Enkeboll Foundation for the Arts & Architecture

Sponsored Project:

Architectural Restoration and Conservation (ARC) of Carved-Wood Interiors

Final Report Volume 2

Carnegie Mellon University, School of Architecture

Administrator: Laura Lee

Lead Faculty: Kai Gutschow

Date: 11 November 2005

Enkeboll Foundation
for the Arts & Architecture

Sponsored Project:

Architectural Restoration and Conservation (ARC) of Carved-Wood Interiors, 2004-2005

Final Report
Volume 2

Carnegie Mellon University, School of Architecture

Administrator: Laura Lee
Lead Faculty: Kai Gutschow

Date:
11 November 2005

Project:

Architectural Restoration and Conservation (ARC) of Carved-Wood Interiors, 2004-2005

STAGE III Report

Carnegie Mellon University, School of Architecture

Team:

Administrator:	Laura Lee
Faculty / Instructors:	Kai Gutschow
Student Assistants:	Joshua Cummings, Design
	Elizabeth MacWillie, Design
	Jared Langevin, Design
	Chang Zhang, Design
	Zach Hartle, Editing
Participants:	Rebecca Rahmlow
	Francisco Restrepo

Date:
11 November 2005

PROCESS

Teamwork

Tools/Technology

Precedents

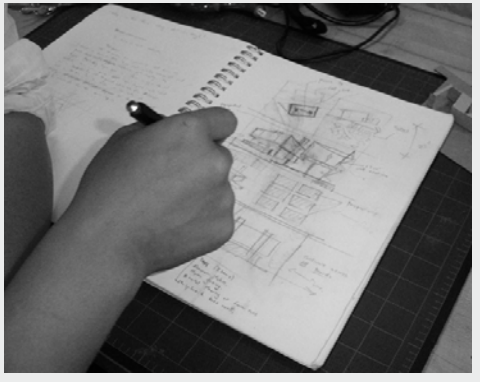
TRANSFORMATION

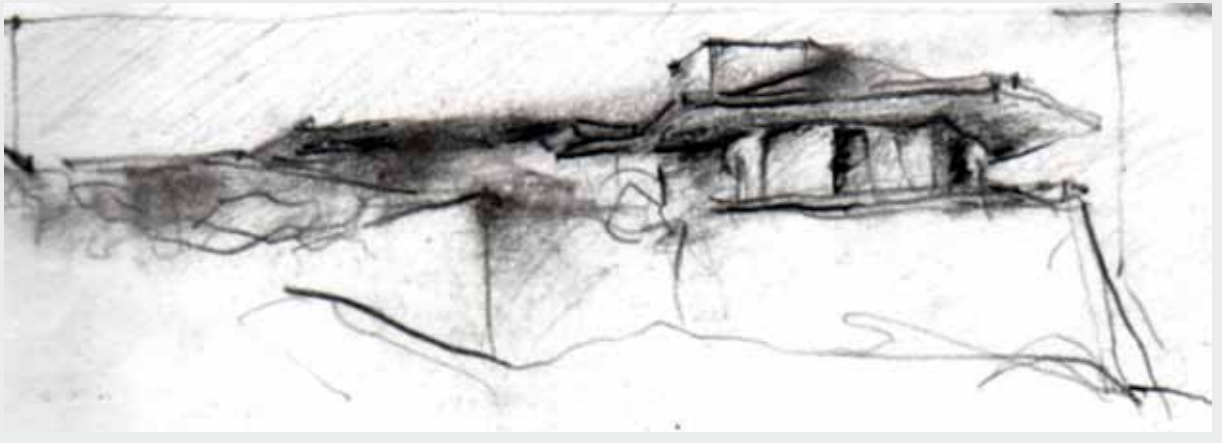
ENKEBOLL FOUNDATION

PROJECT PHASE III

Carnegie Mellon University **Architecture**

1.0





Kentuck Knob

Following the precedent and analysis phases, we began the transformation phase with new input, new ideas, and a new process. Ultimately our goal was to find some way to incorporate technology into traditional design.

With this focus in mind, we approached this process like any other design problem: through discussion, collaboration, and sketching.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.1

Teamwork

With a large, new group of people, we each began our own design schemes, focussing on our individual abilities and skills. During weekly meetings we would meet and discuss our work as a group.

Approaches to design were often vastly different. Some people continued to work mainly through hand drawing while others began developing form in digital resources. Often though, overlaps in schemes were present as ideas of manipulating technology began informing our ideas.

Teamwork

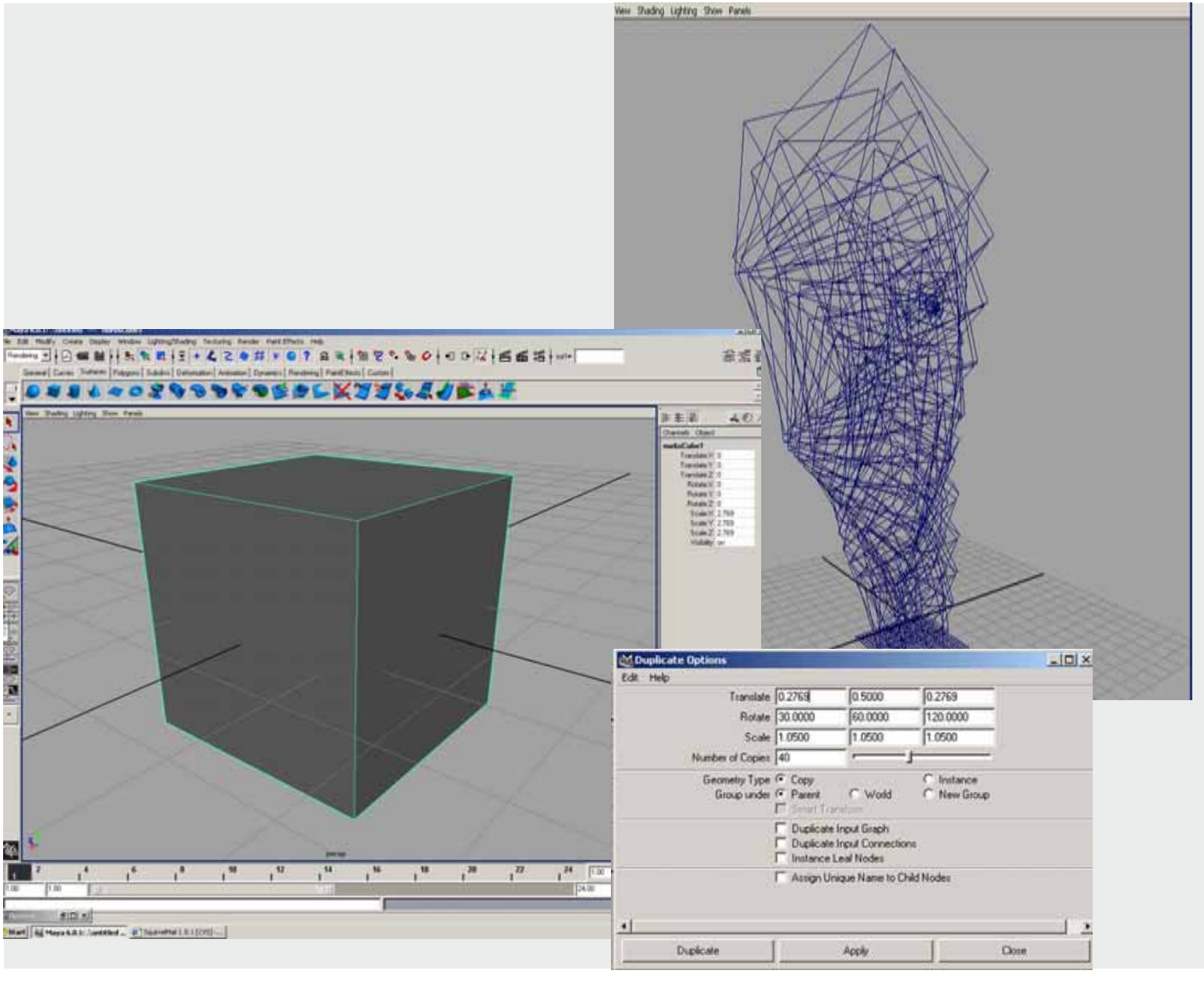
As the weeks progressed, we gathered all our work and began to organize it. We pinned up our work, made corrections and edited as we moved along in the design process. In the final phase we began to lay everything out into chapters to prepare for our final product.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.3



