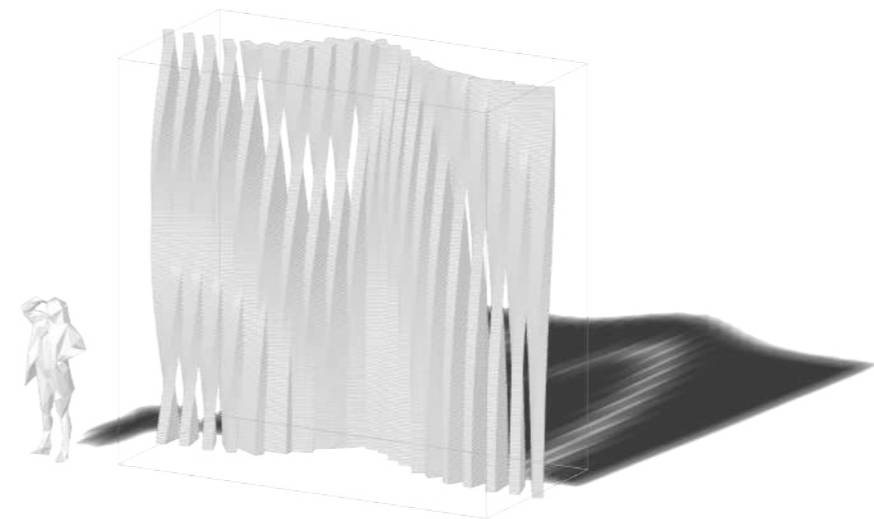
Brickwall Planar Surface



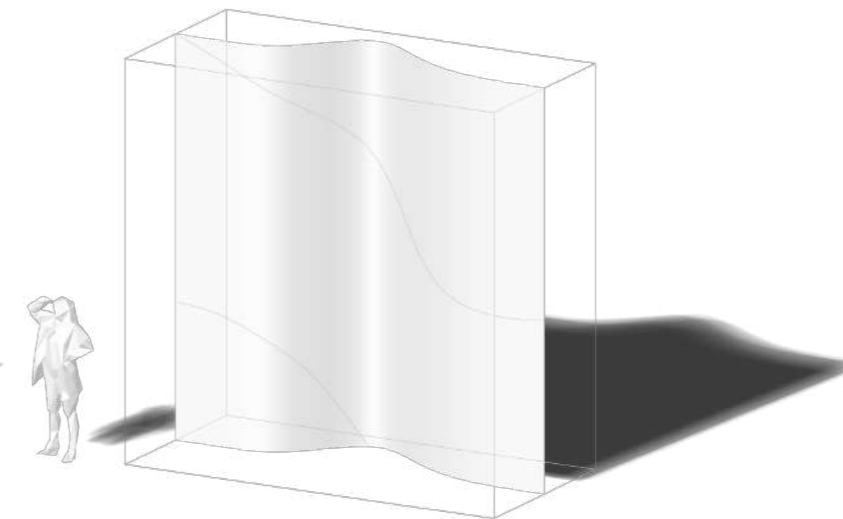
Attractor Curve



Mapped Brickwall

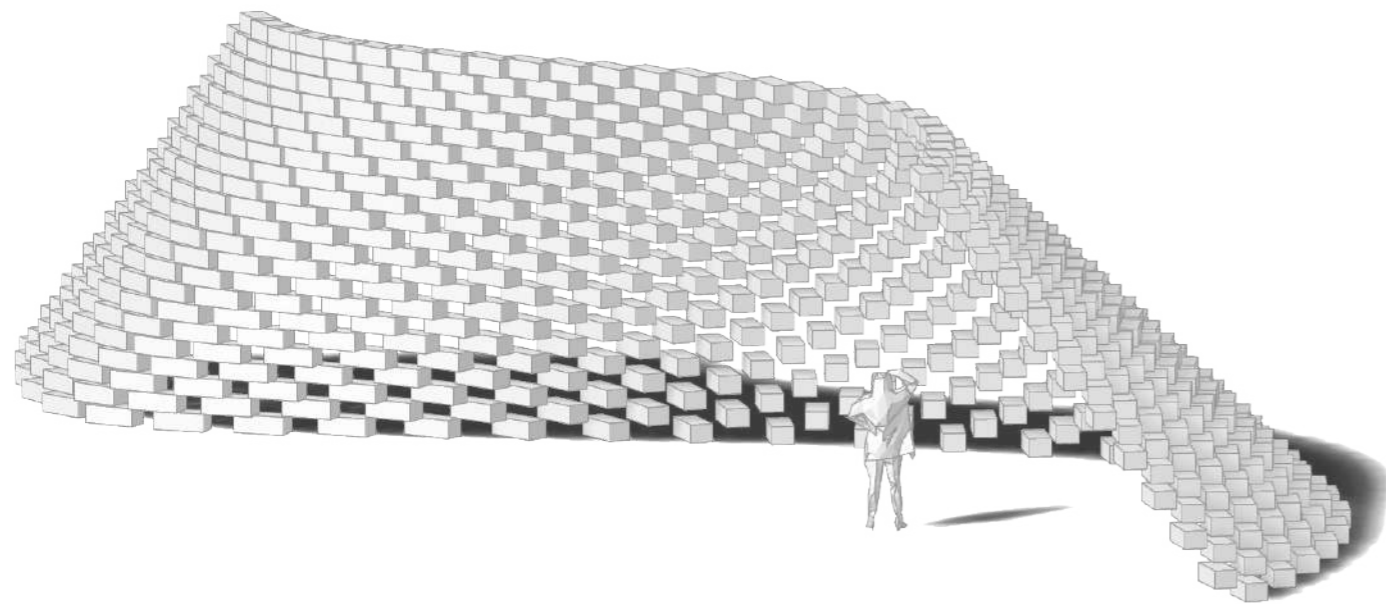


Brickwall Double Curve

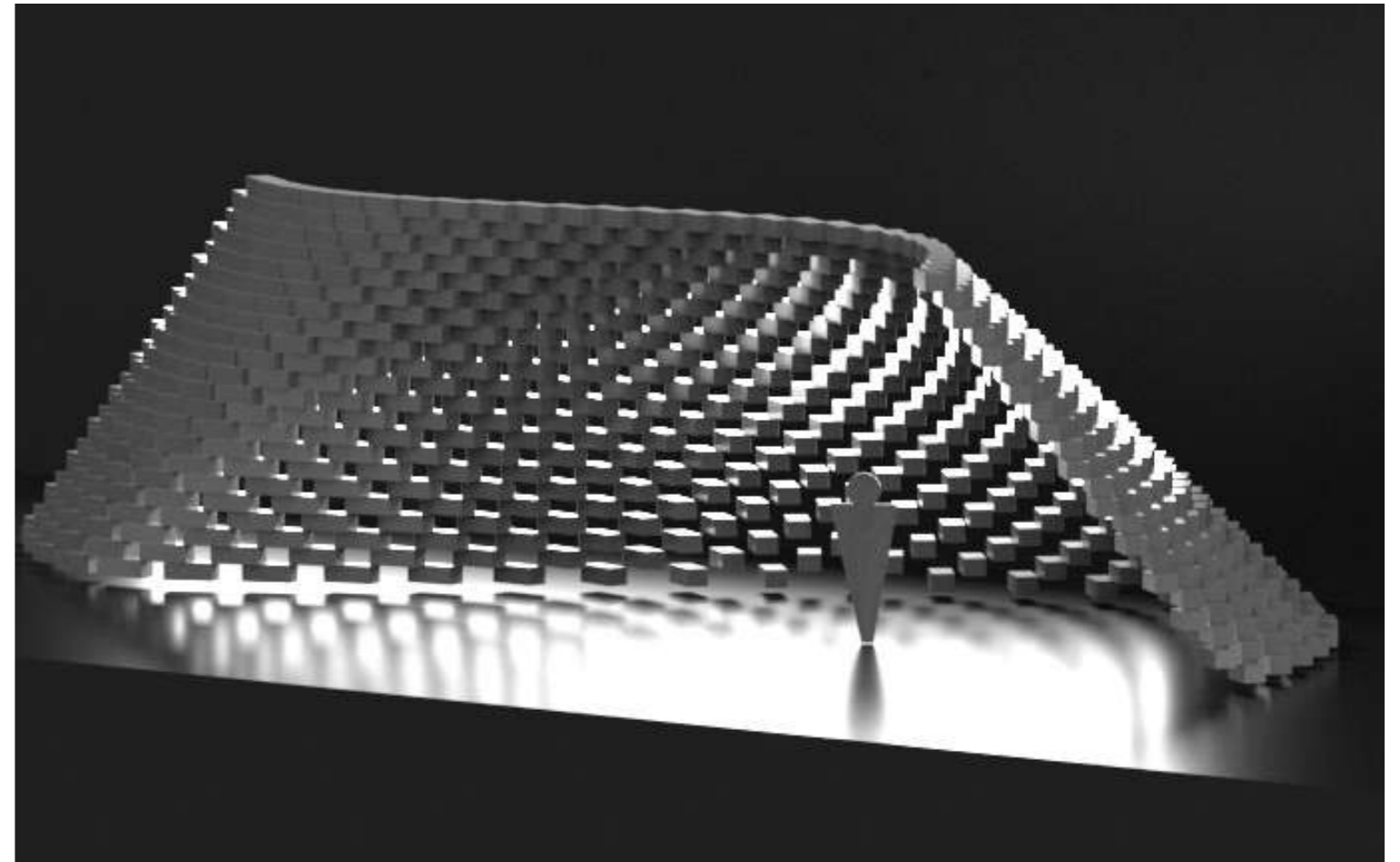


Attractor Spline

Aggregate 4 : Brickwall+ Attractor (Selbstversuch)



Double Curve Surface
Point Attractor



WPM 11 Digital : Analog [dEk]

School of Architecture | Frankfurt University of Applied Sciences

Master | Summer 2021

Nadja Bauer

Exam : Sun protection facade

Concept:

The sun protection facade module was designed on the basis of a 6-cornered hexagon. The geometry tapers towards the inside. The goal was to design a module that