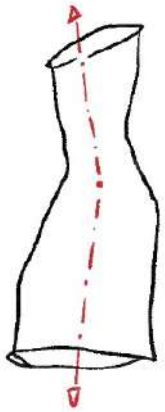
D2RP&A | Workshop 1 Documentation

Vertical Moonbase

Vertical Living Habitats for Space Settlers

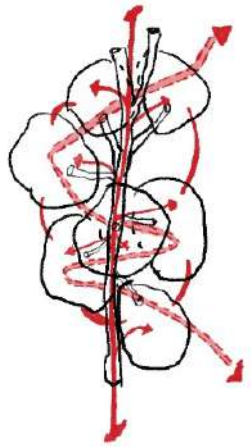
Student: Jonathan Jonathan, Walter Chung // Tutor: Henriette Bier, Arwin Hidding

Form Logic

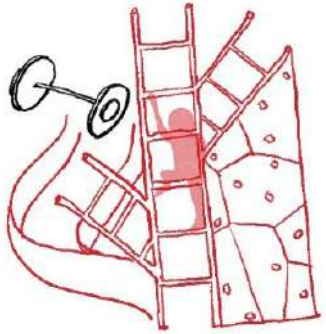


Vertical Structure

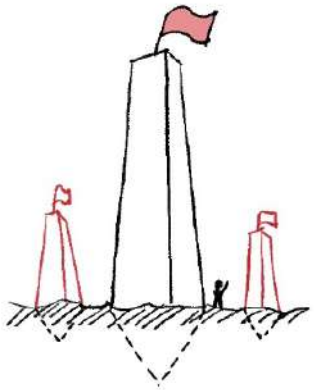
Micro Gravity



Central Core &
Spiral Configuration