Digitalism

Eventually, all of our designs began to incorporate the use of computers and technology to generate our design. Through the use of computers, the manipulation of forms became easier and more precise than ever before in our process. Translations, rotations, and re-flectections could be generated by the simple input of numbers and degrees.

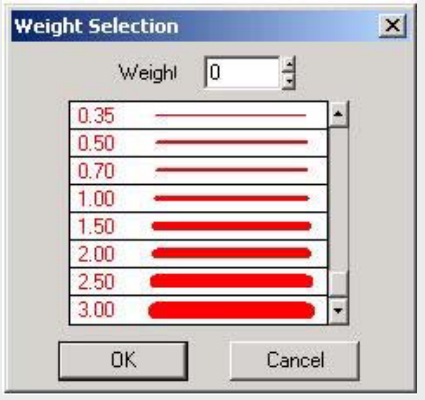
Through the transformation of basic unit shapes, unique and varied arrangements could be formed.

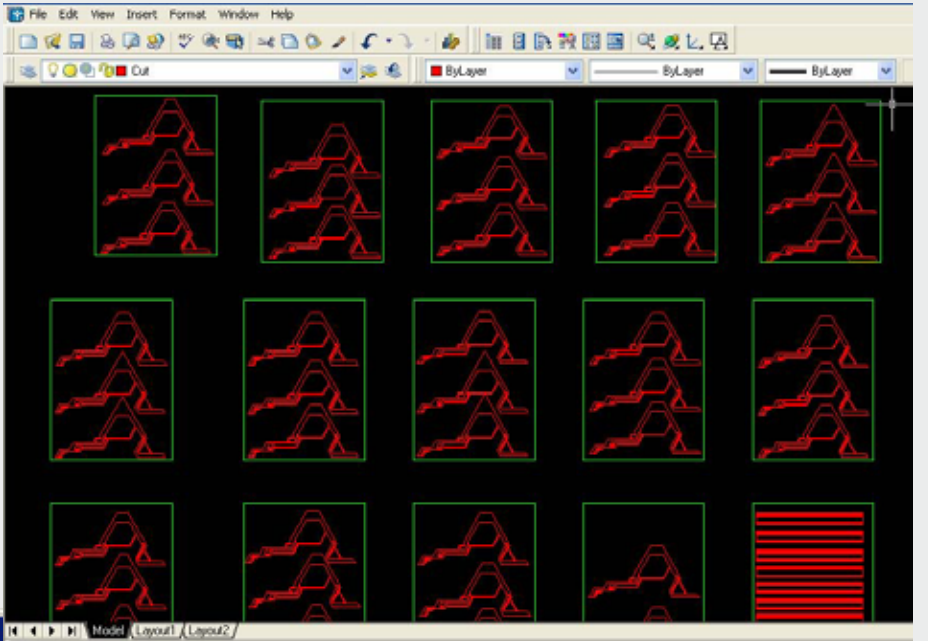
TRANSFORMATION

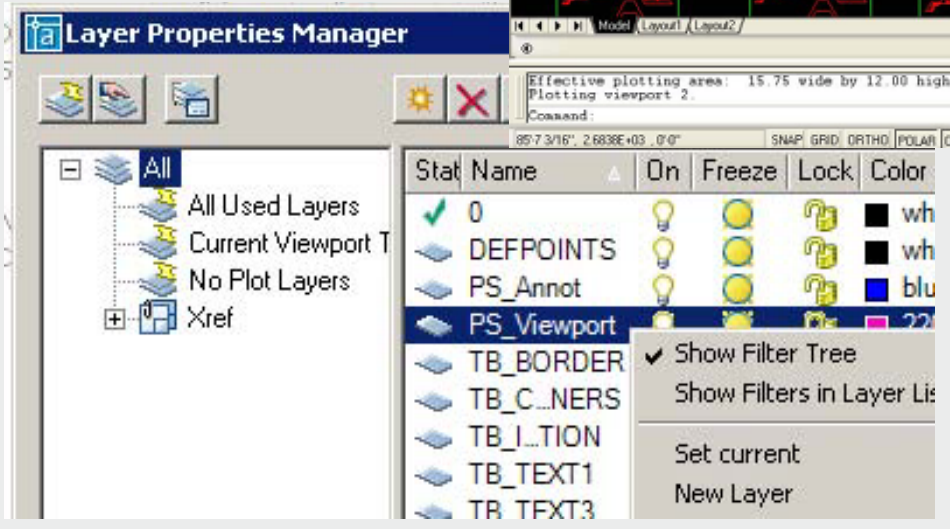
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.4







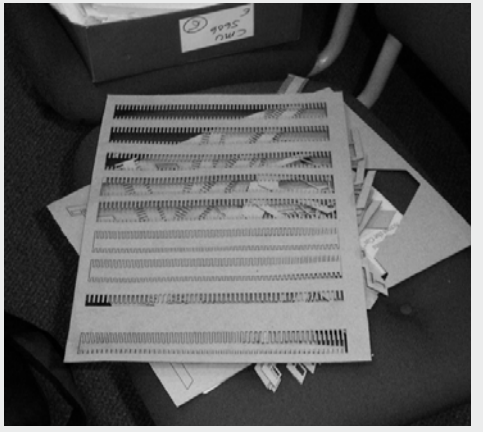
CAD for Laser Cutter

After developing our schemes in various three dimensional modeling programs, we had to prepare separate digital cad files for transfer to rapid prototyping equipment.