shades the summer sun and allows the winter sun to penetrate. In addition, there should still be natural ventilation through window openings, which is why the elements are not completely closed. The element was divided into six parts which always open by one sixth. Two types of modules were created. A module that opens horizontally in 6 parts and a module that opens vertically. The modules are placed on the facade depending on the solar rays to prevent overheating. The warmest part of the facade has the most closed element.

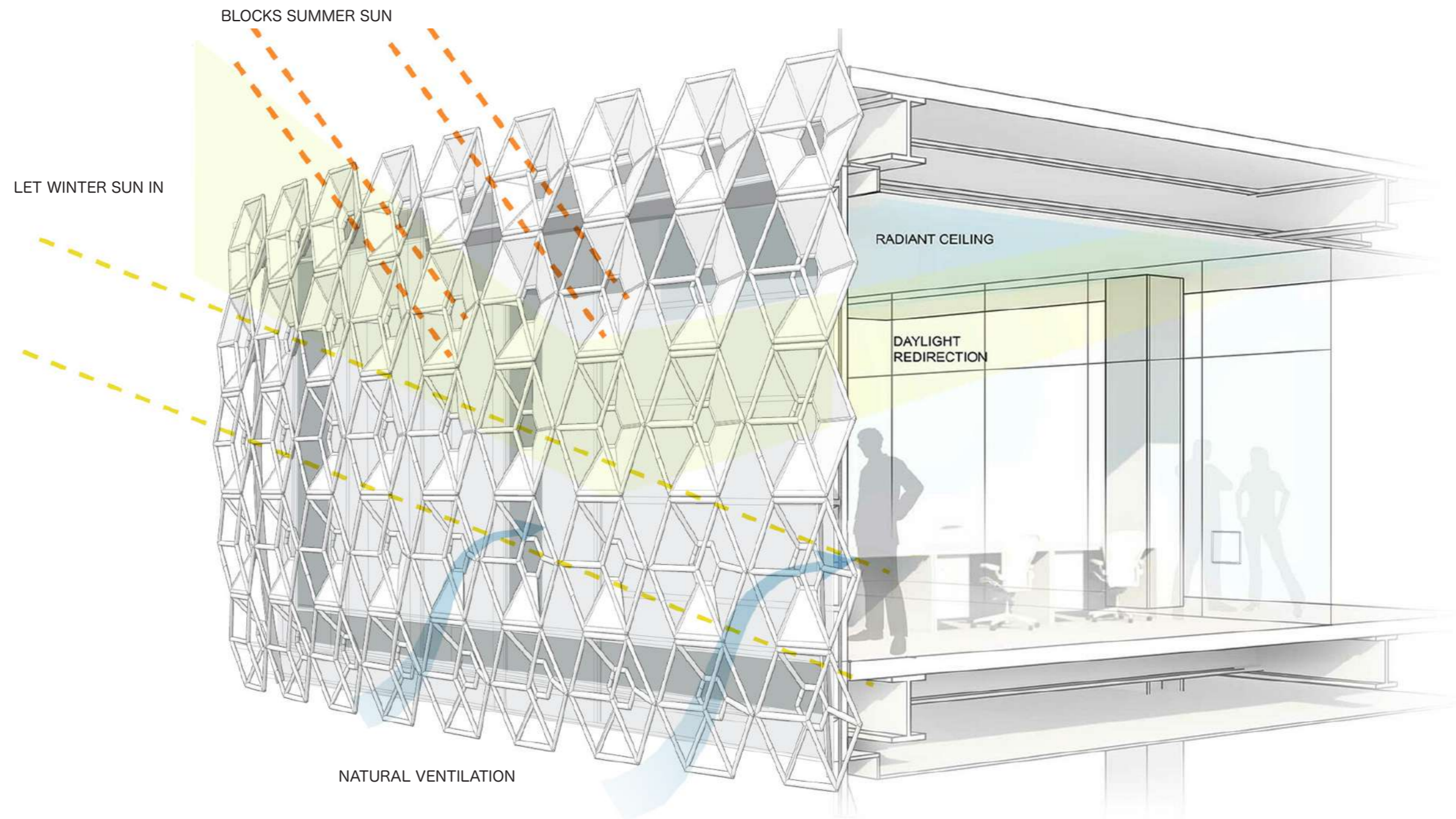
Parameters

The facade element was designed parametrically and fits all curves types. The design was based on the following parameters:

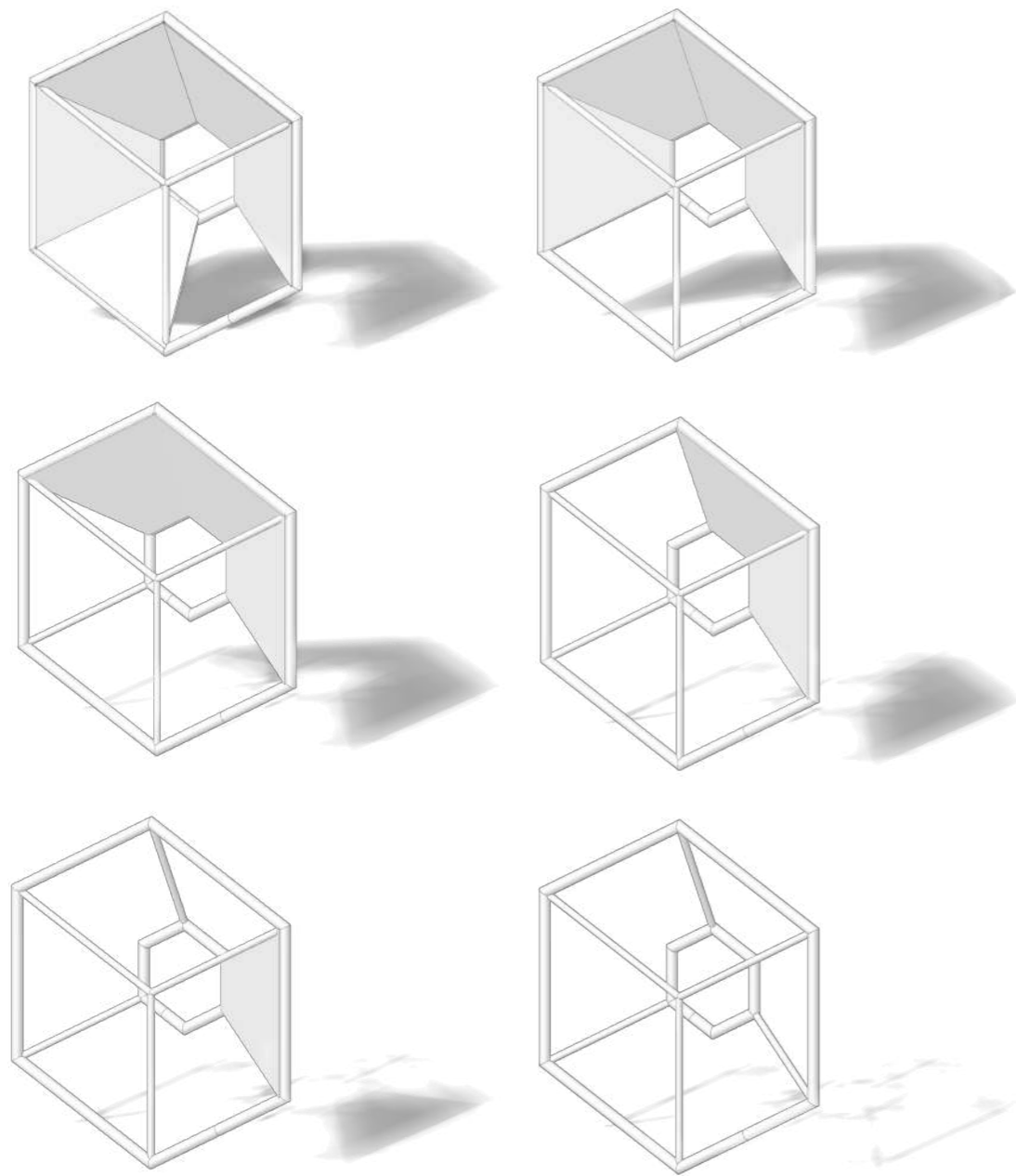
- Weather data Frankfurt am Main
- Base Surface
- Size and number of elements
- Division of the facade into 7 areas
- Structure of the module

Grasshopper:

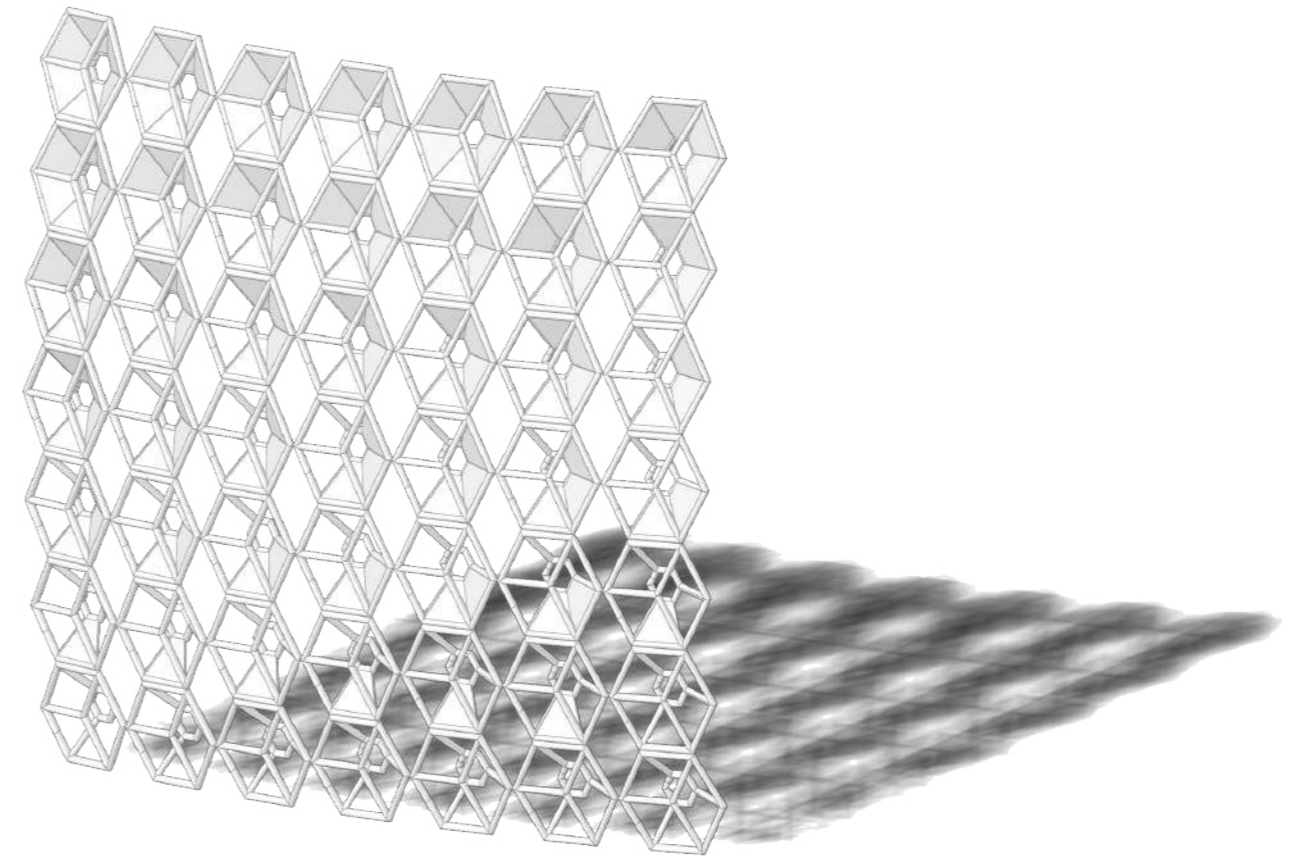
- Ladybug radiation analysis
- Box morph
- loft
- scale