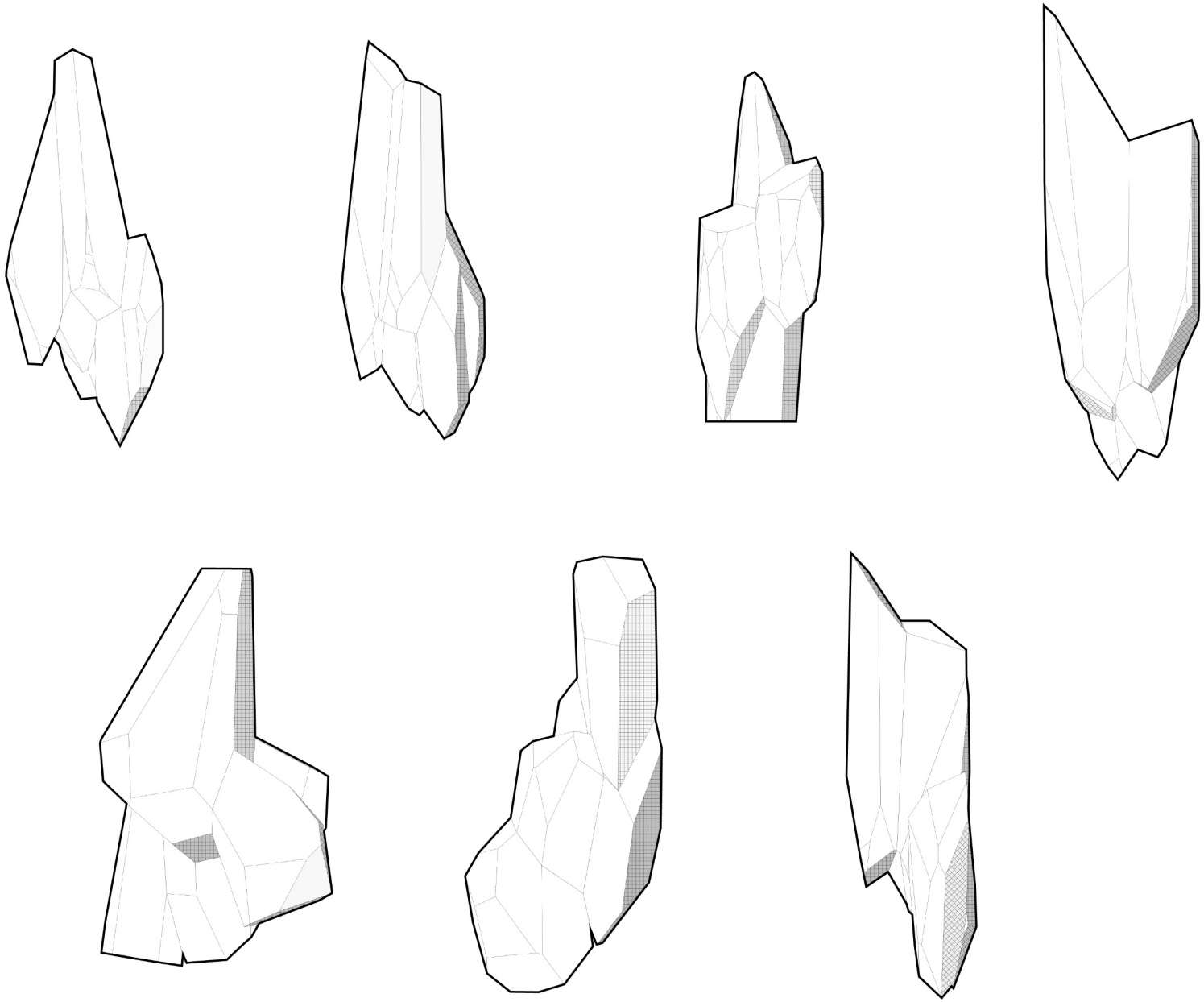
Physical Workout
Optimization



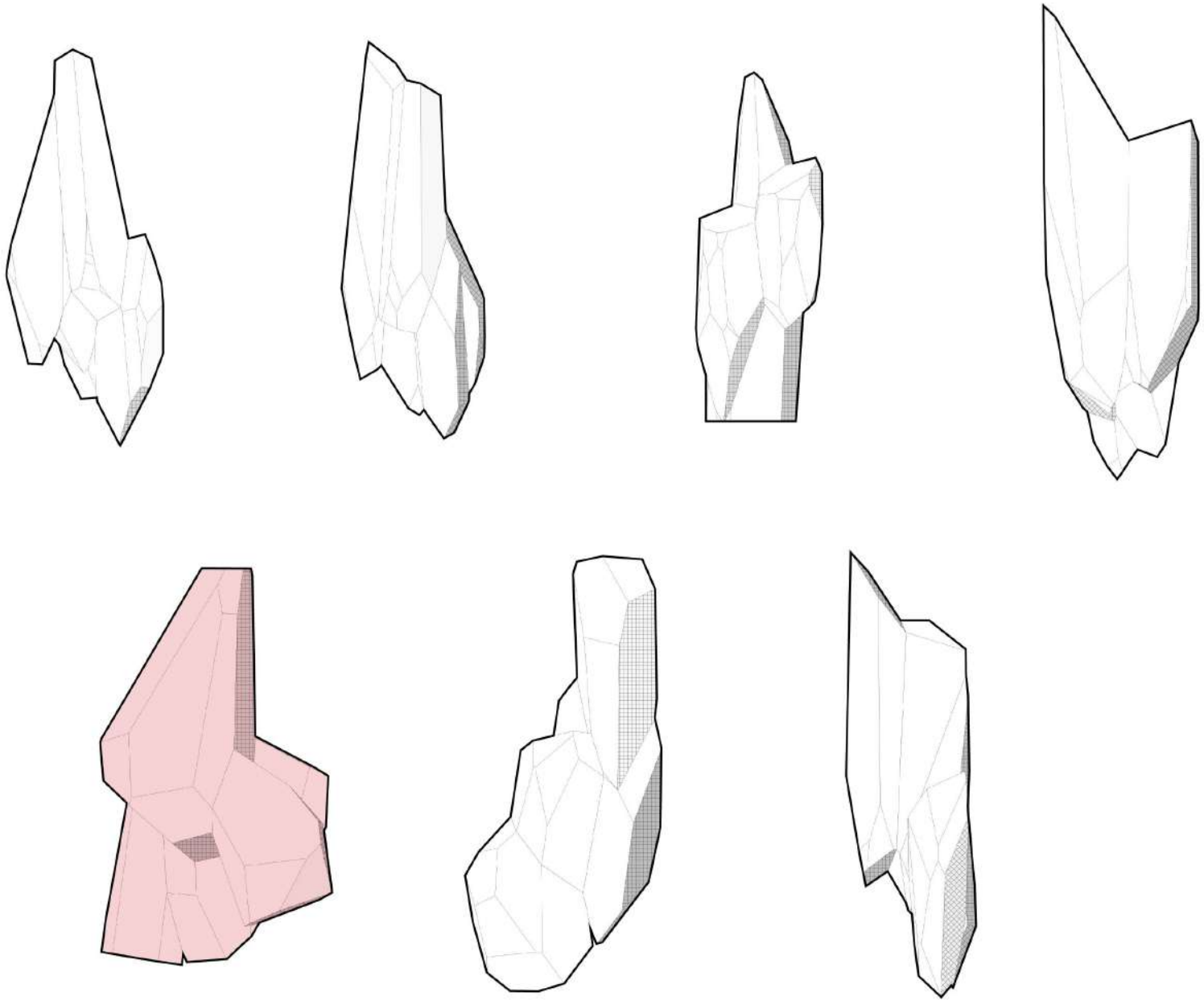
Monumentality of
Humanity Presence

Levels = Privacy Degrees

Overall Form Trials

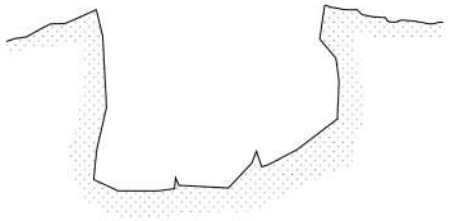


Overall Form Trials



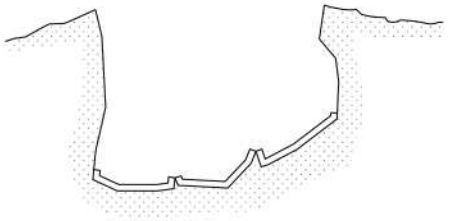
Building Tectonics

1



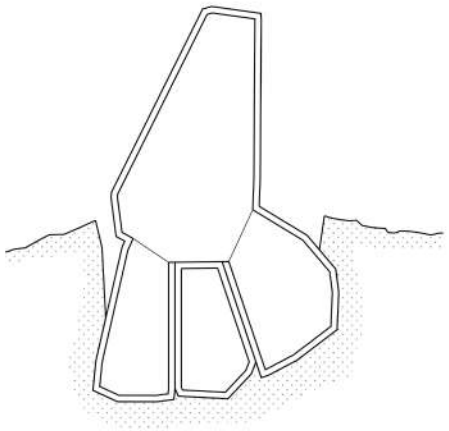
excavation

2



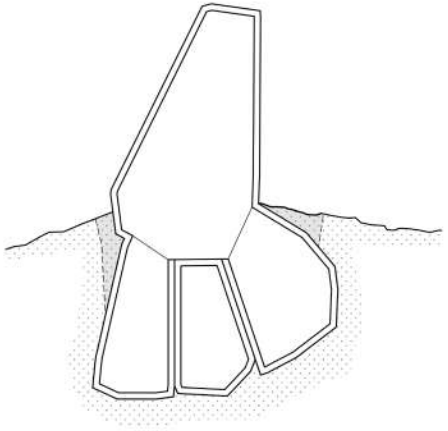
base