Three dimensional forms had to be translated to a series of two dimensional files representing slices of the actual form. Eventually these sectional slices are compiled in consecutive order to generate the form.

Because of the precision of the laser cutter, designs could take on much more complex shapes. Before, multiple cutouts and changing angles were limited to what could be produced by an exacto knife and the hand.

Laser Cutter

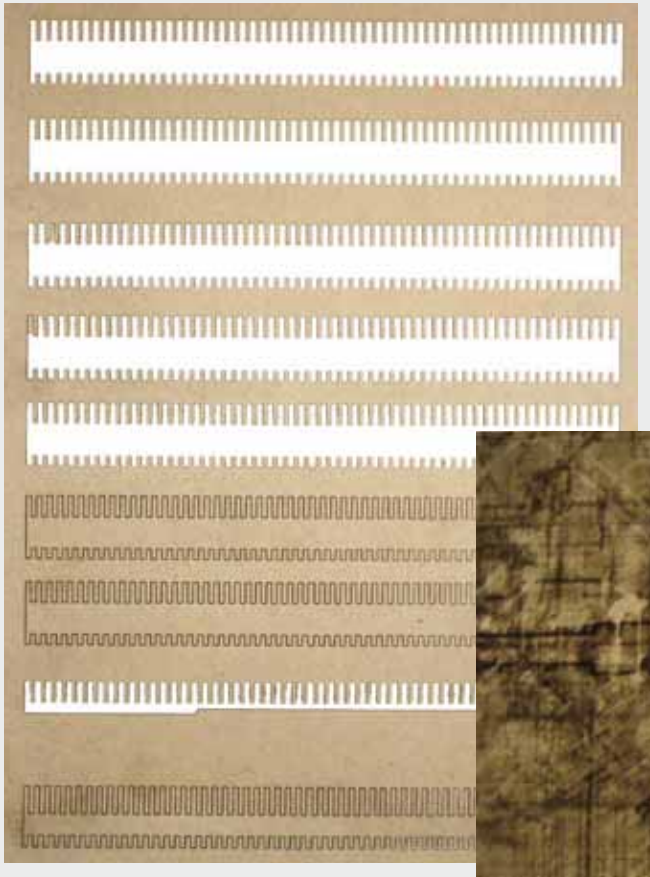


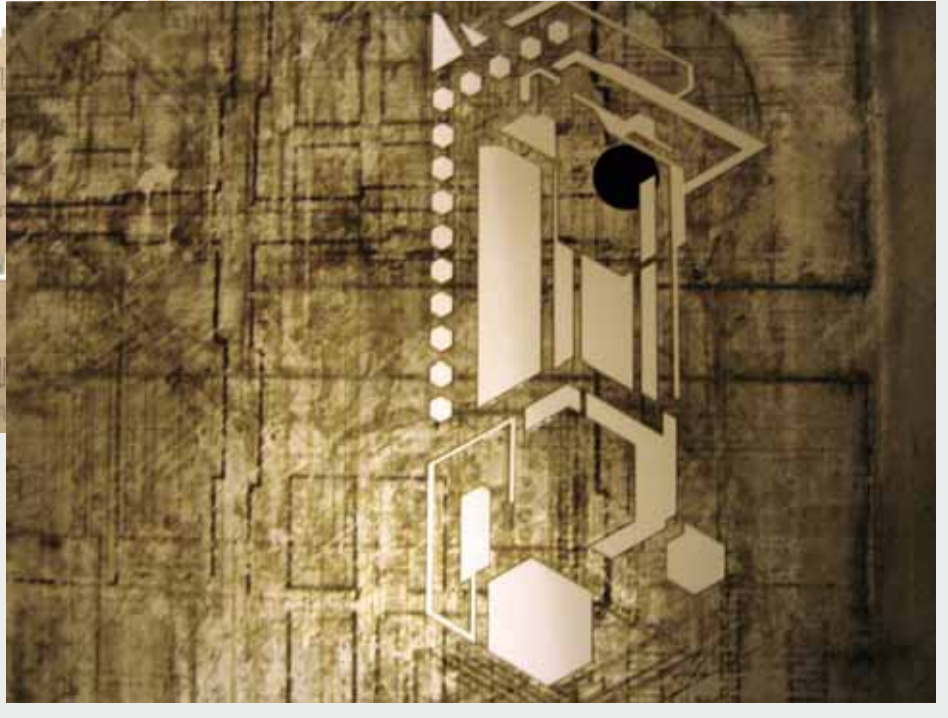
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.6





TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.7

Harvard

(Left) Gateway to Infinity is composed of 504 triangles that when combined form a funnel. Constructed of mylar laminated over nylon reinforcing yarn and joined by polycarbonate rivets.

(Middle) Represented is Toshiko Mori, whose research considers traditional modes of mechanical production, but also explores digital technologies such as CNC, CAD/CAM, stereo lithography, and three dimensional printing.

(Right) Becoming Wall/Becoming Chair by Coggan & Crawford Architectural Design was originally designed for an exhibition of concept chairs. The maple plywood-and-solid poplar bench, was originally conceived for a yoga studio.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.8

Harvard

Organized by Toshiko Mori, the Edge Exhibitiion attempts to radicalize the materials' spatial, tactile, and experiential potentials. Edge studio designs an enclosure to: be made of a single enclosure, use a consistent and systematic method of construction, design three joints by the turning of three corners, include three types of apertures to be designed in the enclosure. Constructed by laser cutting 192 individual panels of thin sapele mahogony and joining then with rivets and it's own complex system.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.9

Virgin Atlantic Clubhouse

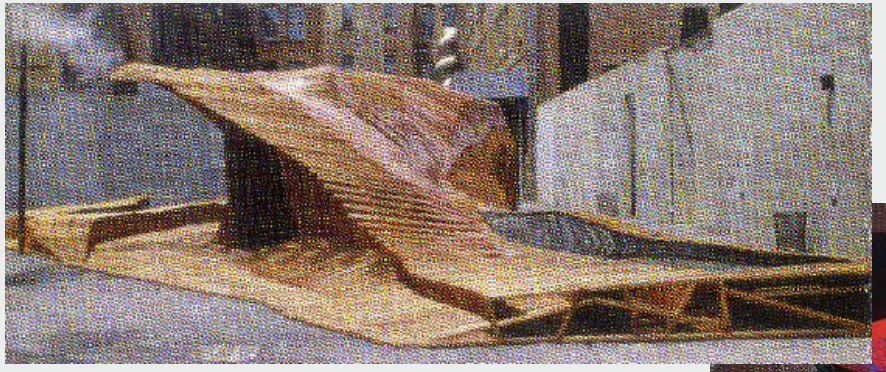
The Vigin Atlantic Clubhouse by SHoP Architects is an upperclass airport lounge that overlooks a retailing concourse reasonably described as a shopping mall. Mass produced non-structural slats of medium-density fiberbaord and steel pipe columns make up the structure of this lounge.