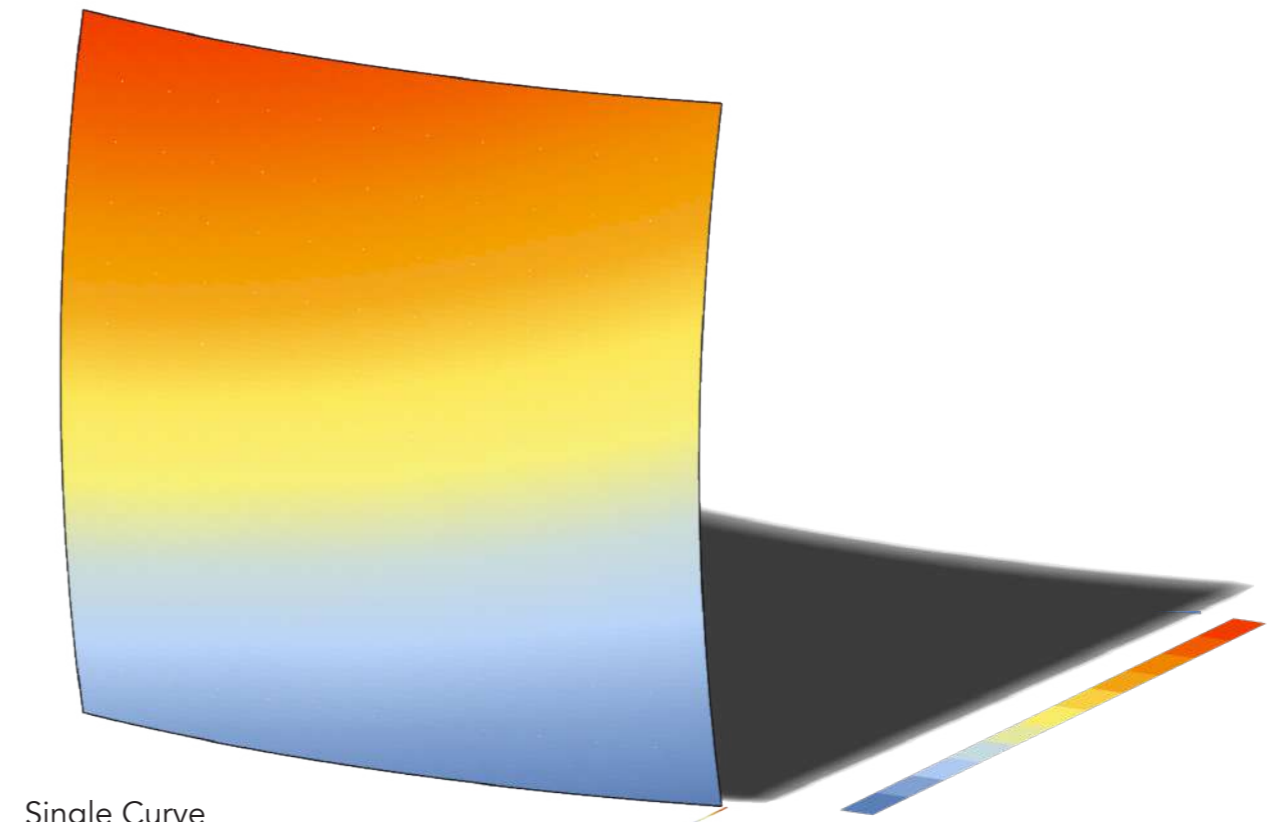
Exam : Sun protection modul (Horizontal Spin)