3

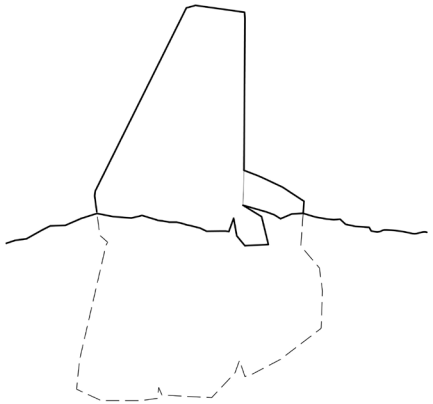


wall components

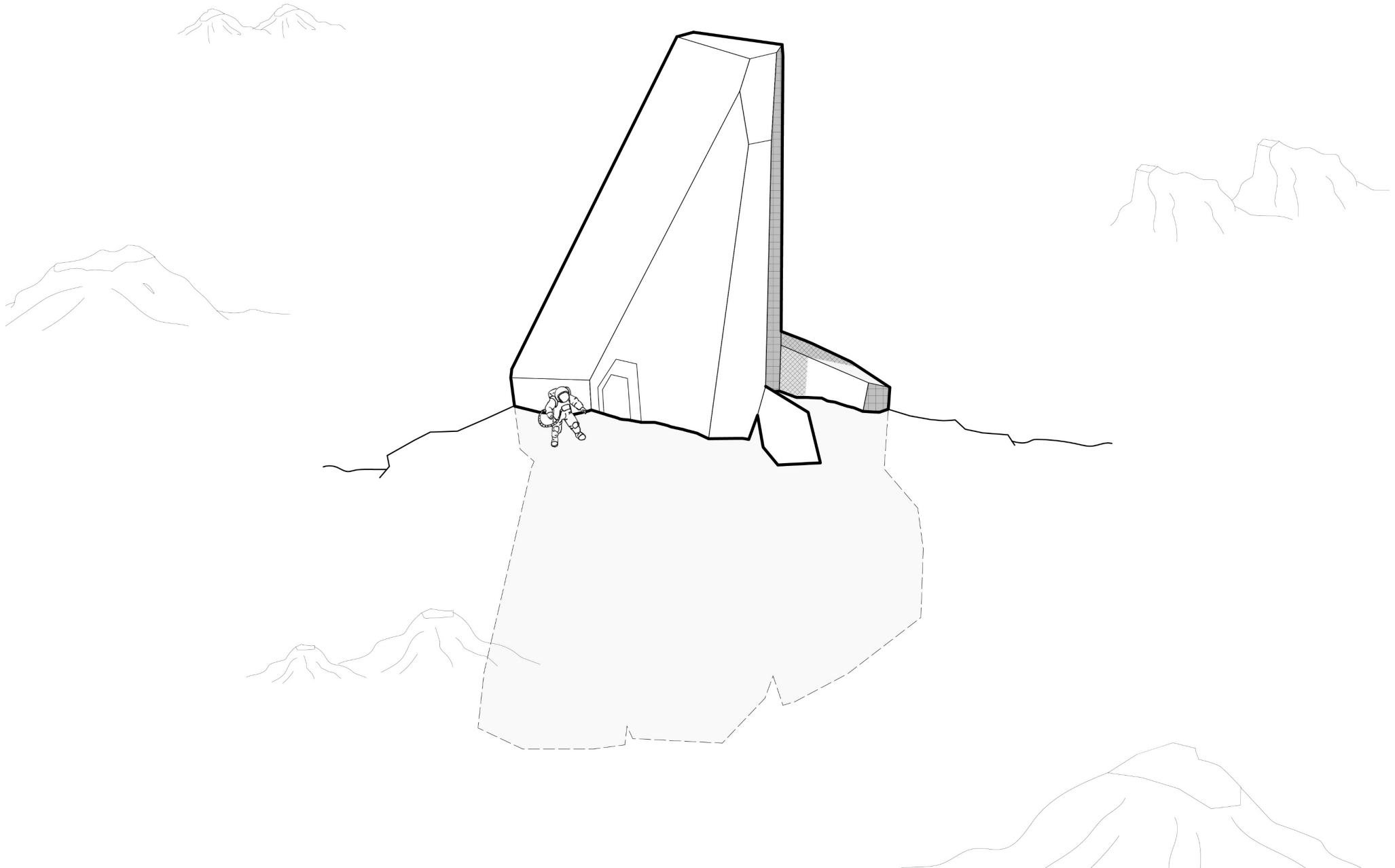
4



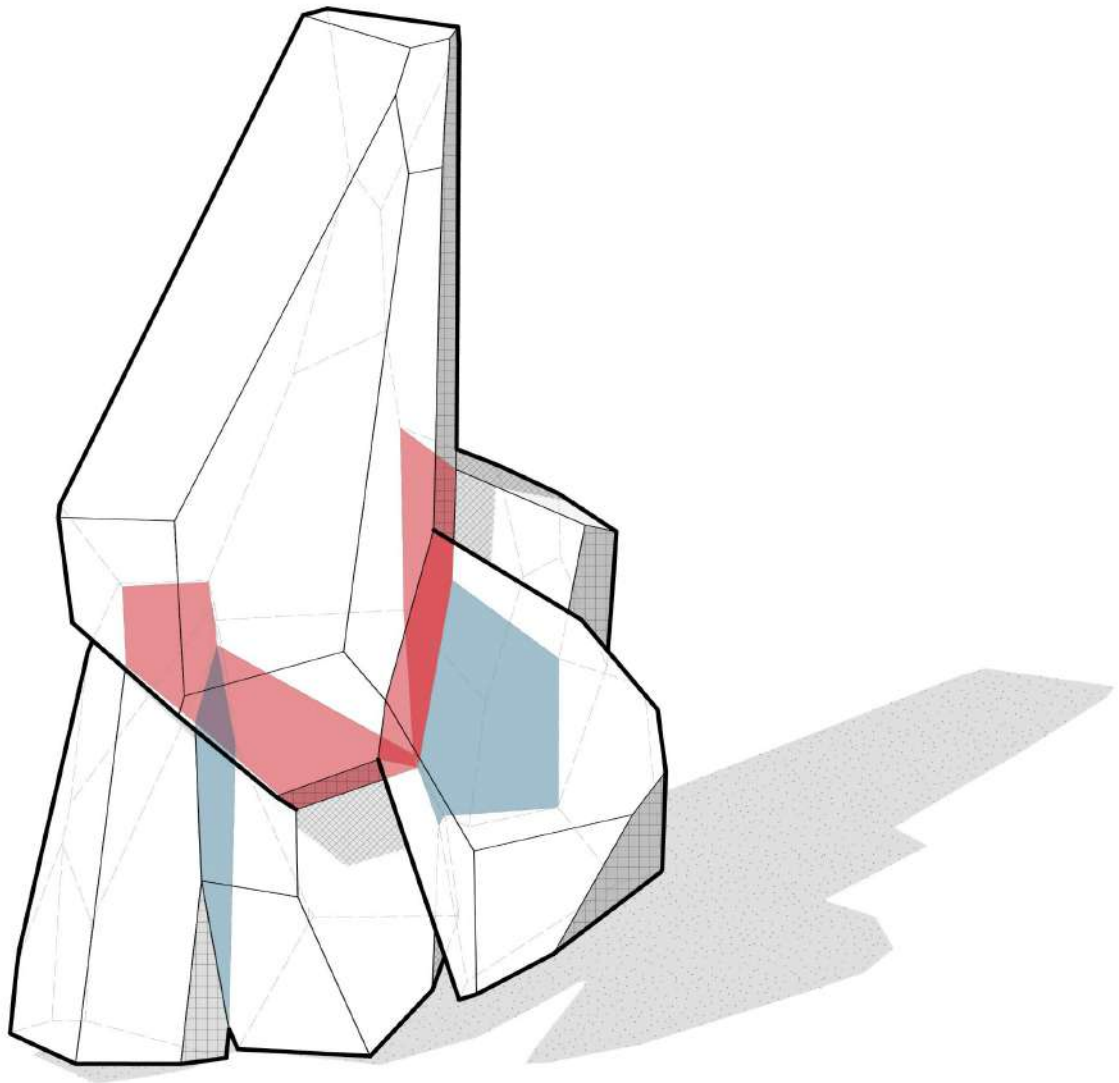
regolith coverage



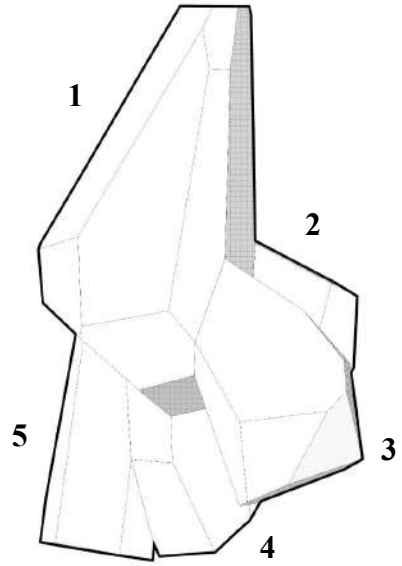
Building Tectonics

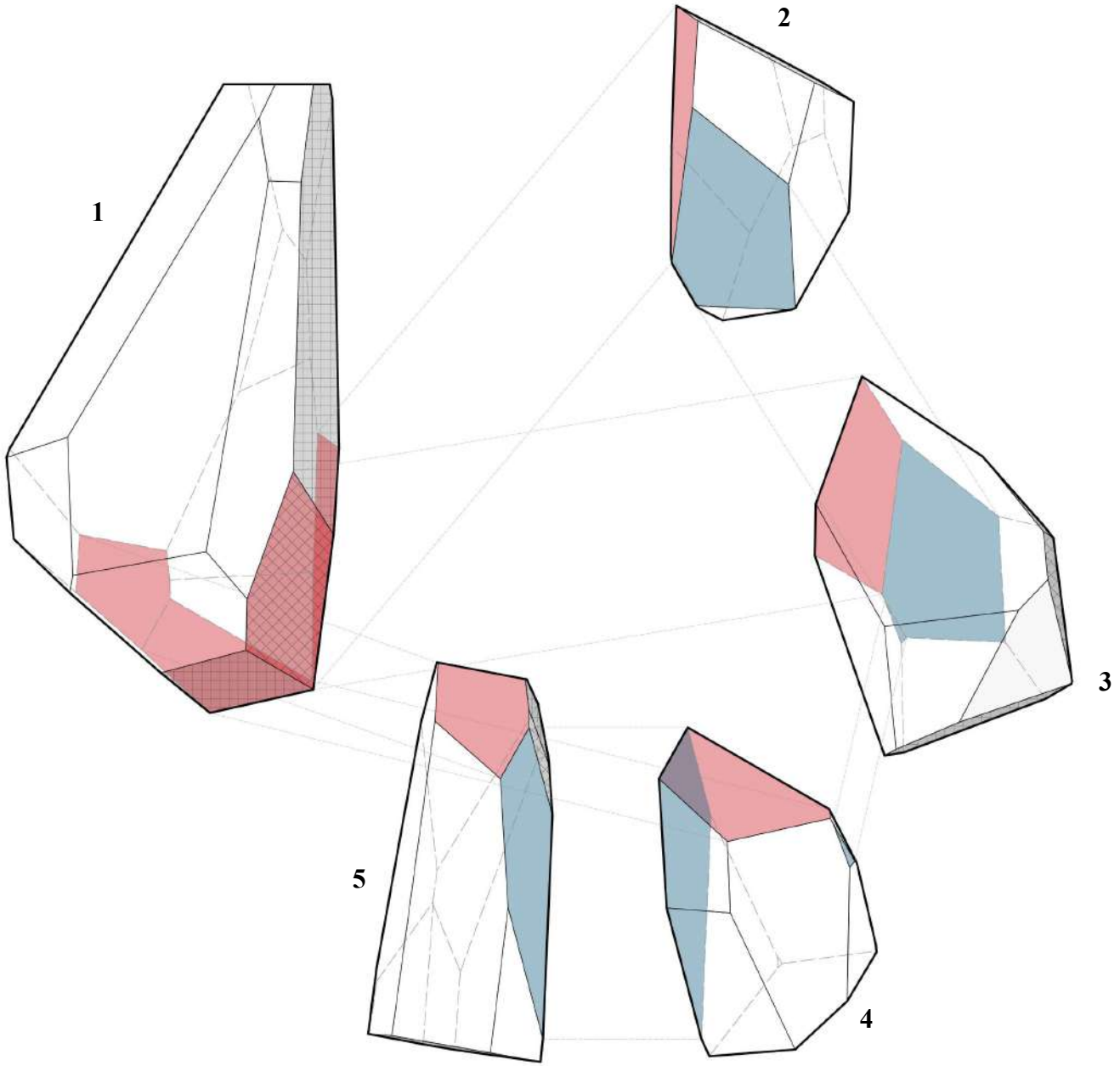


Volumes

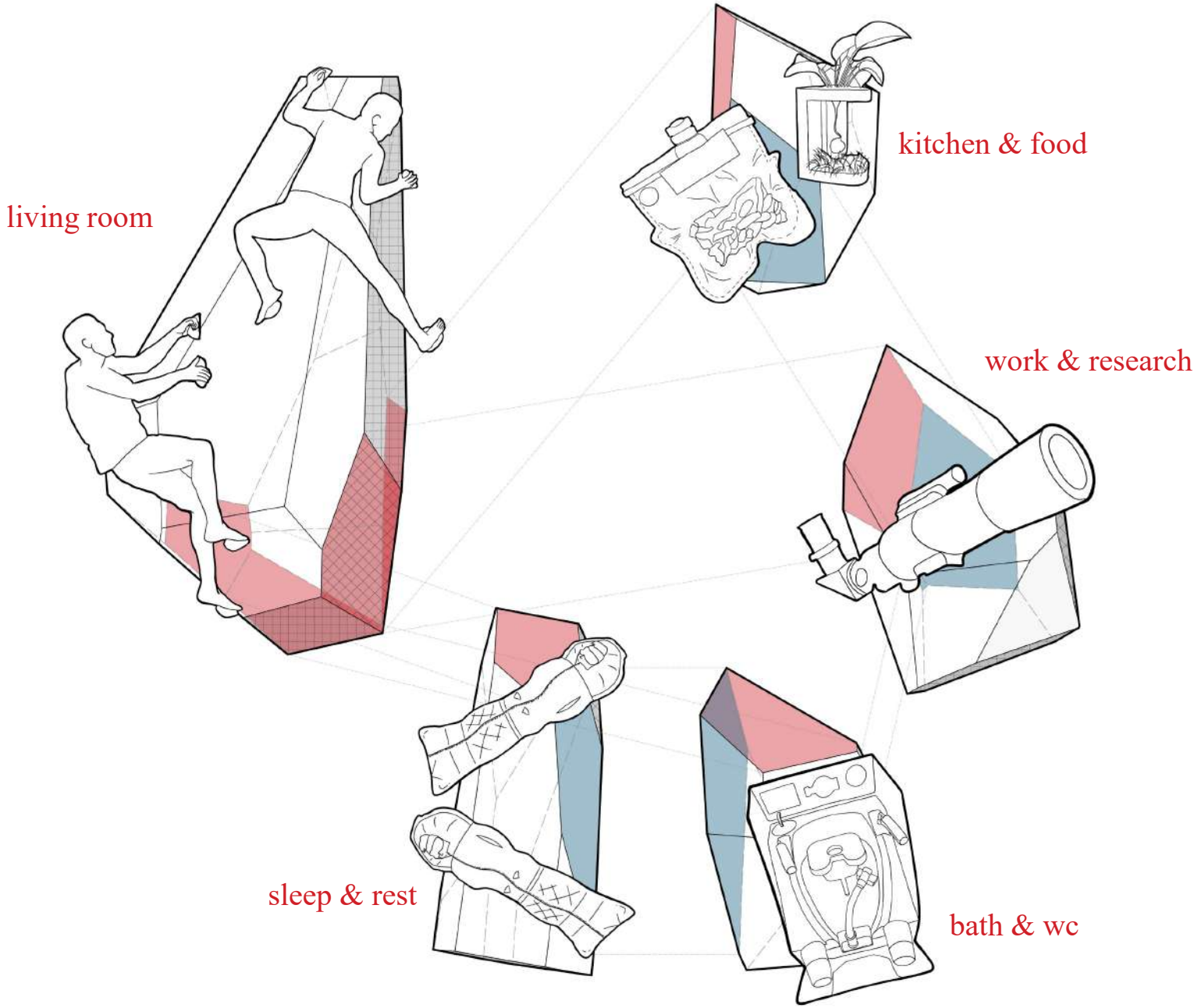


Volumes

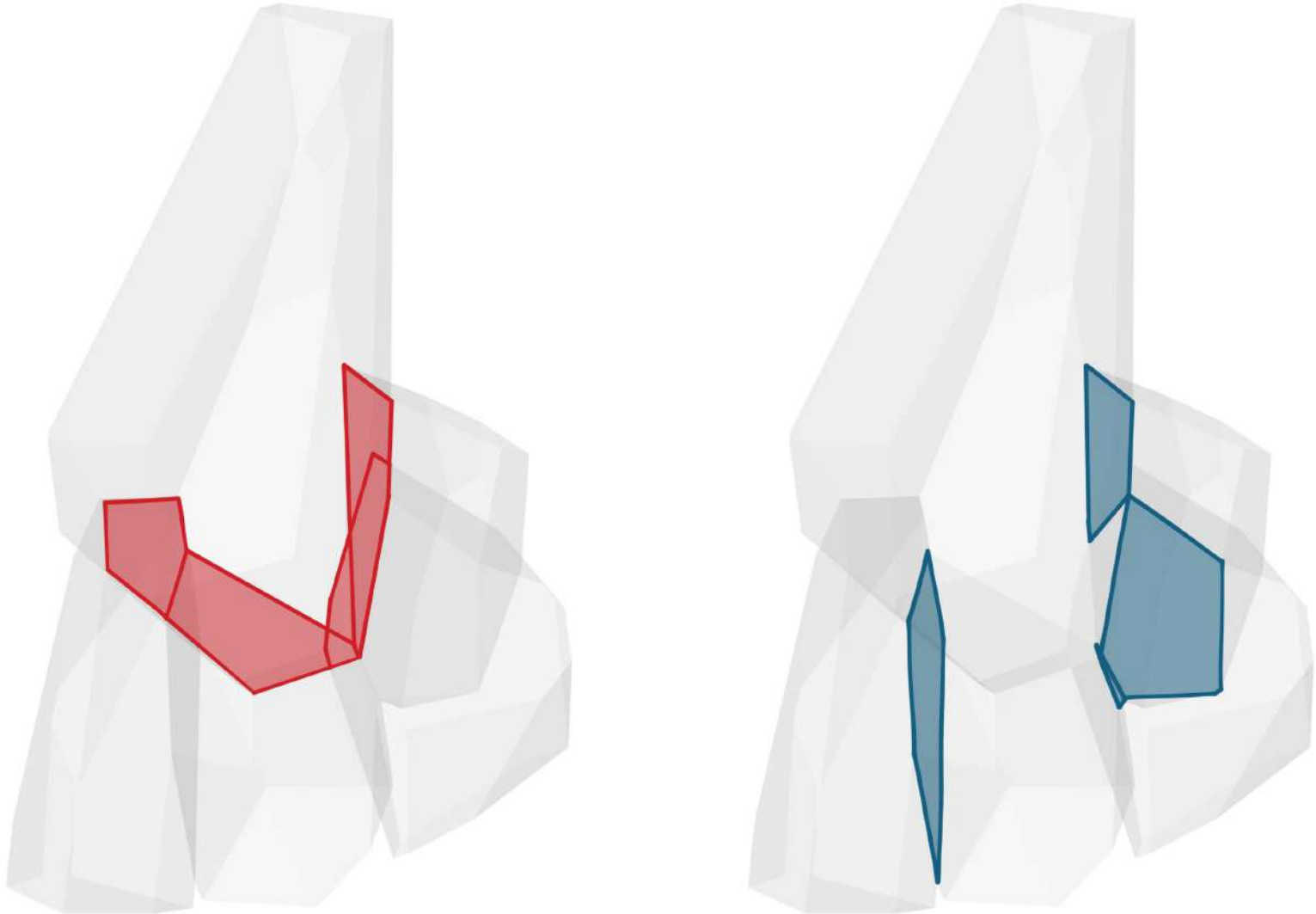




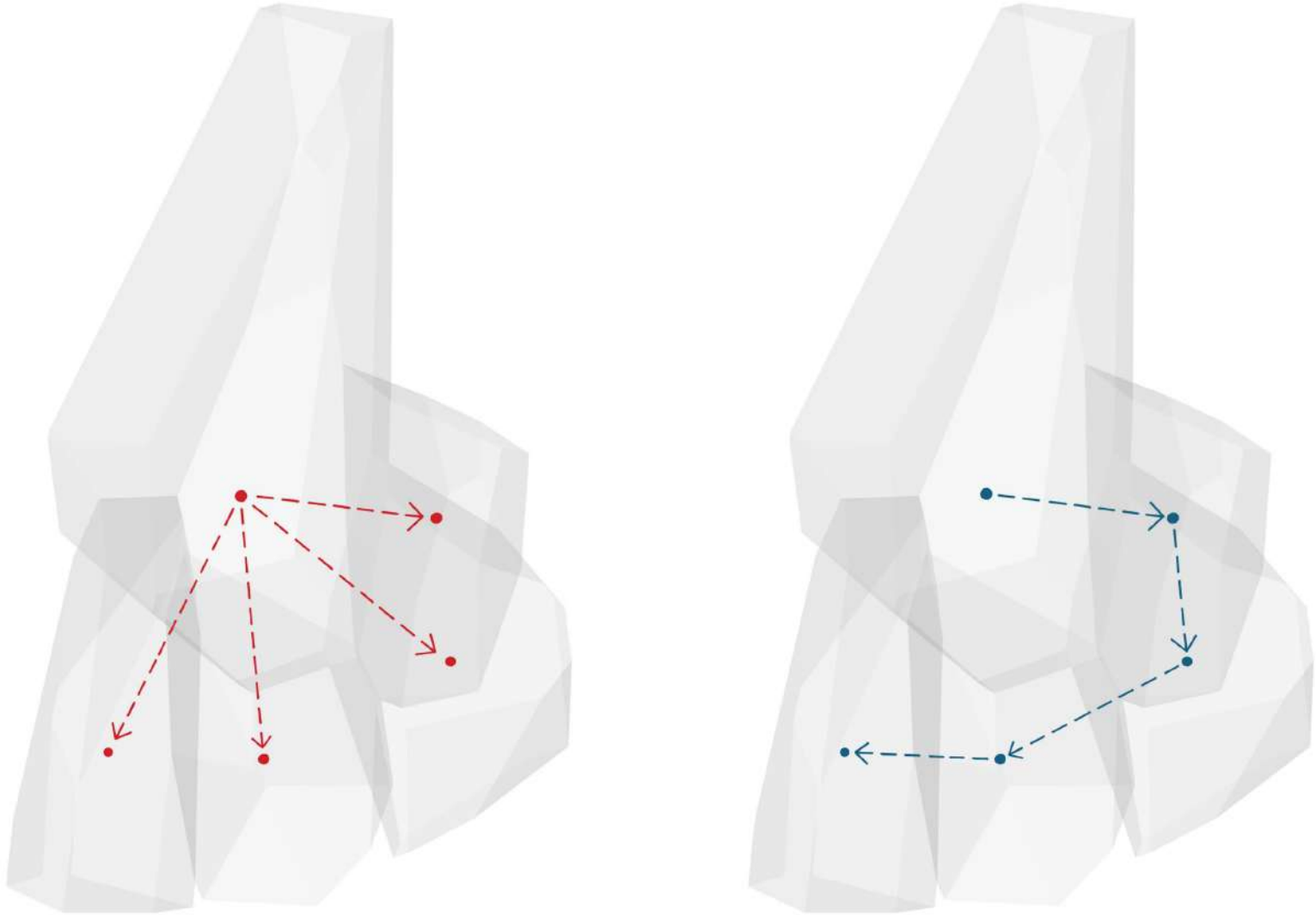