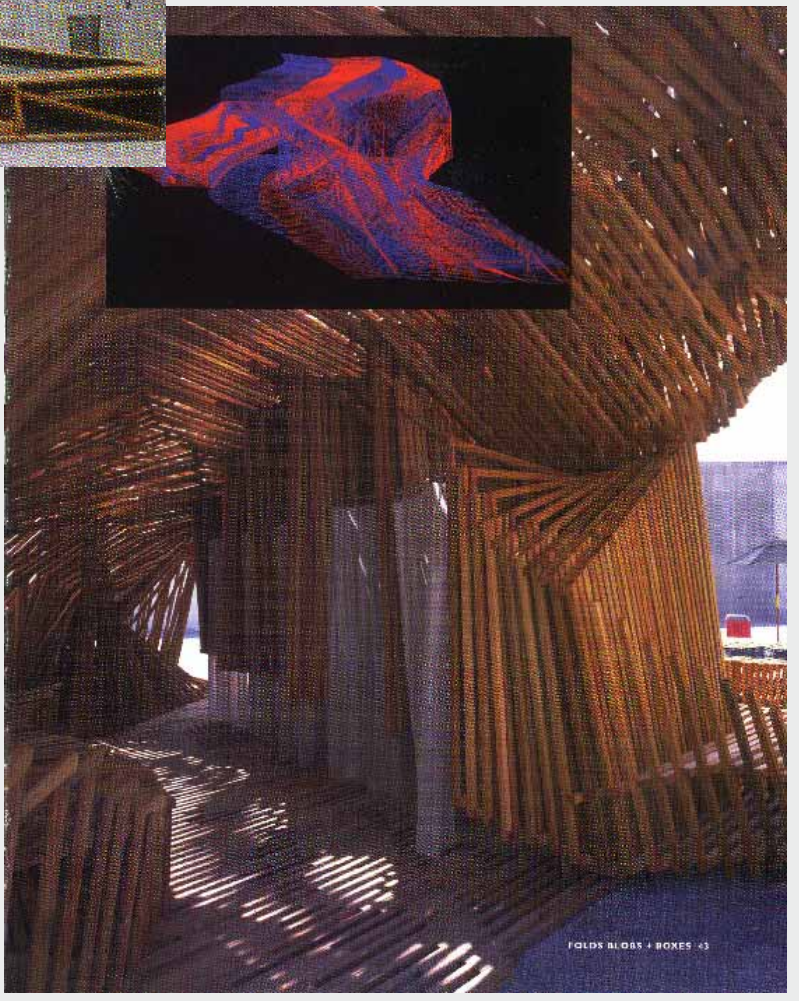
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

1.10





Dunescape

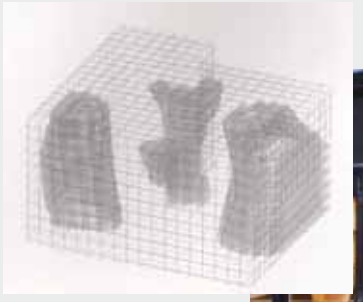
Designed by SHoP Architects for the P.S. 1 Summer Courtyard Installation, Dunescape created an oasis in the middle of Queens New York. Slats of wood undulated to create a landscape that provided places to lounge, sit, and wade, in the sun or the shade.

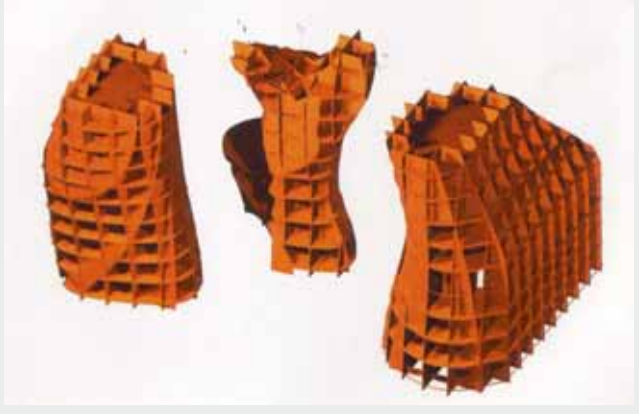
TRANSFORMATION

ENKEBOLL FOUNDATION PROJECT PHASE III

Carnegie Mellon University **Architecture**

1.11





Florence Loewy Bookstore

Three undulating grid forms that act as stacks for books with concealed storage spaces within. Conceived digitally and then produced using a CNC machine.