Base Module

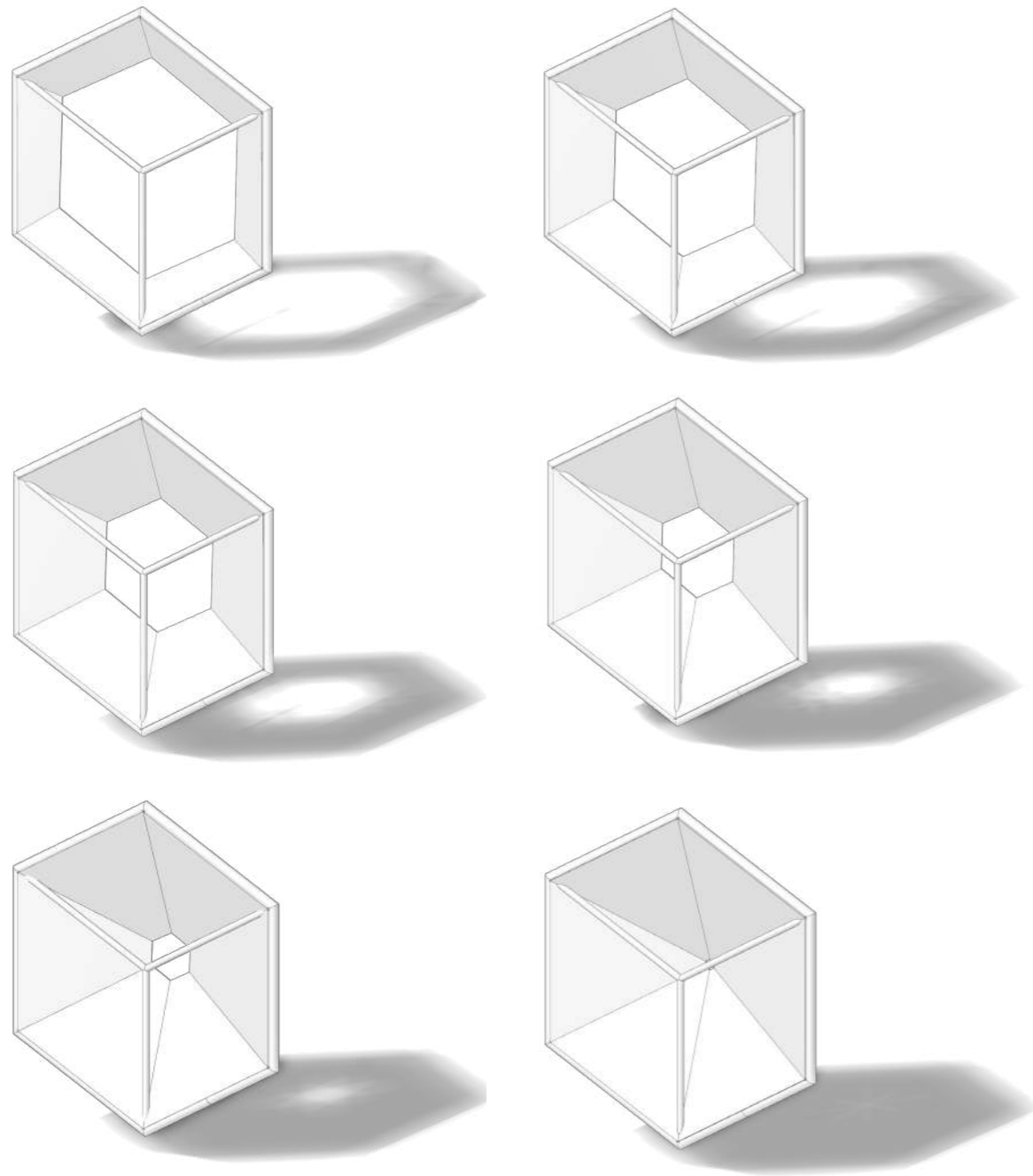


Single Curve
Module on Surface

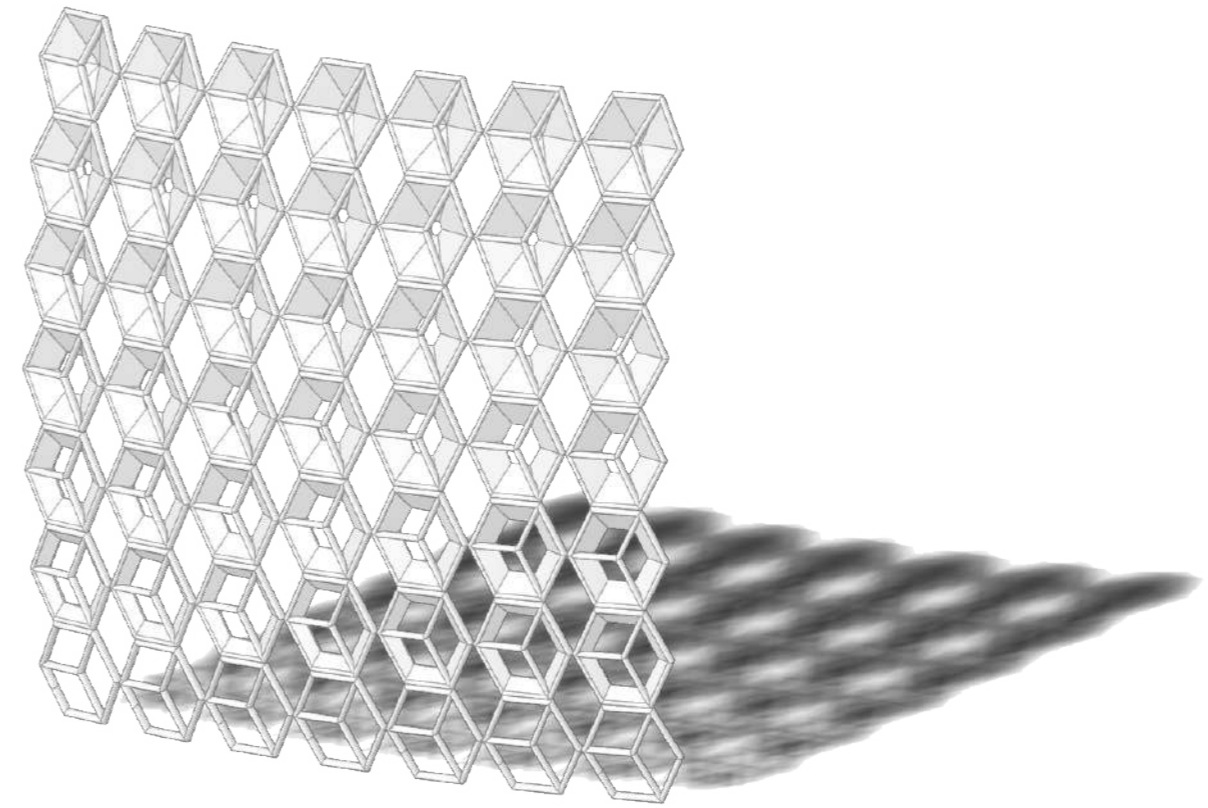


Single Curve
Ladybug Radiation (Frankfurt, Germany)

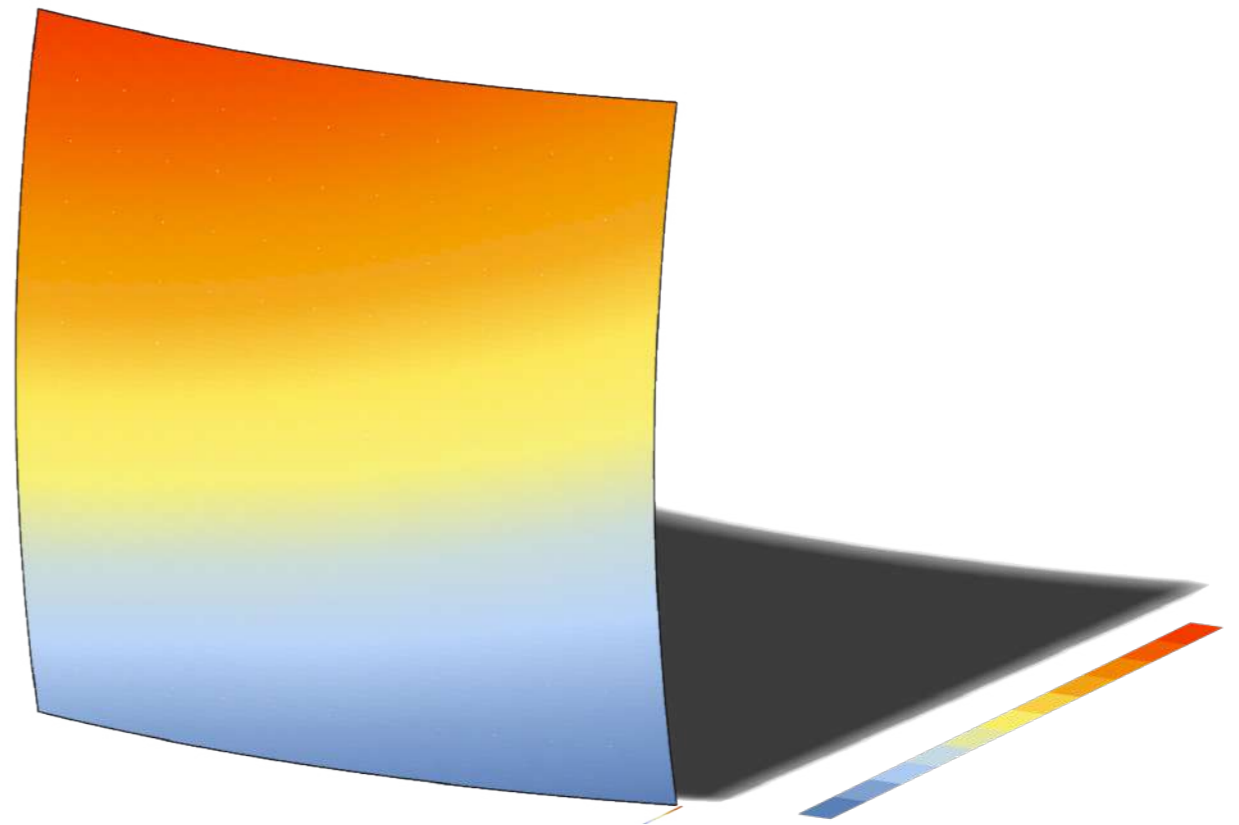
Exam : Sun protection modul (vertical Spin)



Base Modul



Single Curve
Module on Surface

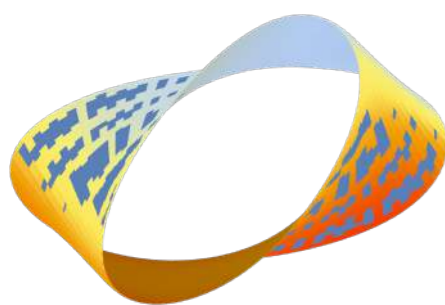


Single Curve
Ladybug Radiation (Frankfurt, Germany)