Spatial Programs



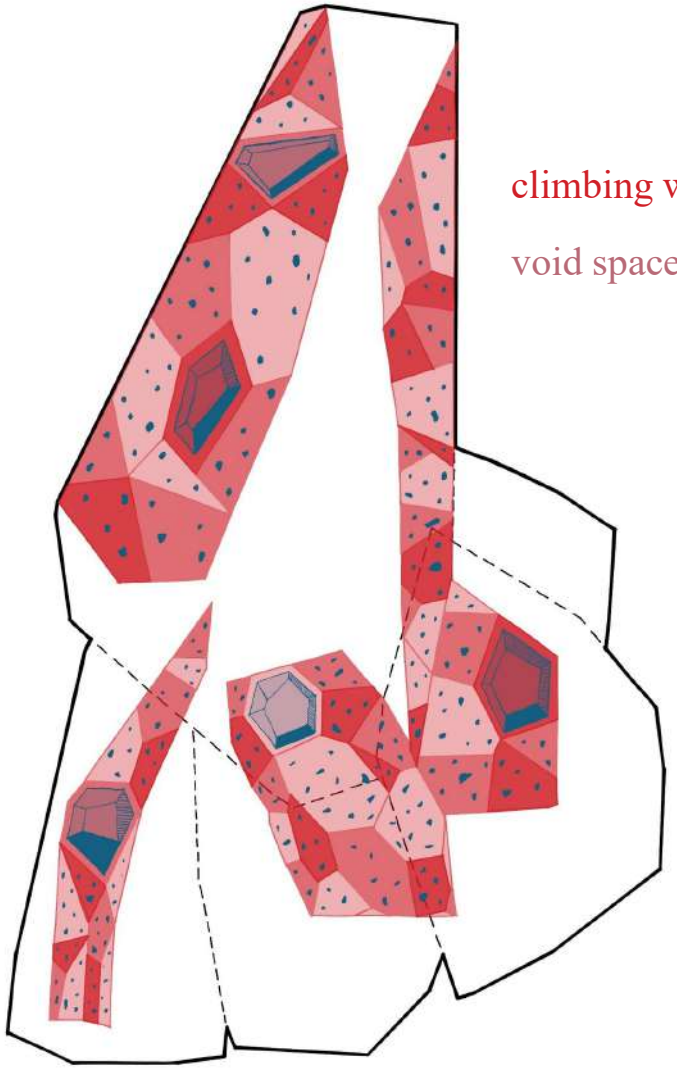
Spatial Connectivity



Spatial Connectivity



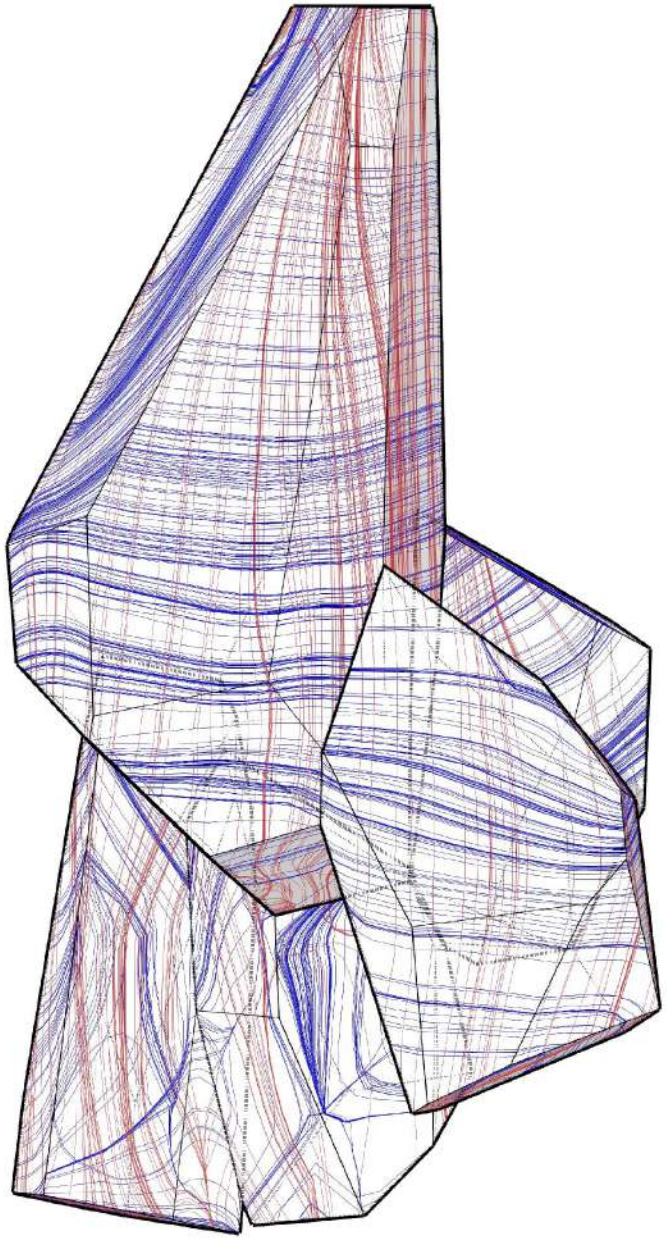
Spatial Connectivity



climbing walls

void spaces

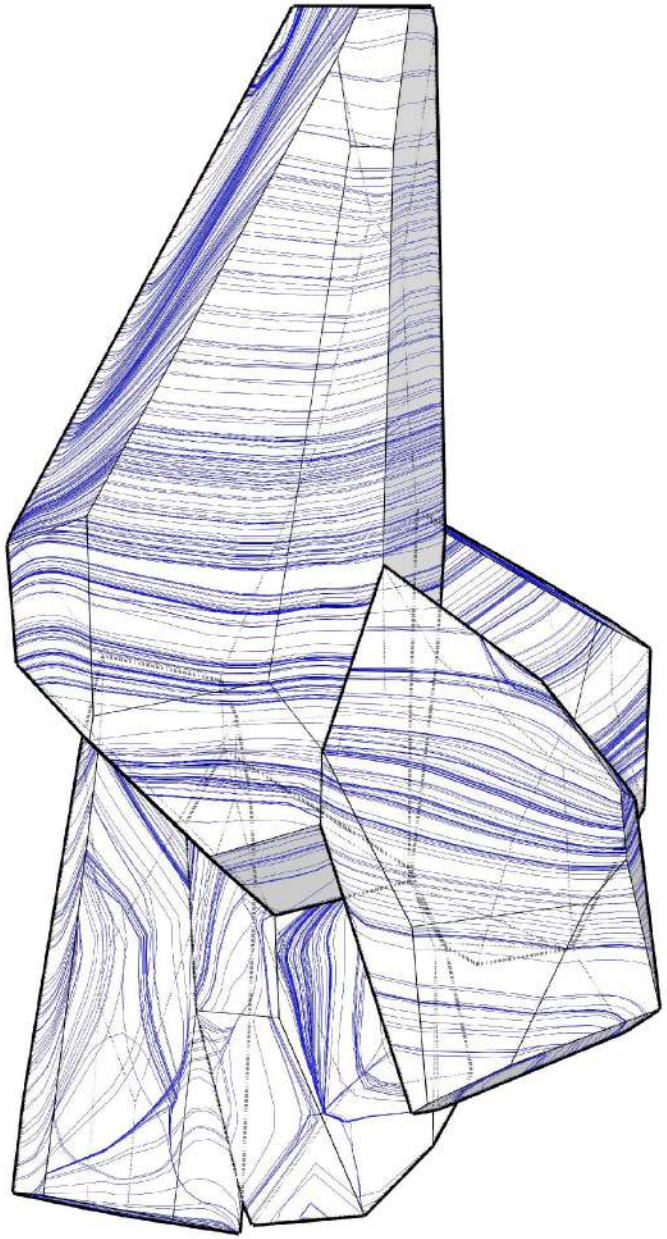
Stress Lines



Compression Lines

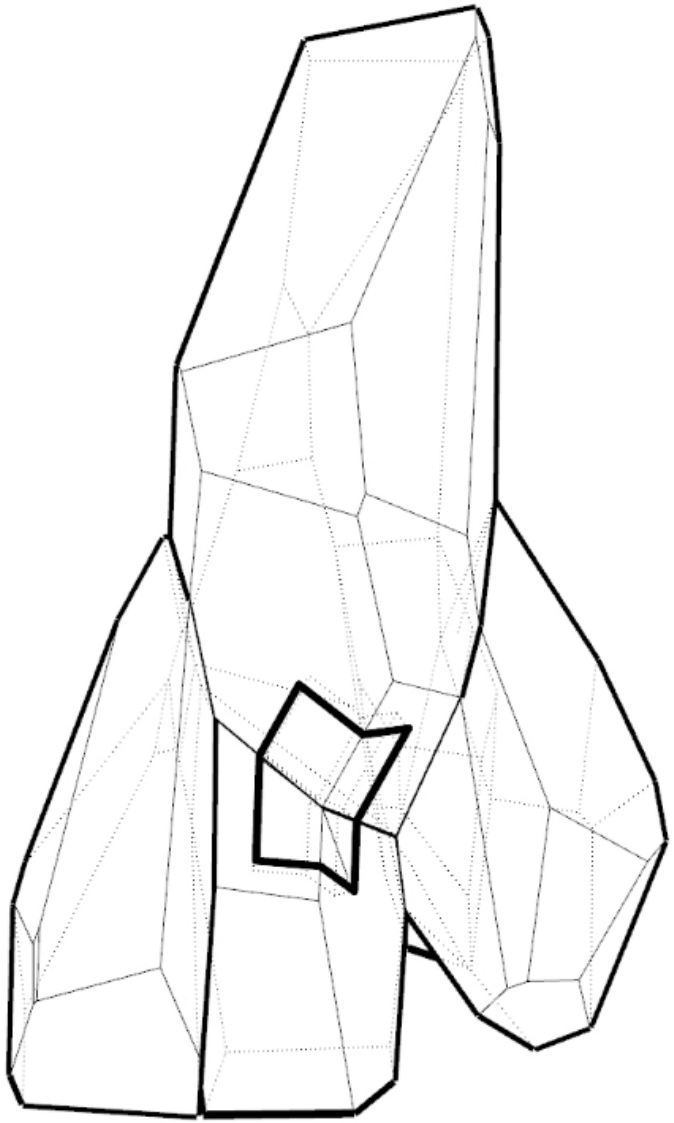
Tension Lines

Tension Lines

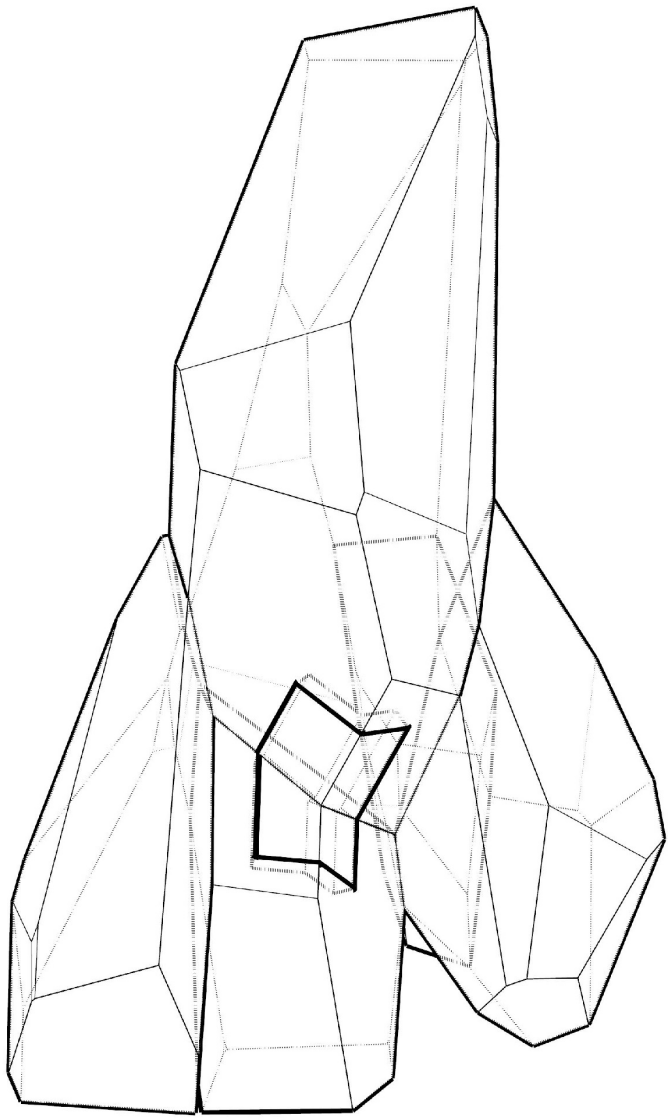


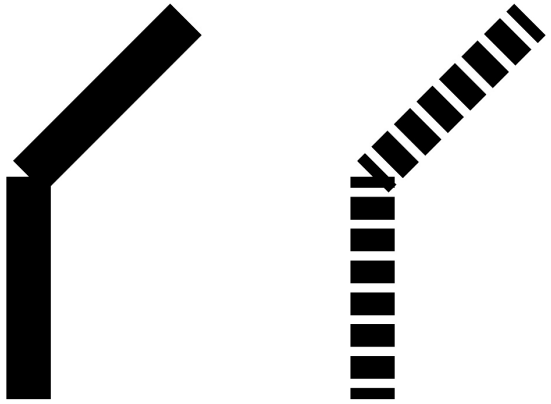