TRANSFORMATION

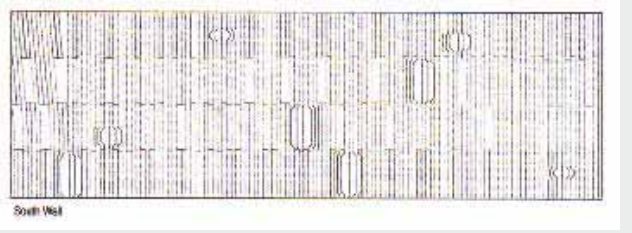
ENKEBOLL FOUNDATION
PROJECT PHASE III

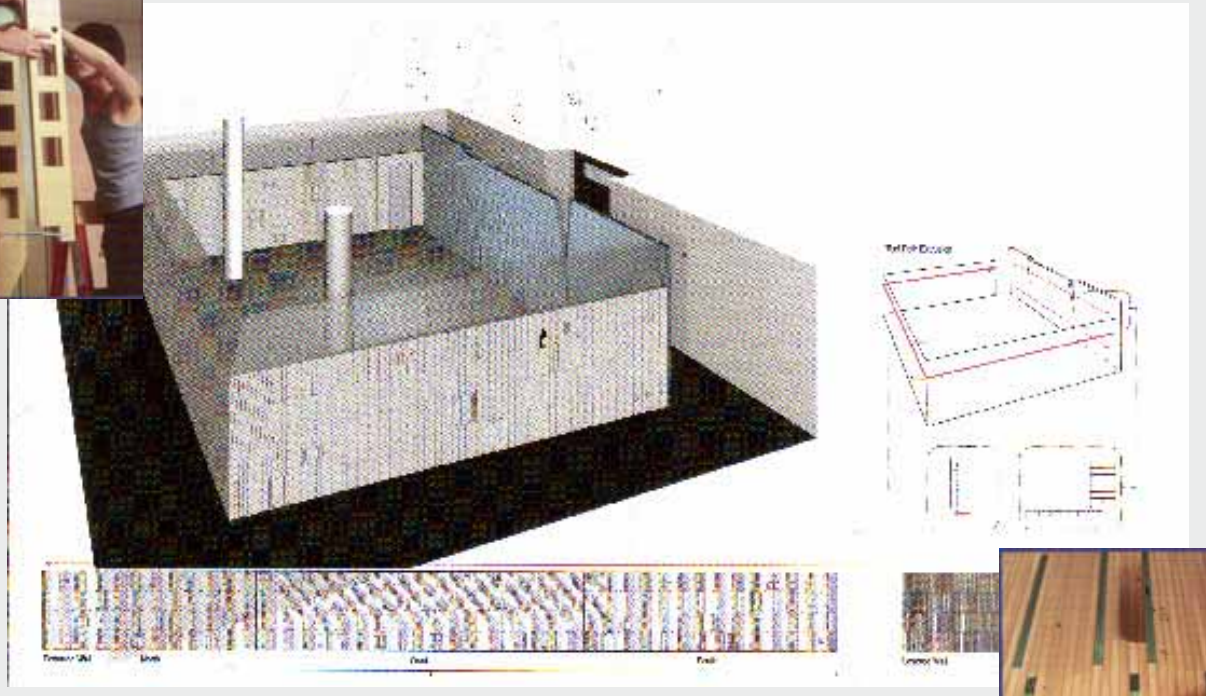
Carnegie Mellon University
Architecture

1.12

GEORGIA TECH

The technology of digitally manufacturing materials has become very prevalent at Georgia Tech. In this instance they are digitally manufacturing wood to create a seat in one of their halls. Using machines such as a CNC and a Laser Cutter, Georgia Tech can produce many products such as this one with very ittle effort involved.





Columbia

A new room is being added in the center of the faculty office area. Students are manufacturing this room by the use of a CNC machine. The machine allows them to produce multiple slighty altered versios of these wood panels

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

1.14

Clemson

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

1.15

Clemson

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

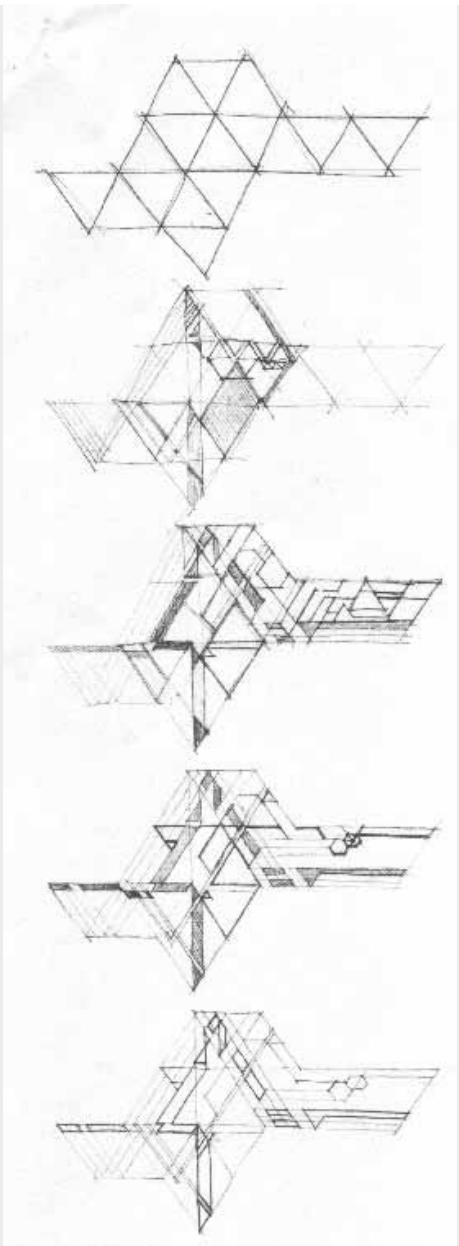
1.16

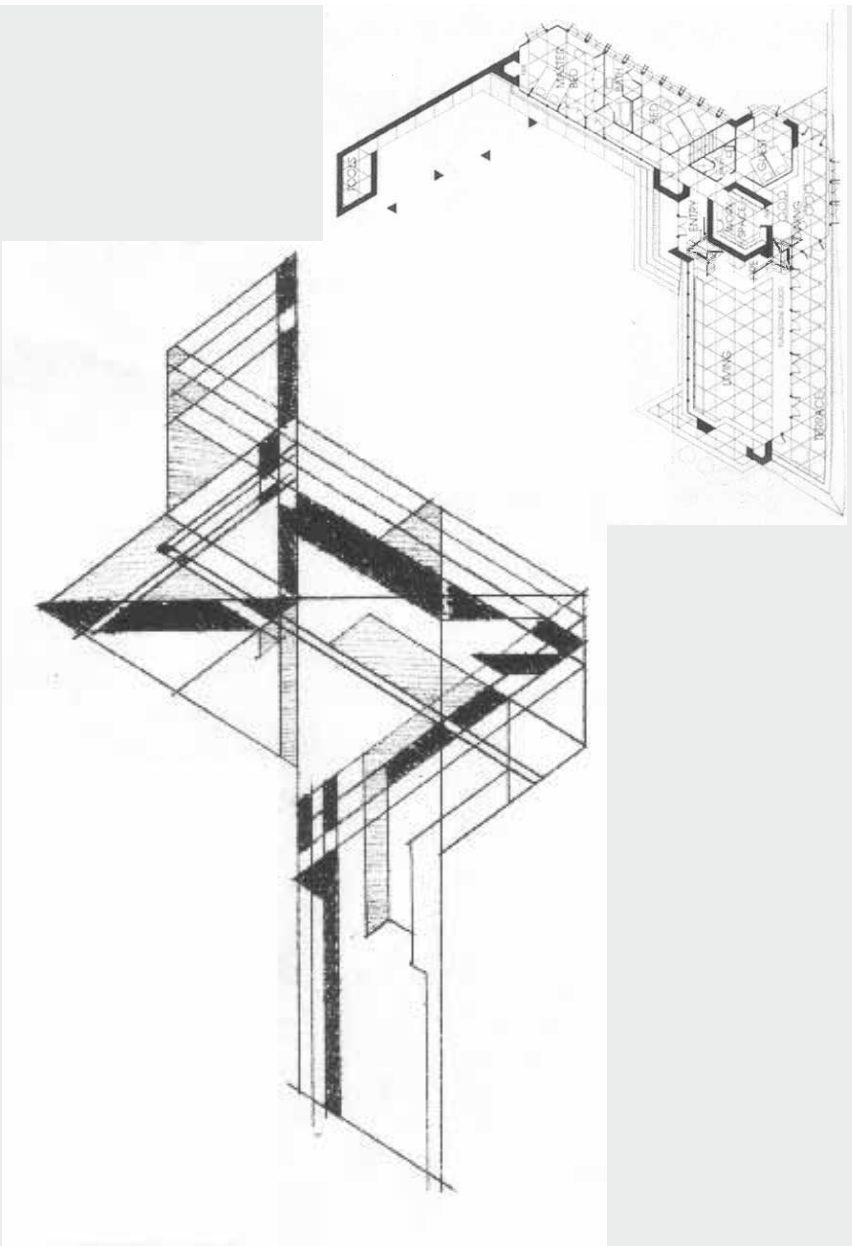
Transformation:
Early Design Experiments