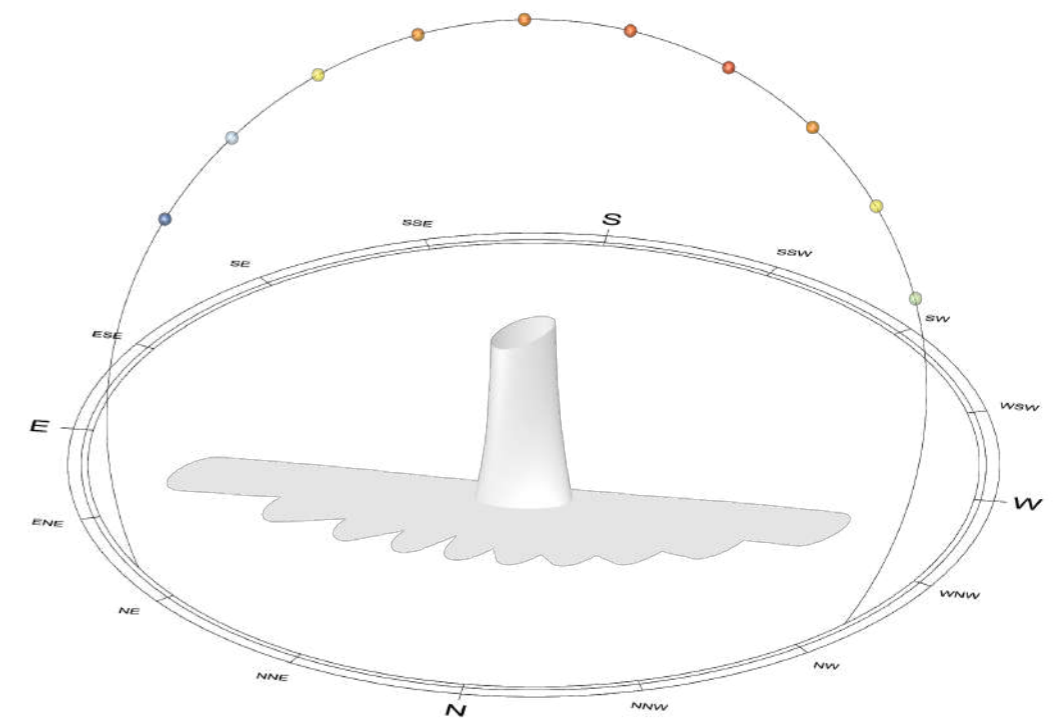
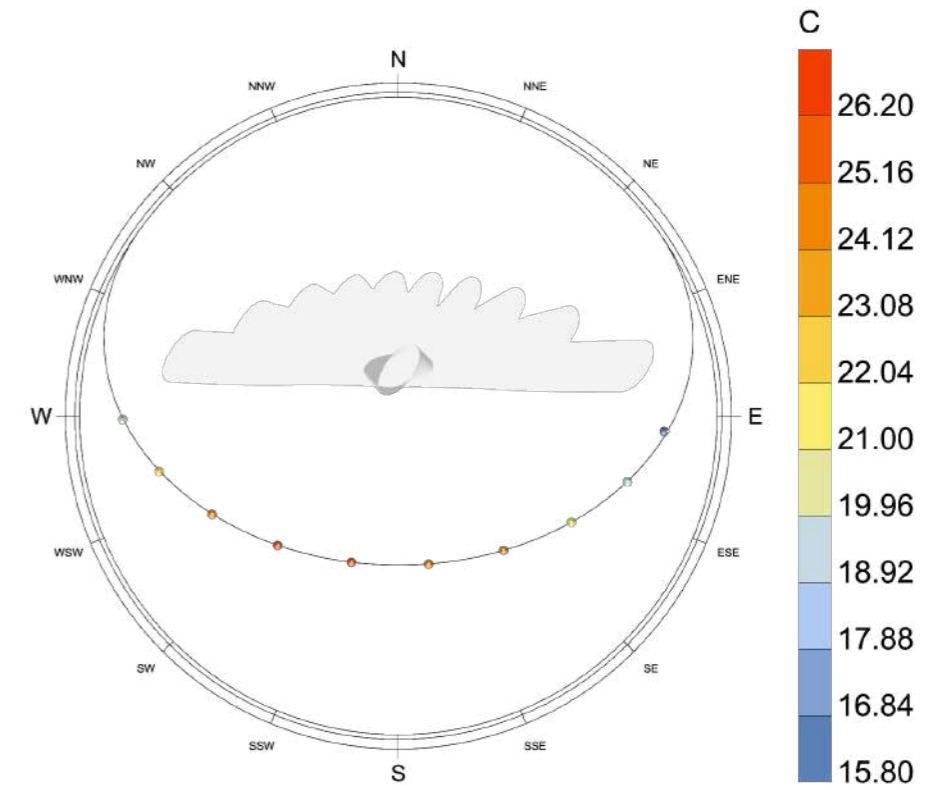
Exam : Ladybug Radiation, Shadows