Assuming regolith-based 3D printing material has a similar structural performance to concrete

Fragment

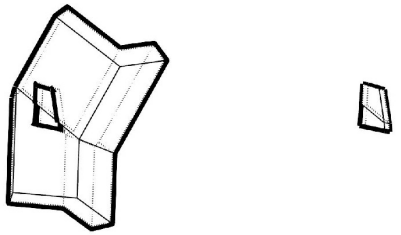


Fragment

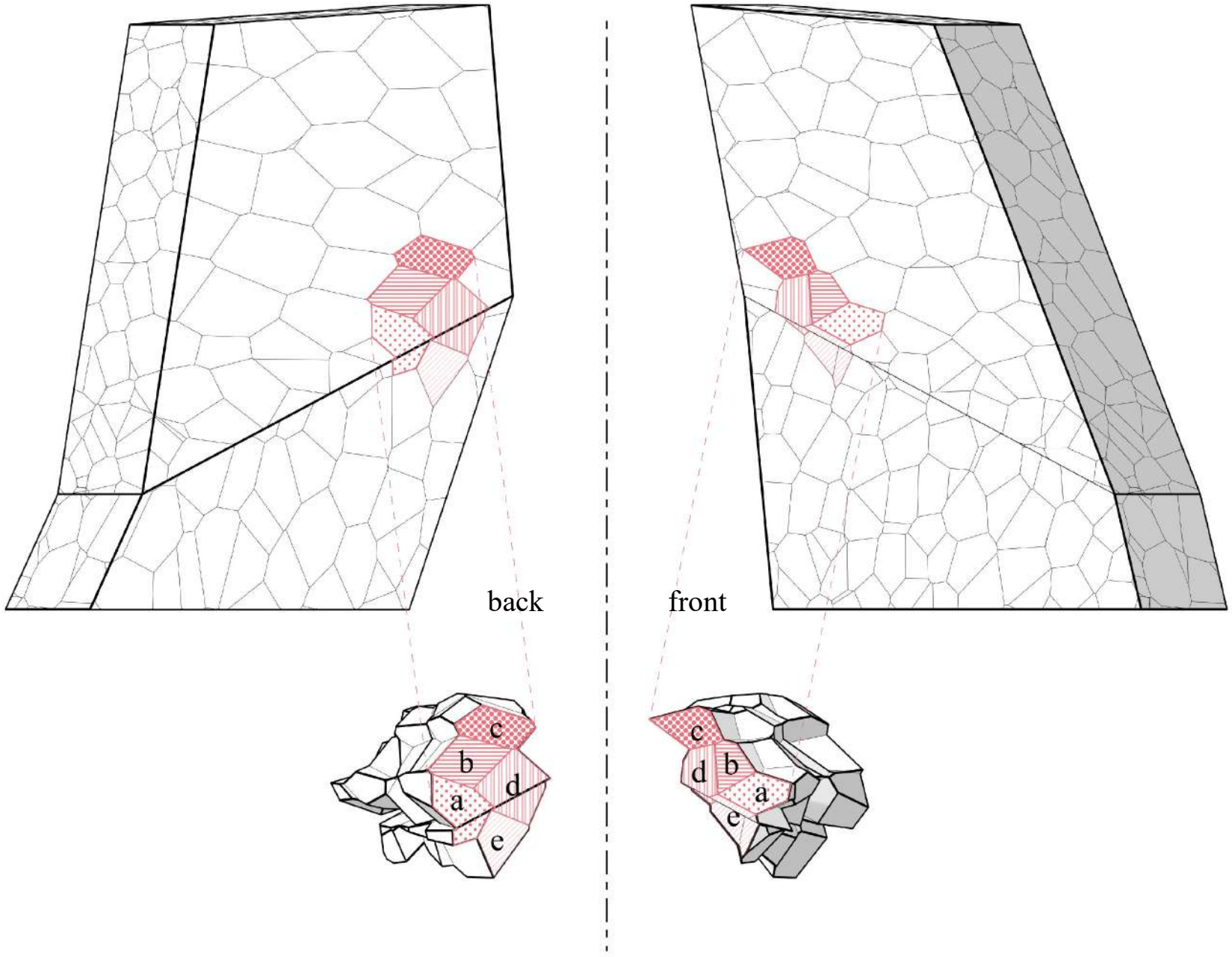




From vertical to inclined plane



Sub-fragment



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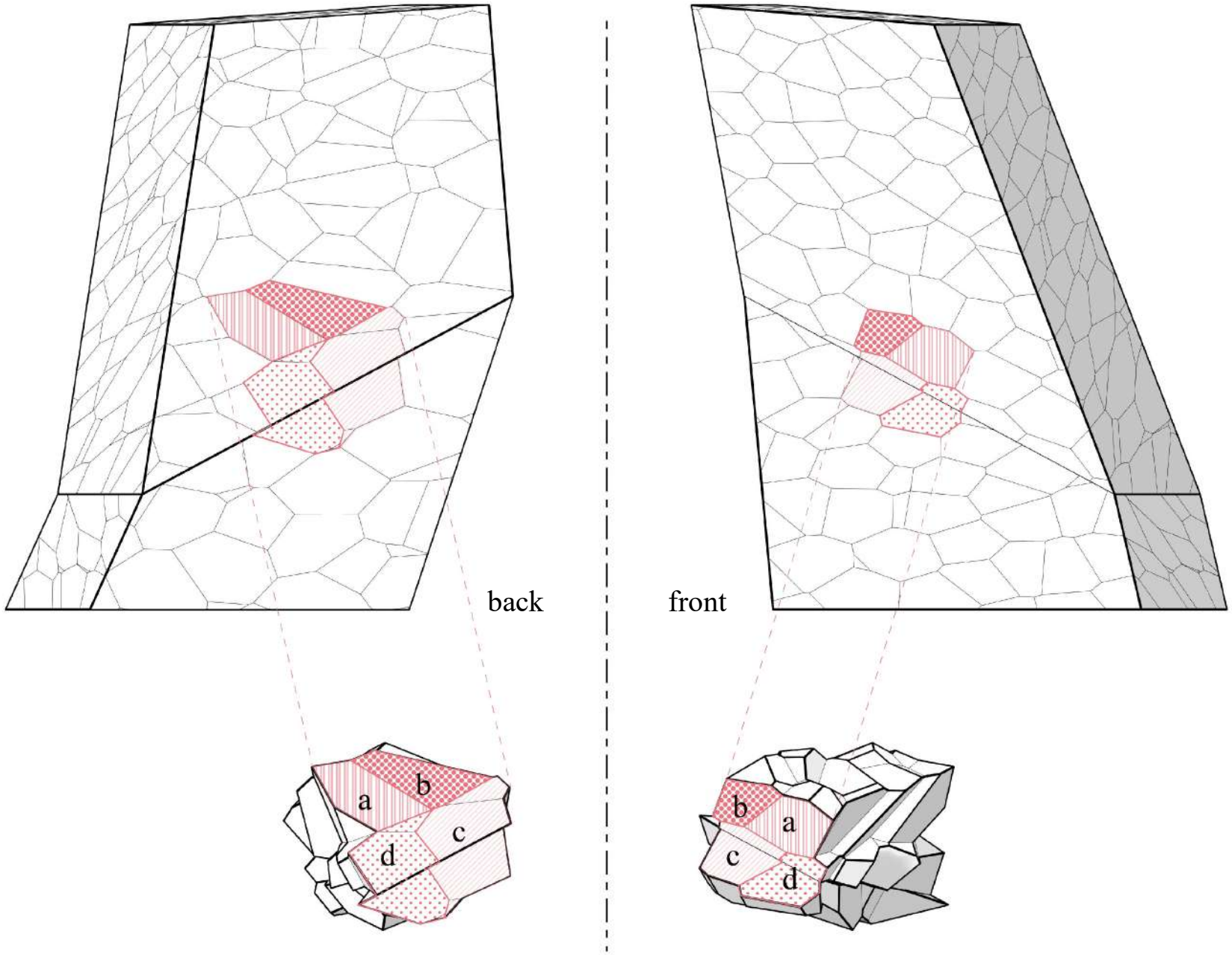

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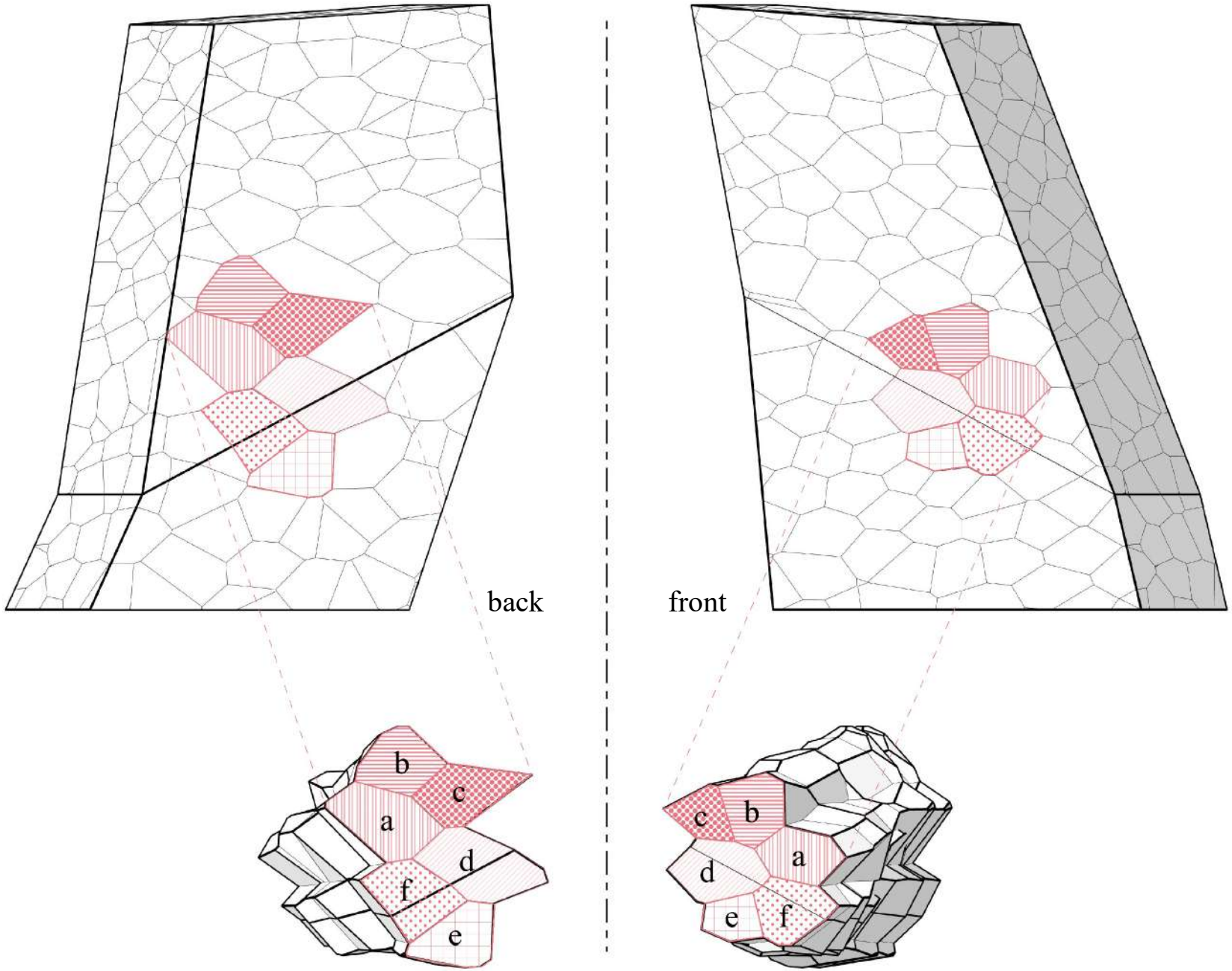