TRANSFORMATION
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

2.0





Kevin Wei
Rug Design

Reacting to the obtuse angles present in the Hagan House, this rug is meant to “hug” any such angle and serve as a threshold marker when transitioning from one space to another.

The rug design is based off of a triangle/hexagon grid, just like the existing Hagan grid; however, the first process sketch shows triangles transcribed within a hexagon, whereas the Hagan grid omits such triangles.

Principles such as repetition, layering, and interlocking geometries helped generate the rug design, and were derived from the plan and interior view sketches, but undoubtedly it is a whimsical creation loosely tethered to any Hagan-esque aesthetic.

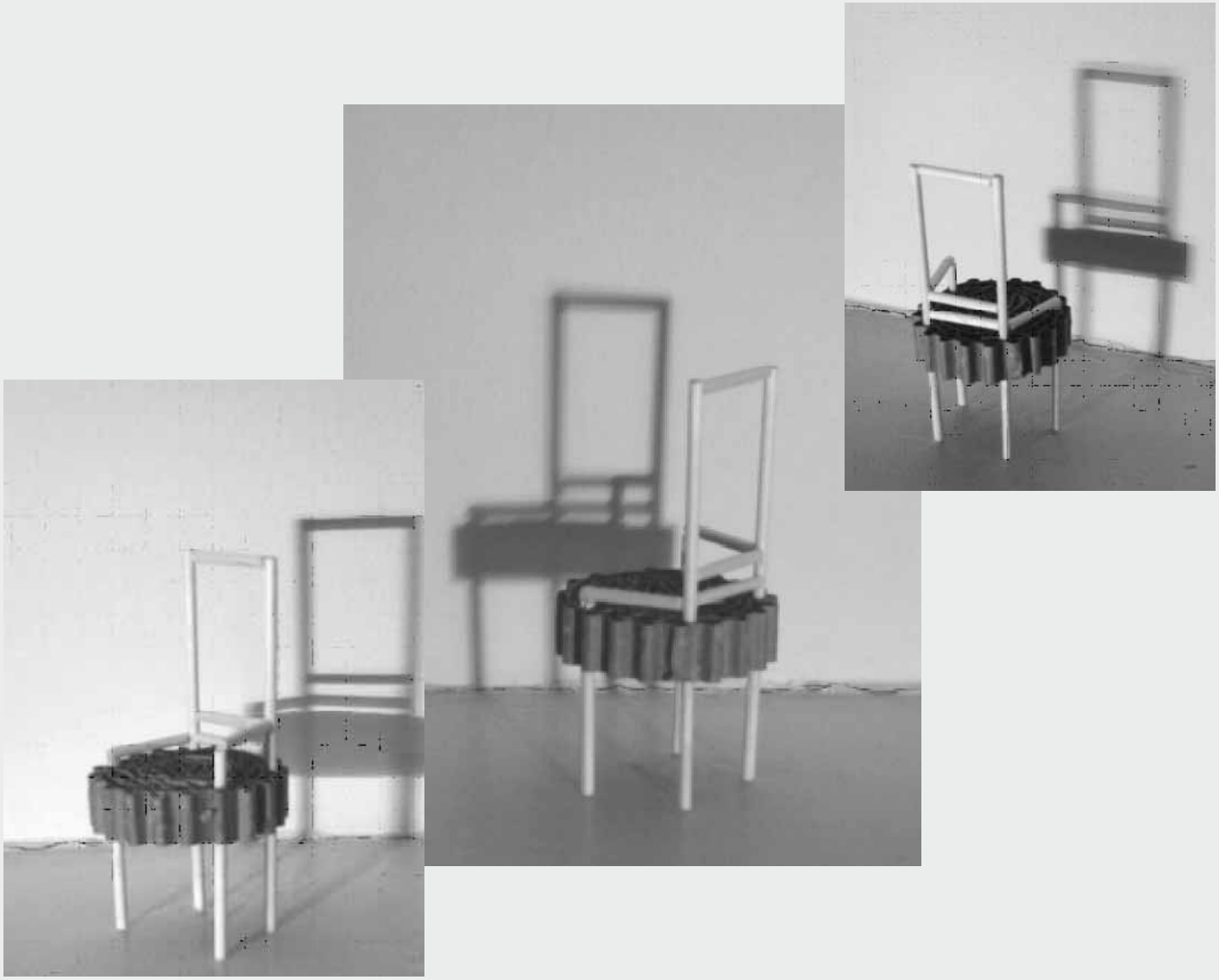
In the design, shapes imply lines and direction, and lines evolve into shapes. Those shapes then combine into other shapes, with other lines react to their intersection by changing direction or opacity.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.1