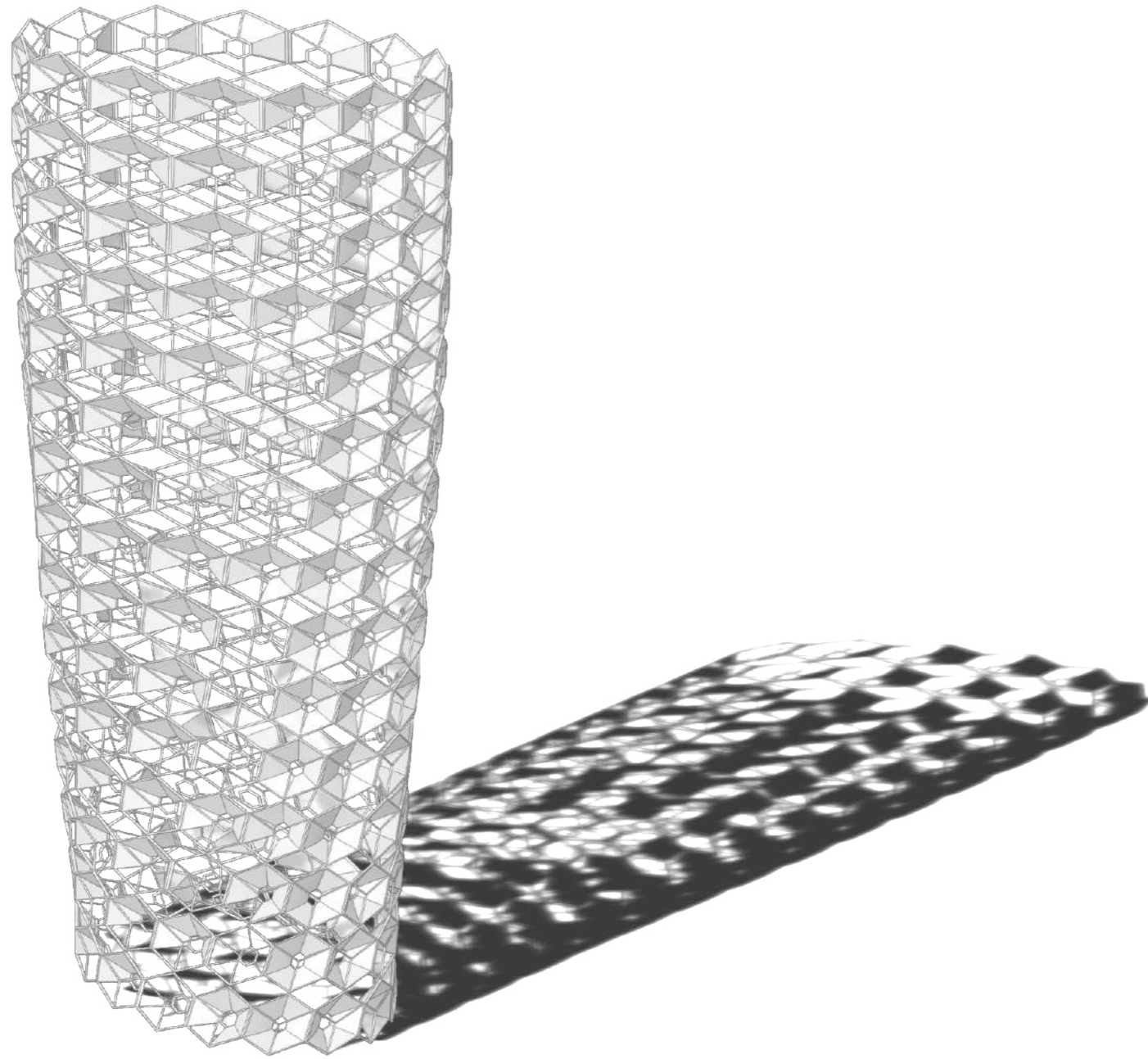
Base Surface



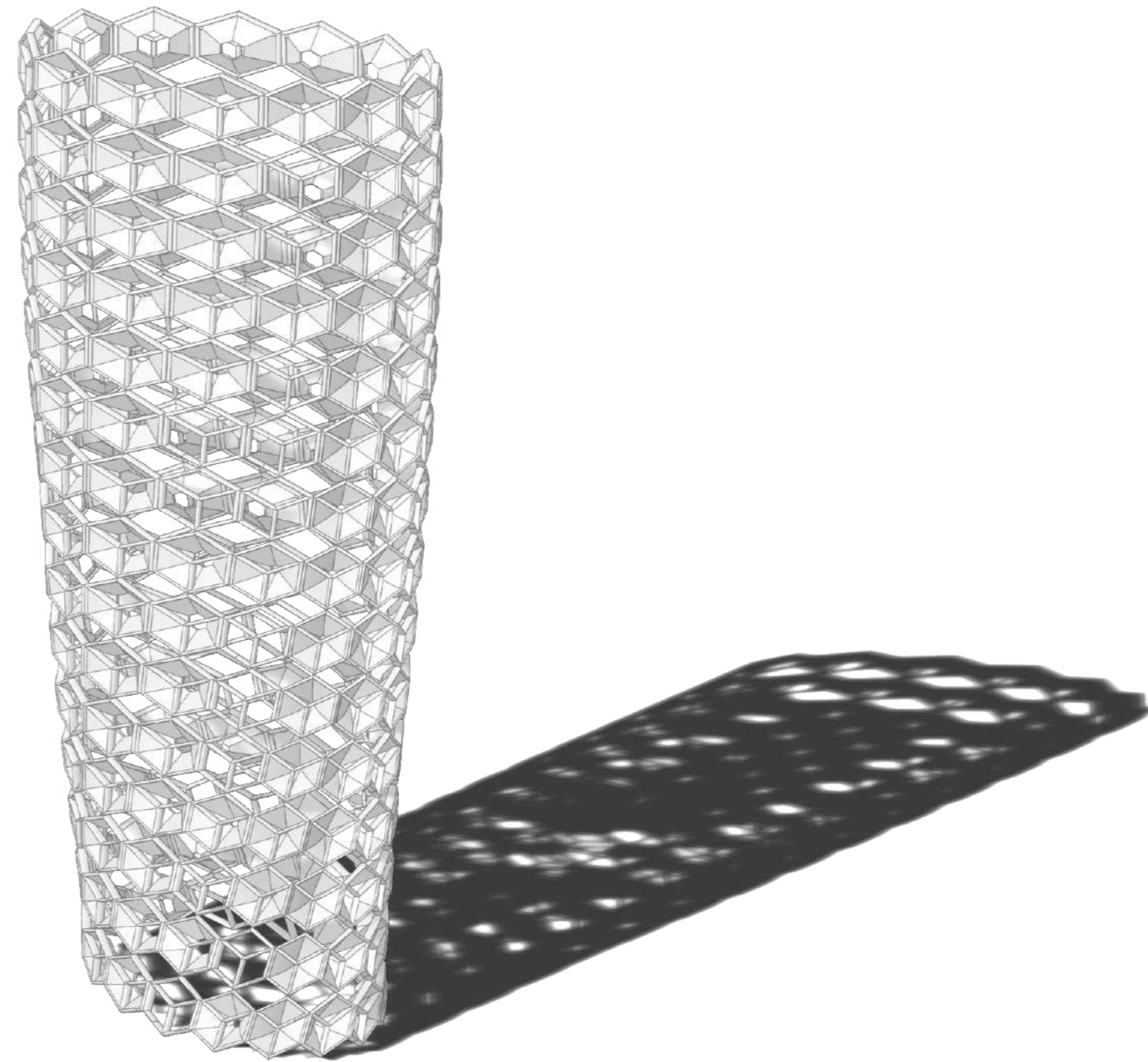
Radiation (Frankfurt am Main)



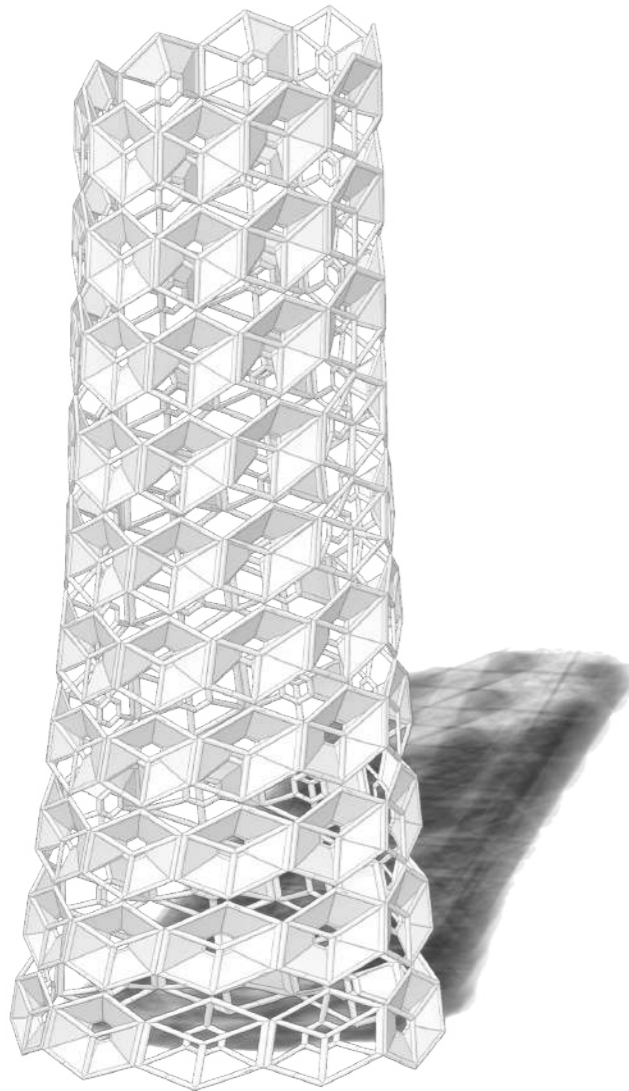
Temperatur 15. Juni 8 - 17 Uhr
 (Frankfurt am Main)



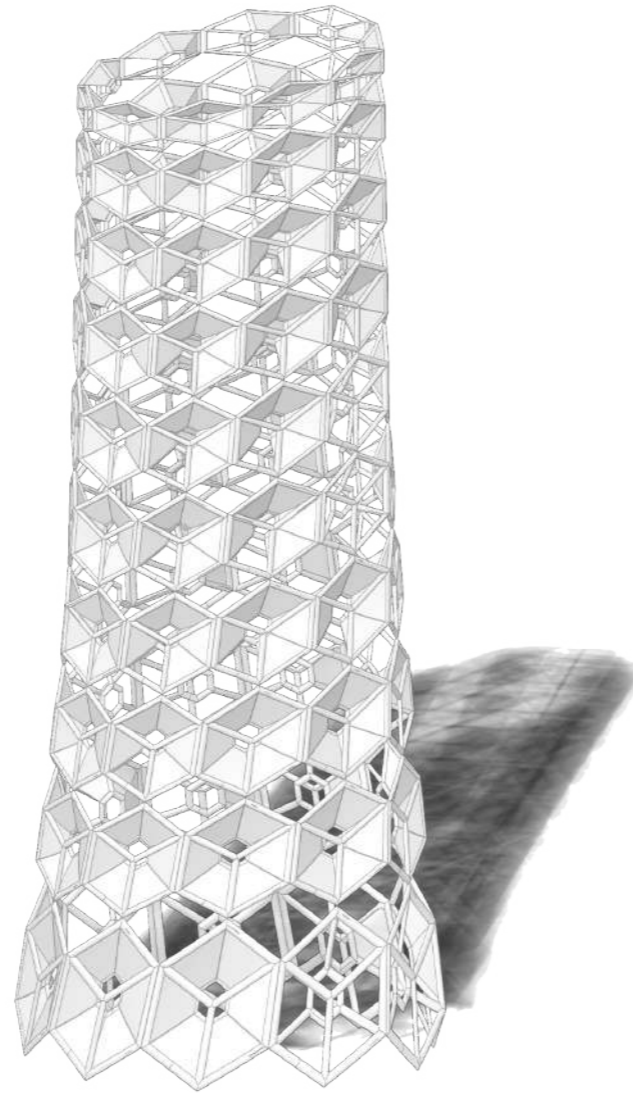
Modul on Surface
(Horizontal closed Base Module)