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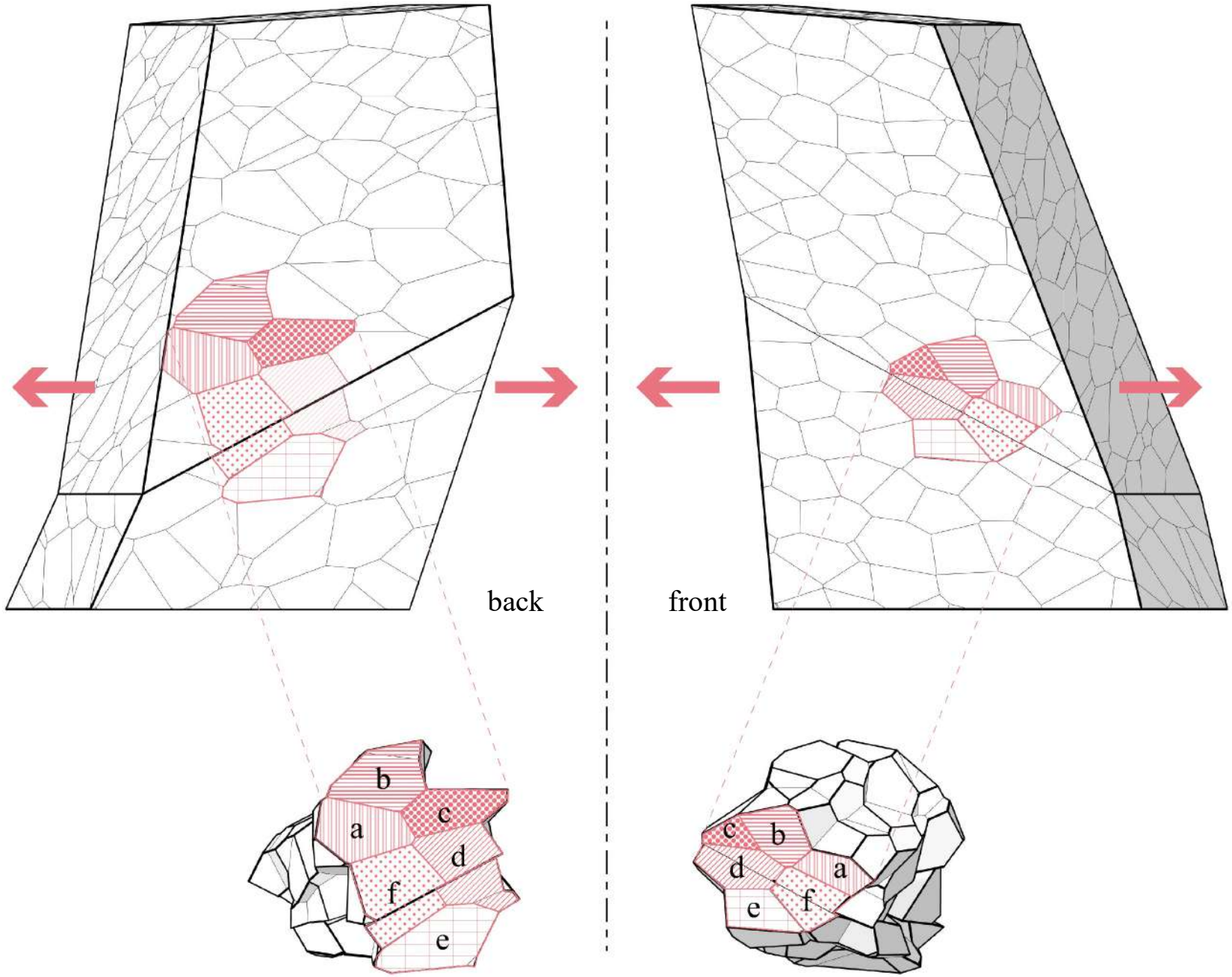

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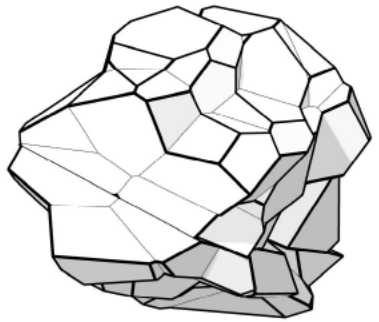

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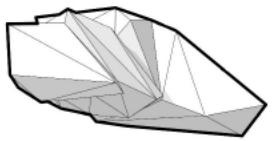
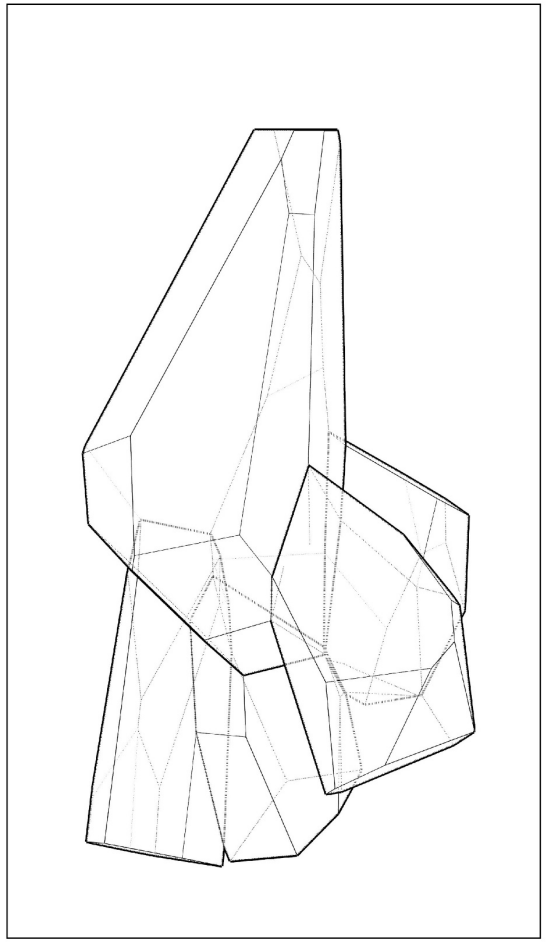


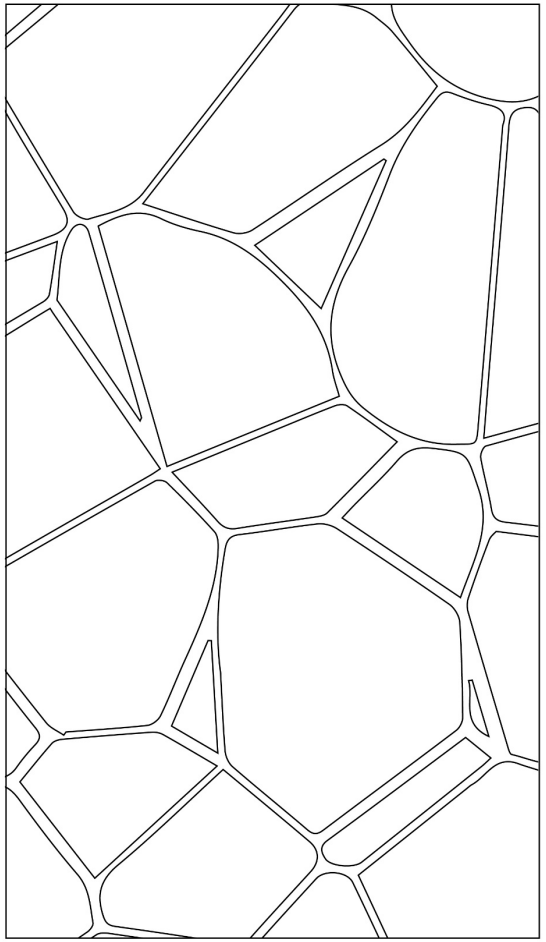
Sub-fragment

Why Voronoi?