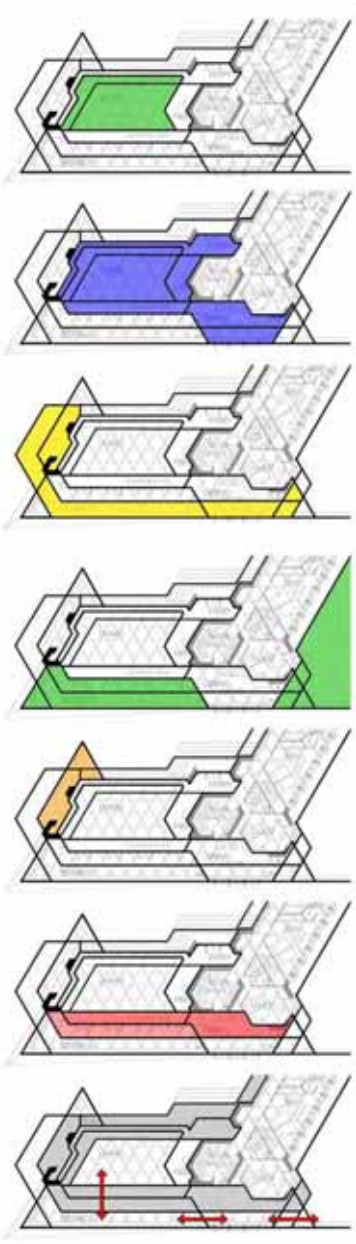
Carole Aspeslagh
Chair Design

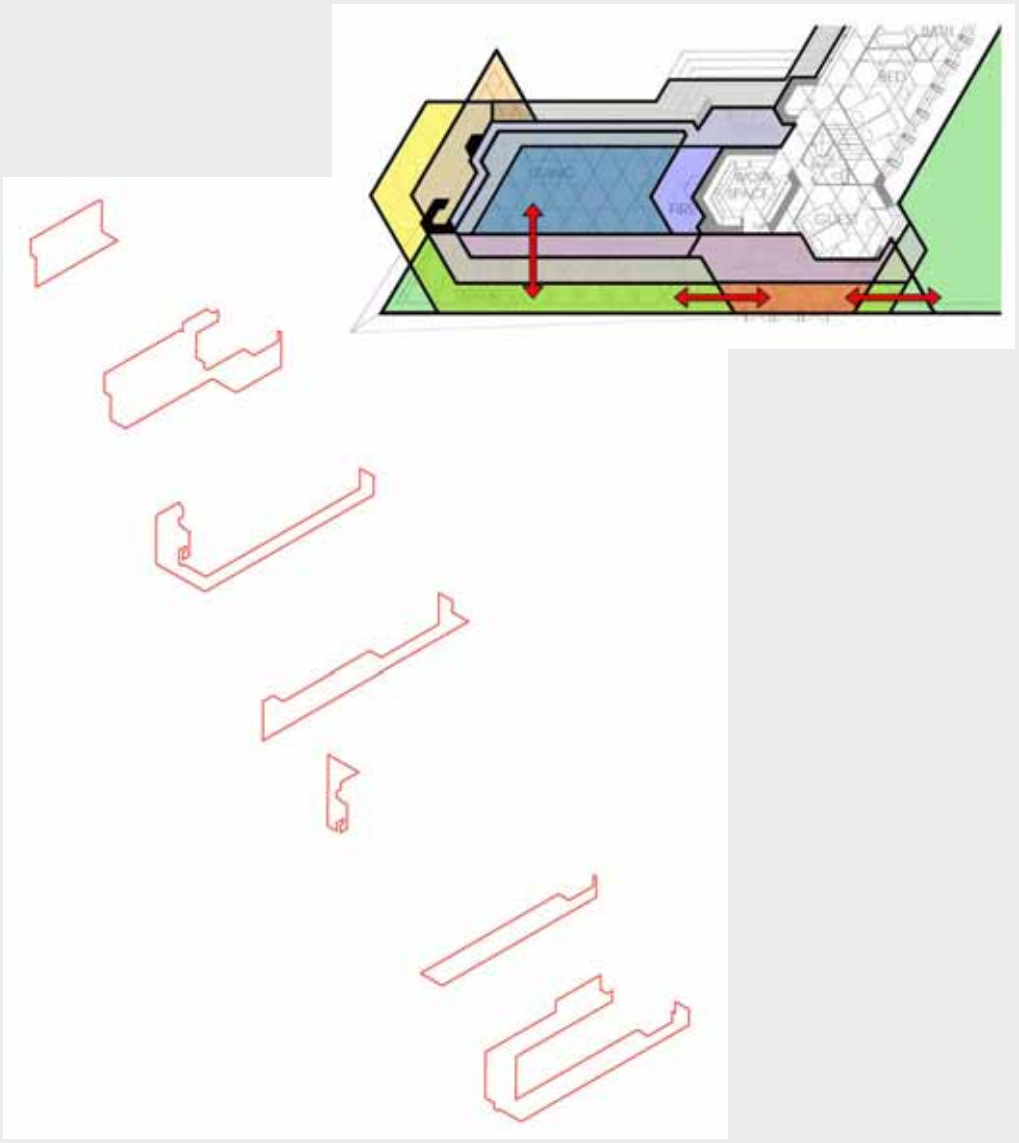
A proposed chair design based on previous analysis of Hagan House.