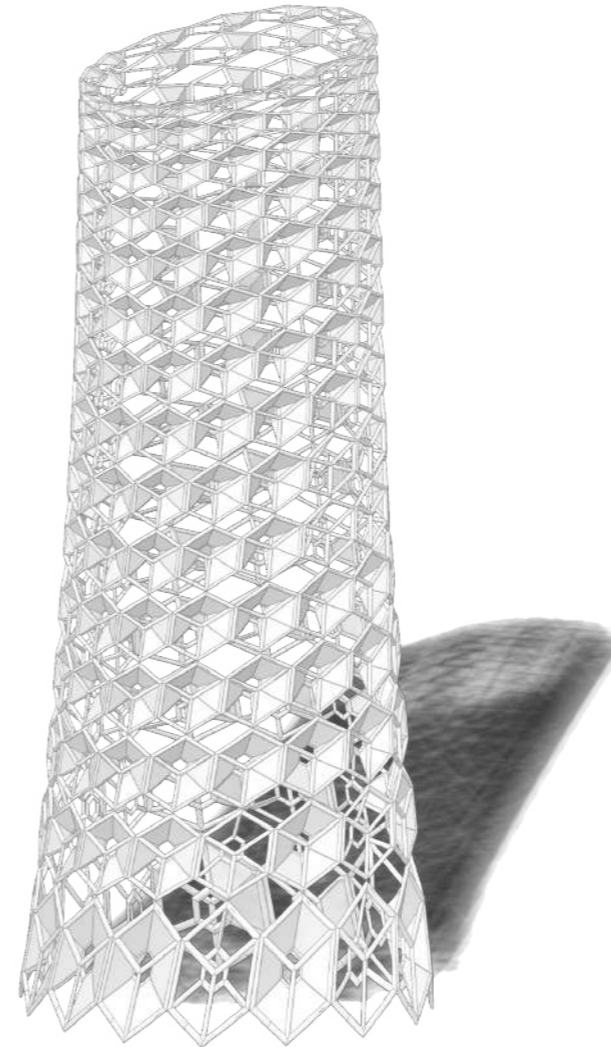
Modul on Surface
(Vertical closed Base Module)



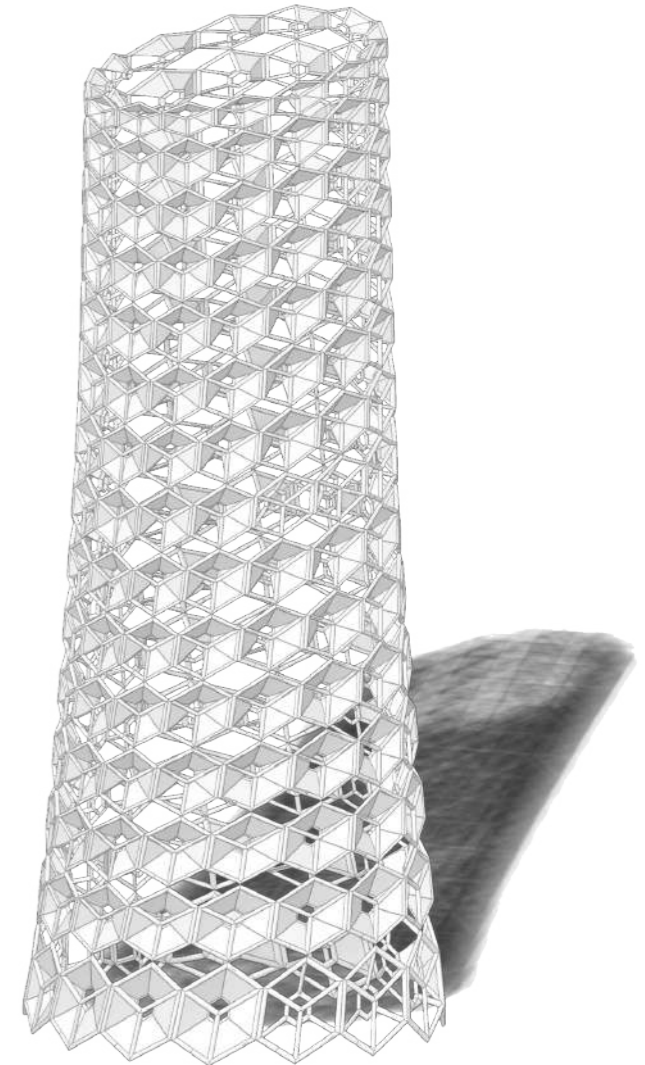
10 x 10 Modules



10 x 10 Modules
Graphmapper

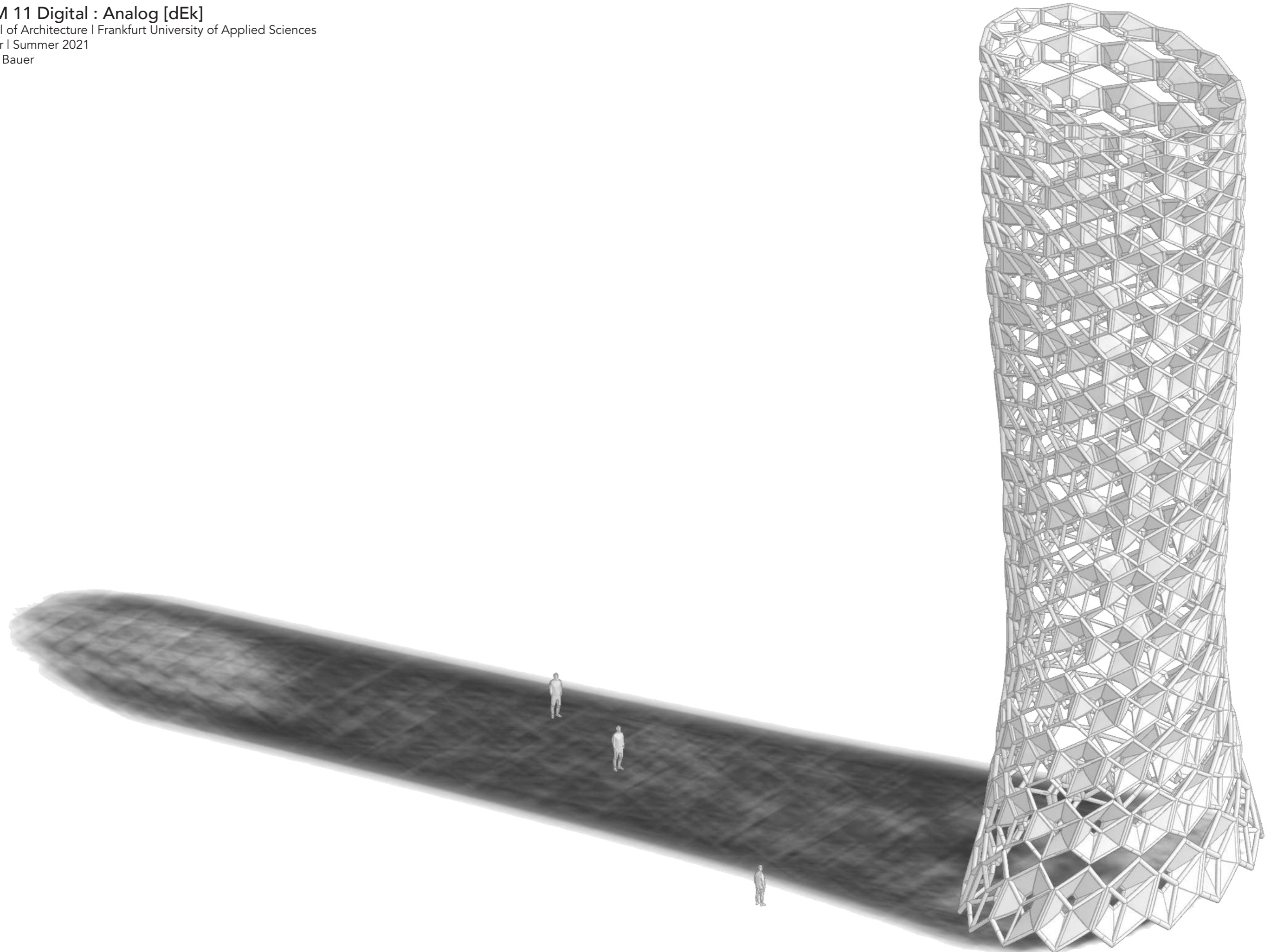


15 x 15 Modules
Graphmapper



15 x 15 Modules
Graphmapper

WPM 11 Digital : Analog [dEk]
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