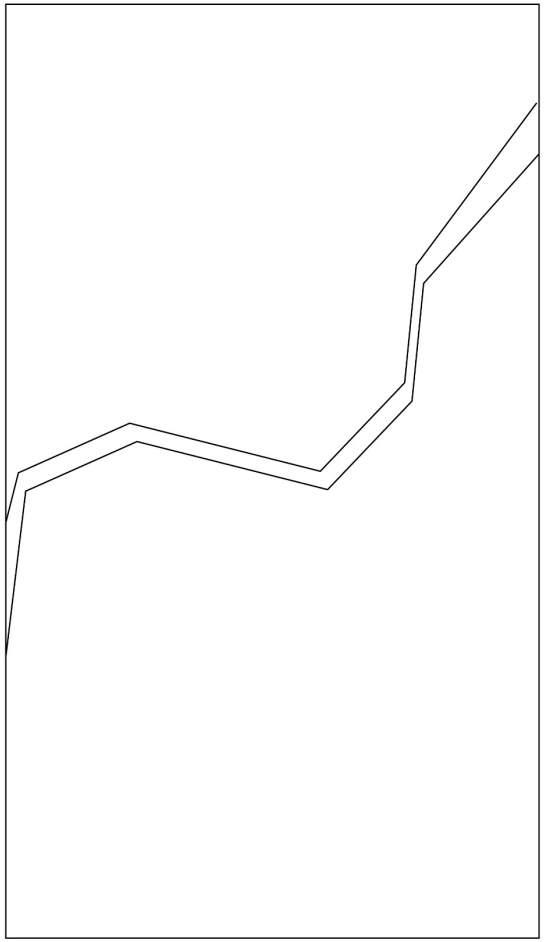
Sub-fragment



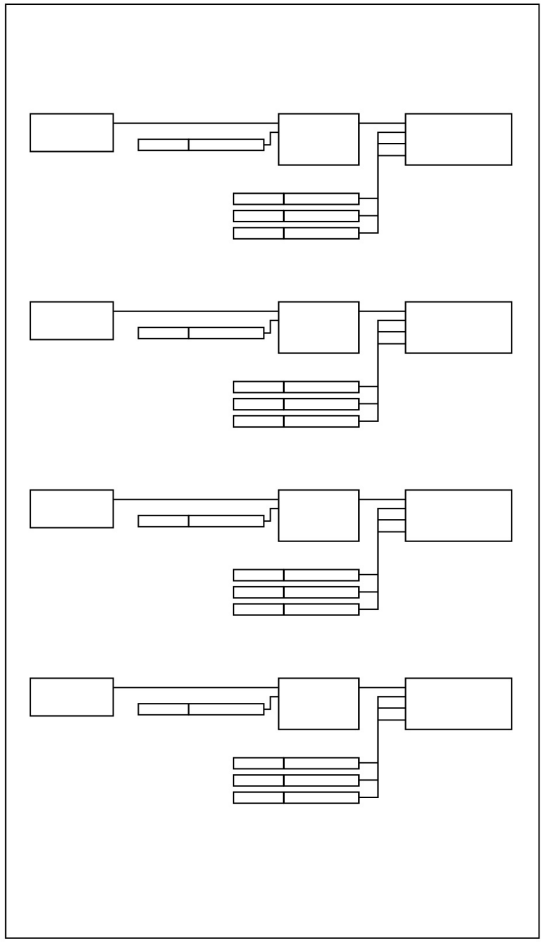
design language
consistency



resemblance to
nature



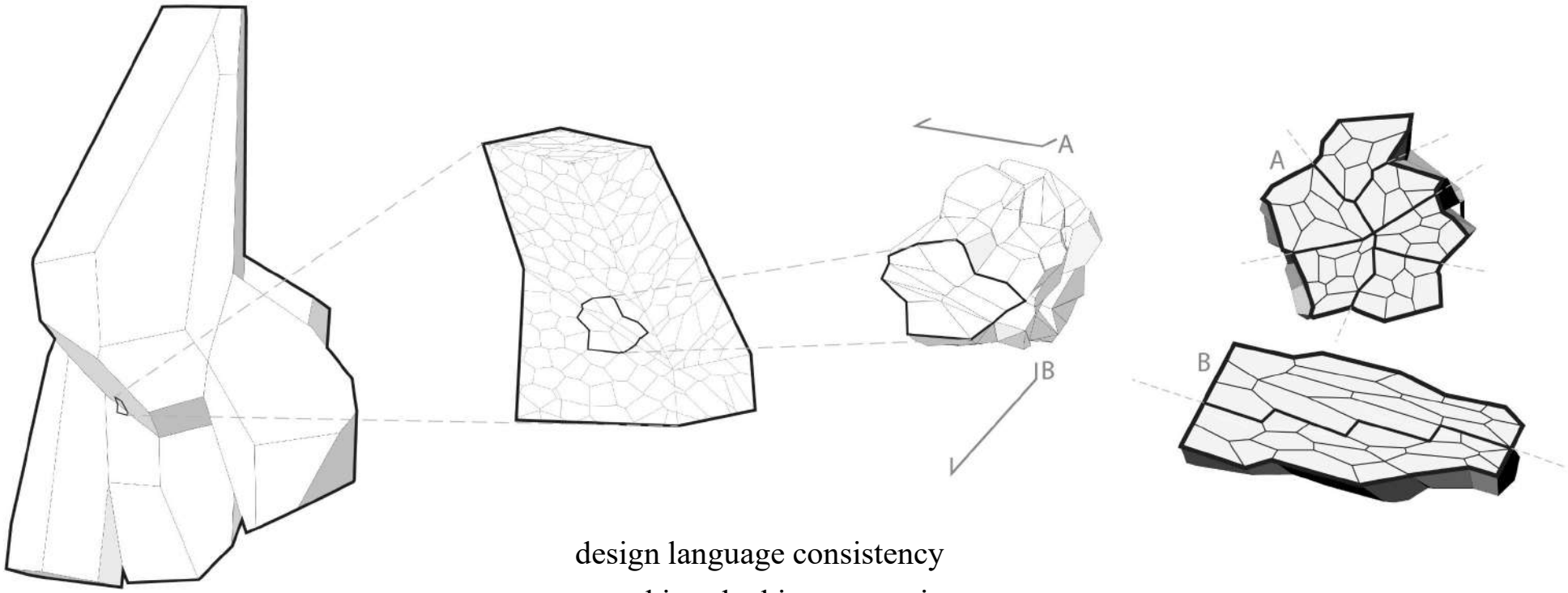
natural interlocking
properties



flexibility on rapid
computational generation

Sub-fragment

architecture component material

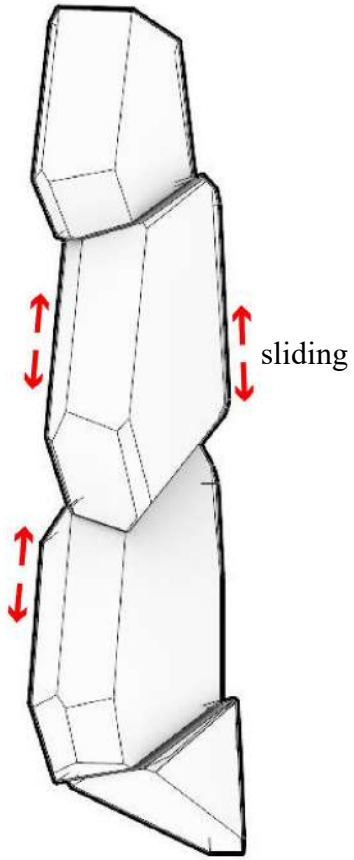


design language consistency
natural interlocking properties
resemblance to nature
flexible & rapid computational generation
material efficiency on complex geometry

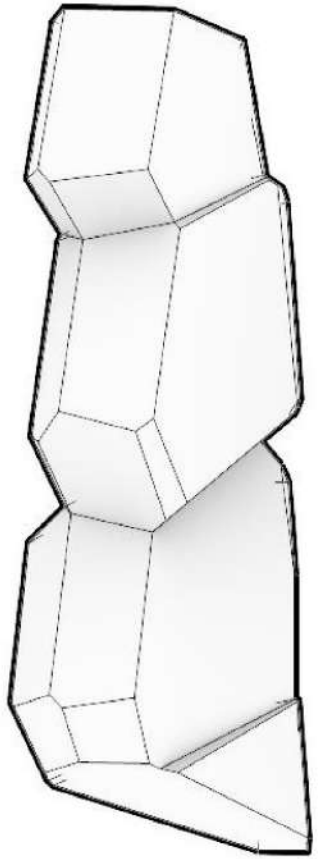
Sub-fragment

more stretching

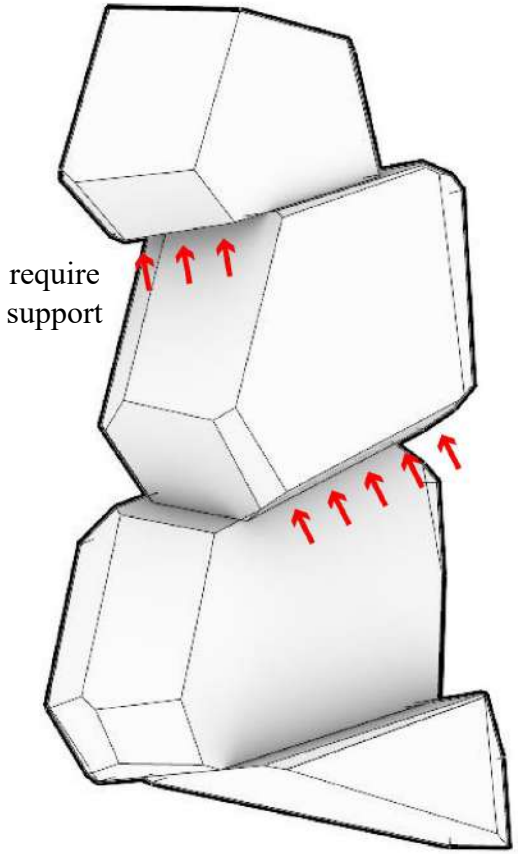
less stretching



printability V
interlocking X

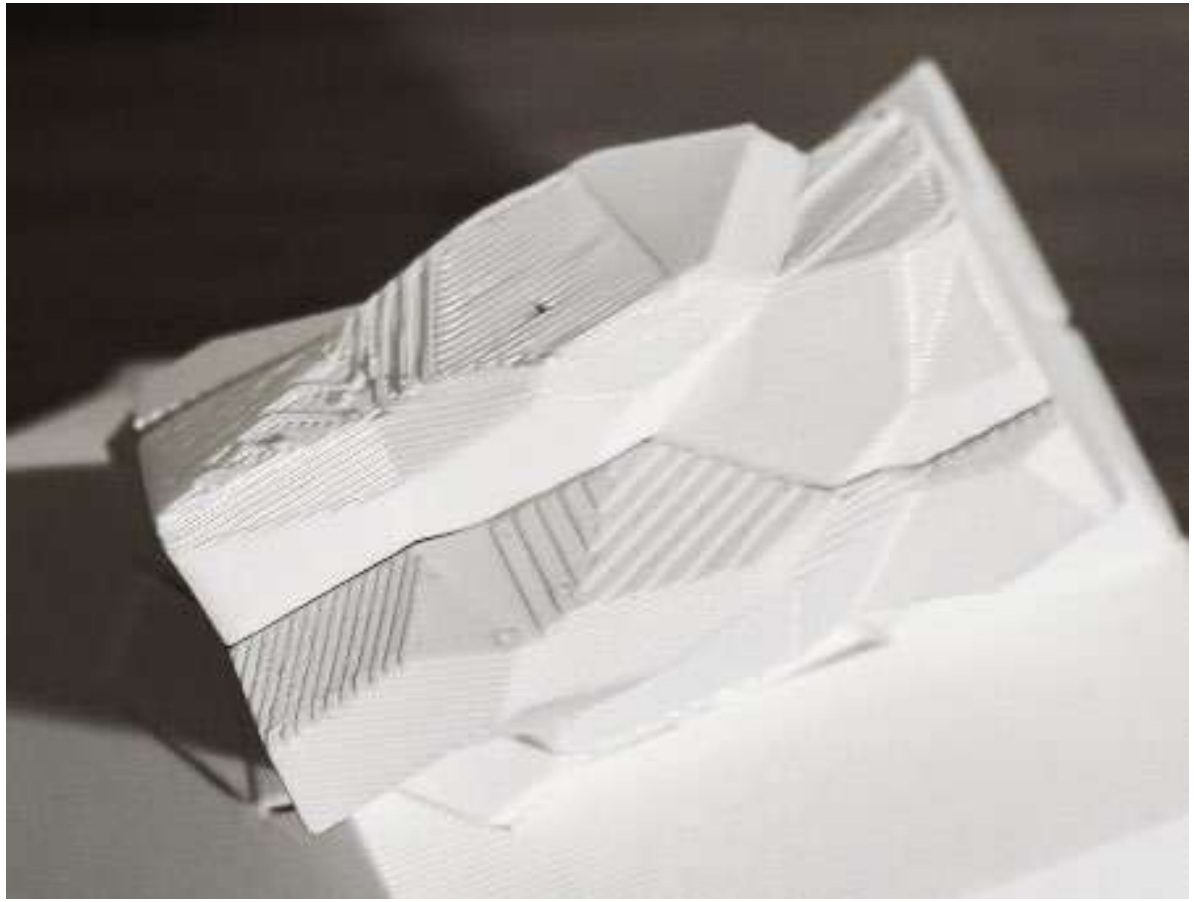


printability V
interlocking V



printability X
interlocking V

Interlocking Optimisation with 3D Print

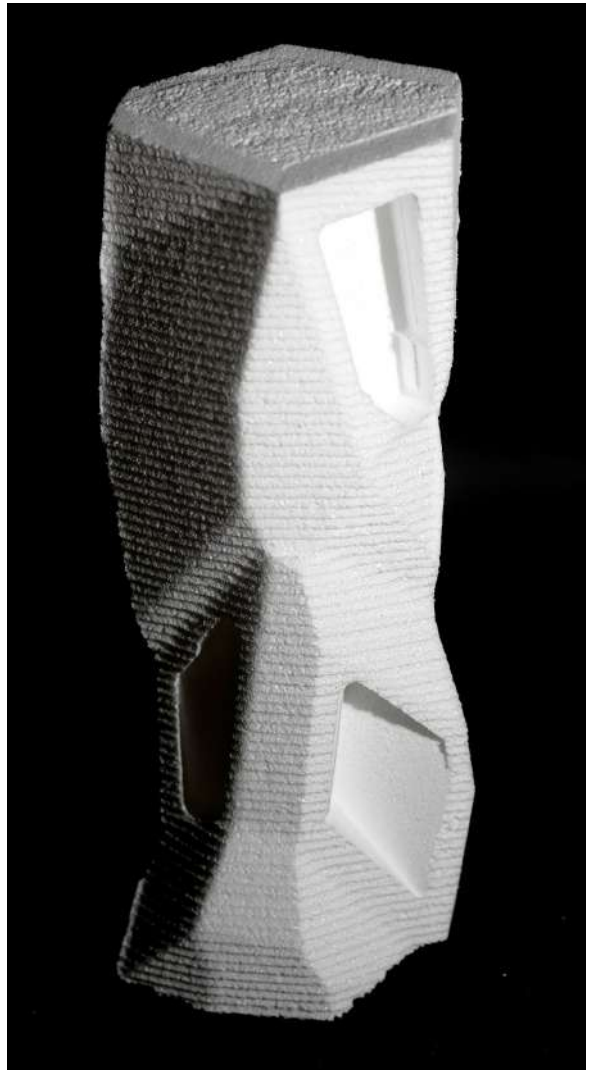


trial 1 (1:10 model)

trial 2 (1:10 model)

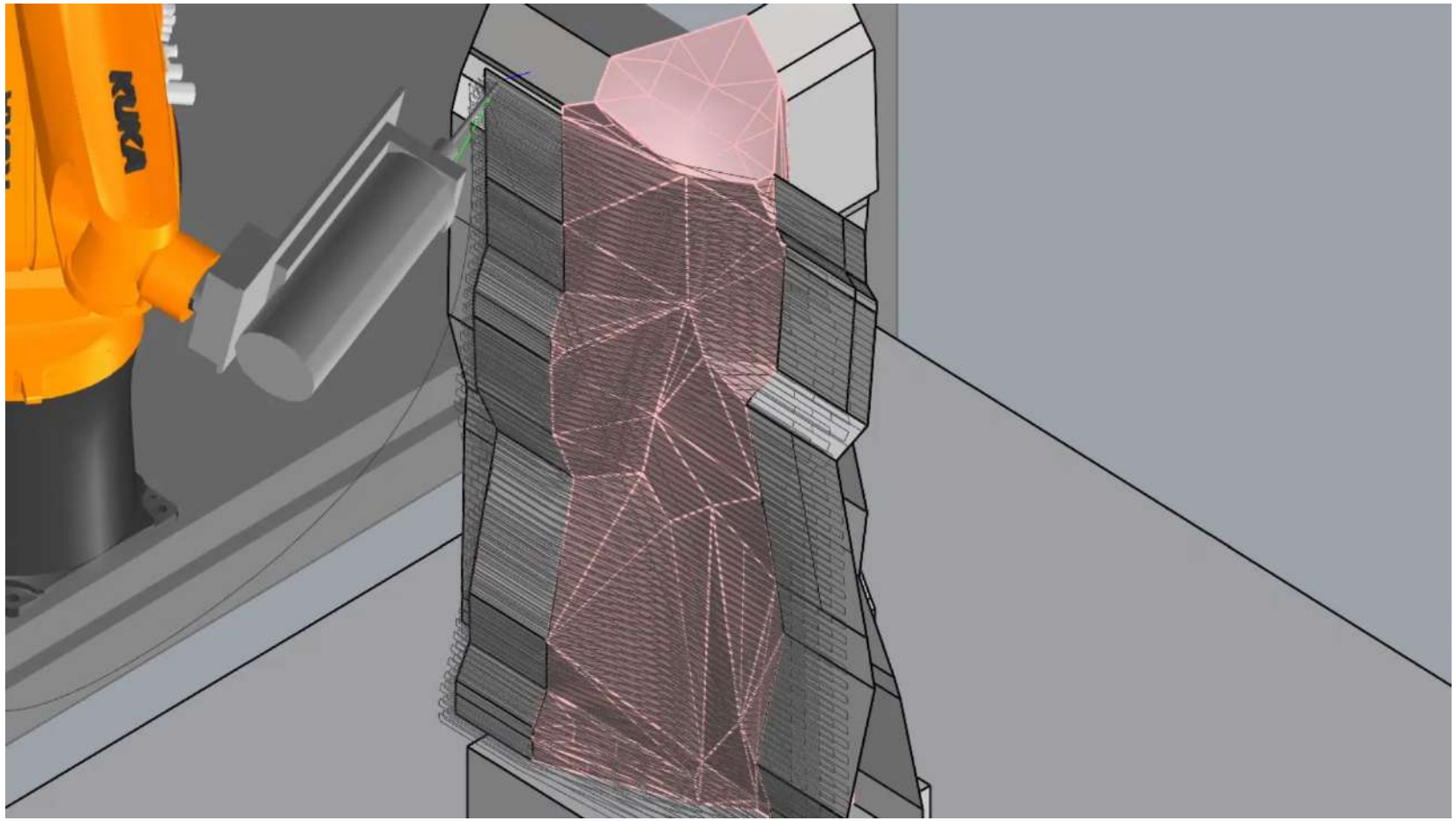
Fabrication: Milling

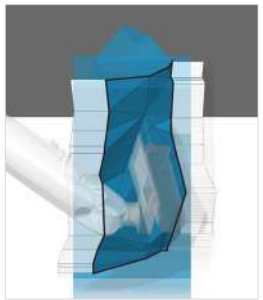
subtractive method on foam
using drill & robotic hand

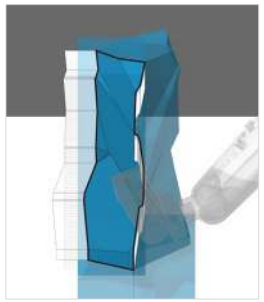


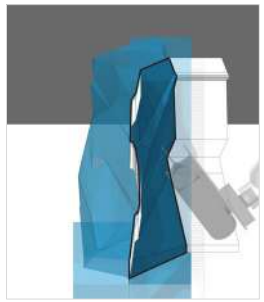
result (1:1 prototype)

Fabrication: Milling Process

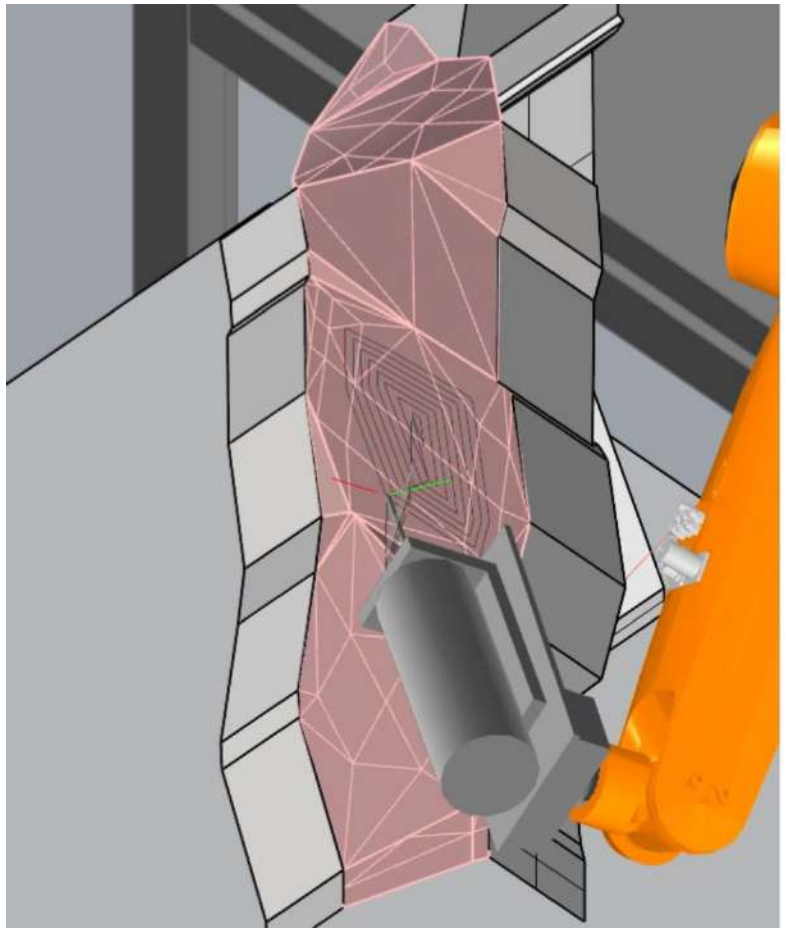


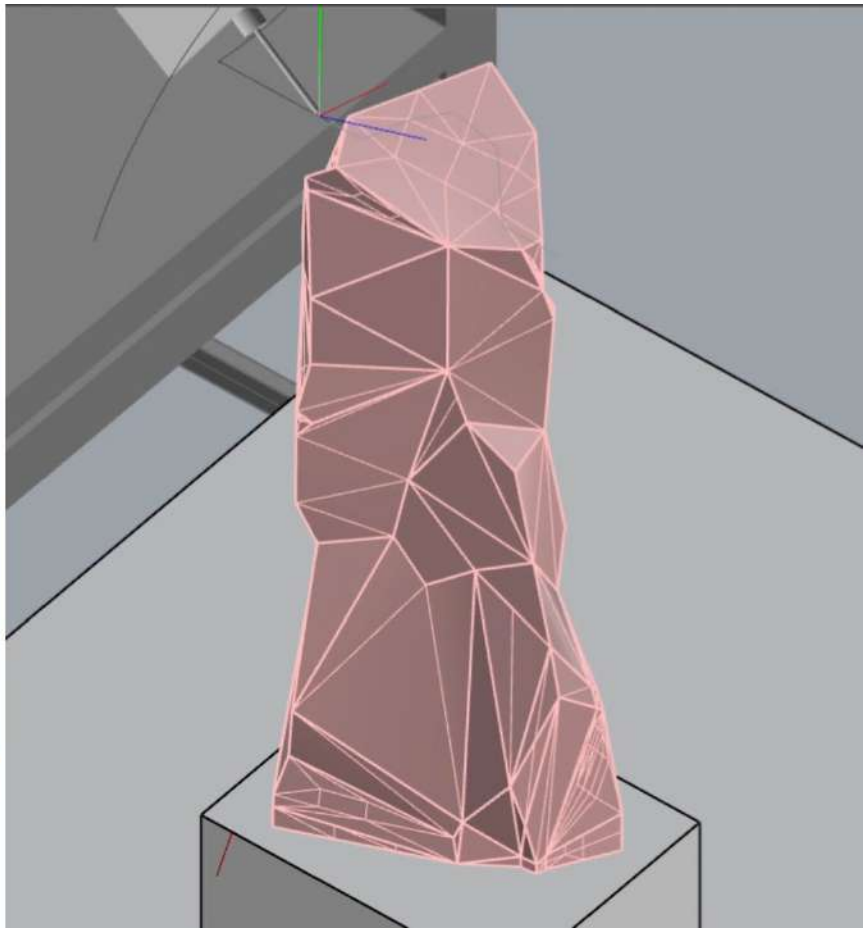

side A

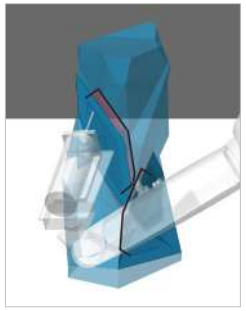

side B


side C

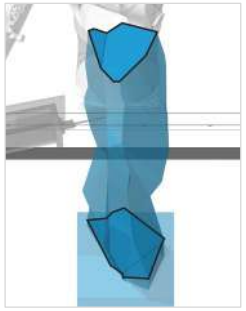
Fabrication: Milling Process







holding holes



top & bottom

& Interlocking Feature