TRANSFORMATION
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.2





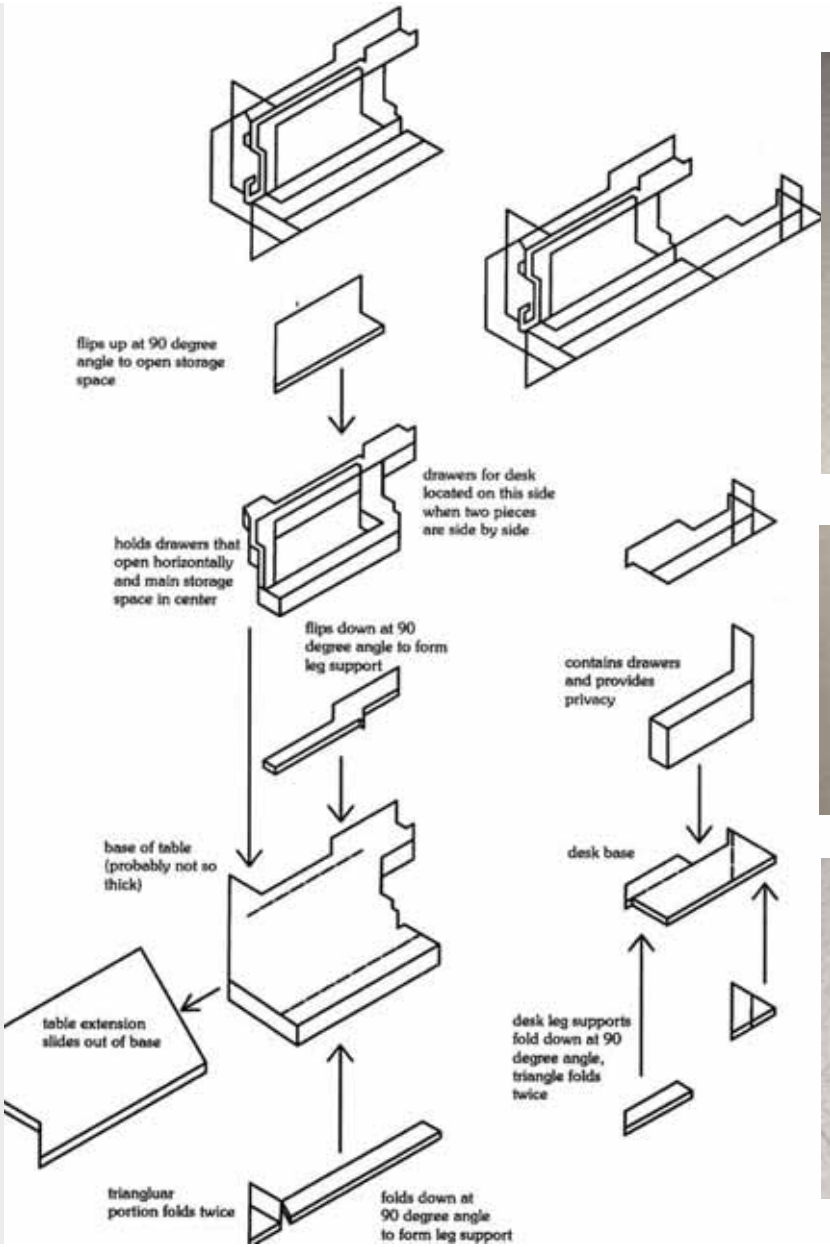
Becky Rahmlow

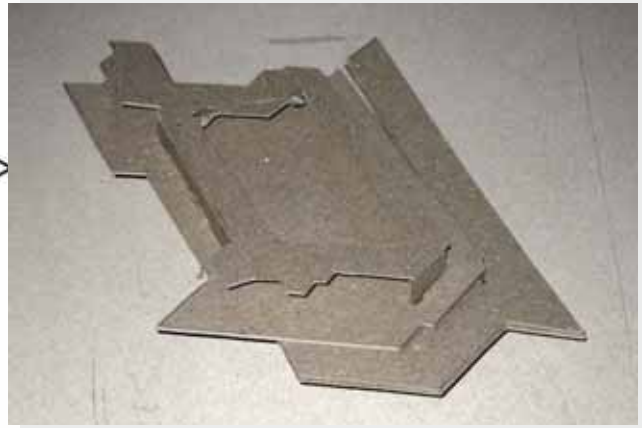
TRANSFORMATION

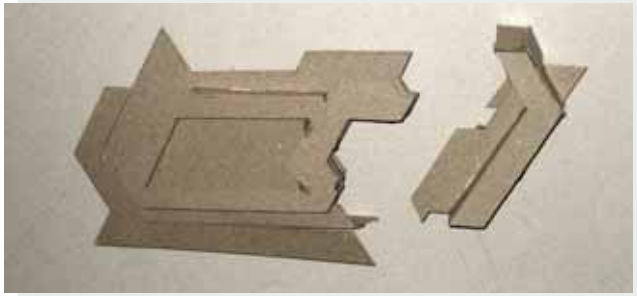
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.3







Becky Rahmlow
Desk and Coffee Table

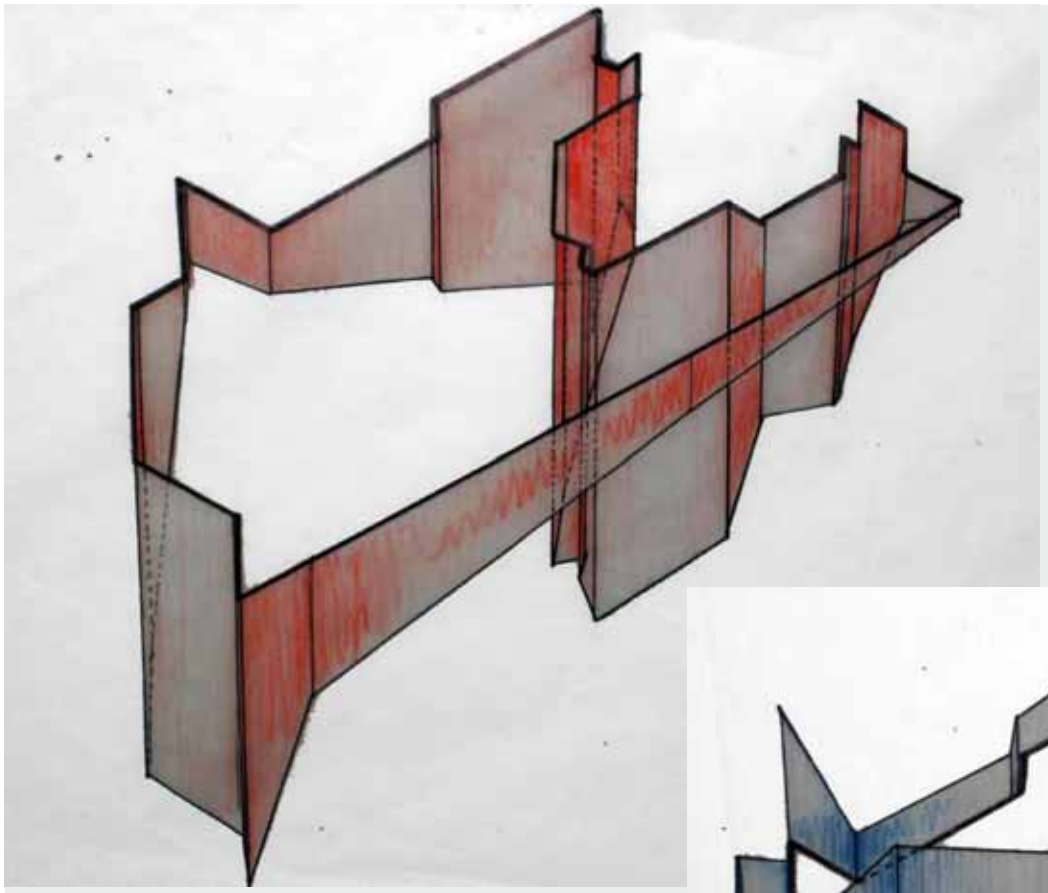
This table design demonstrates the possibilities of transforming a diagrammatic analysis of zones created by overlapping architectural experiences generated by light, materiality, height, and textures (i.e. carpet). In keeping with Wright's themes of overlapping and continuous space which can be subdivided with the addition of architectural elements into smaller spaces, this furniture design functions as multiple pieces that can serve separate functions as well as larger ones. The two-dimensional analysis creates a three dimensional form by extending, folding and extruding elements of the analysis.

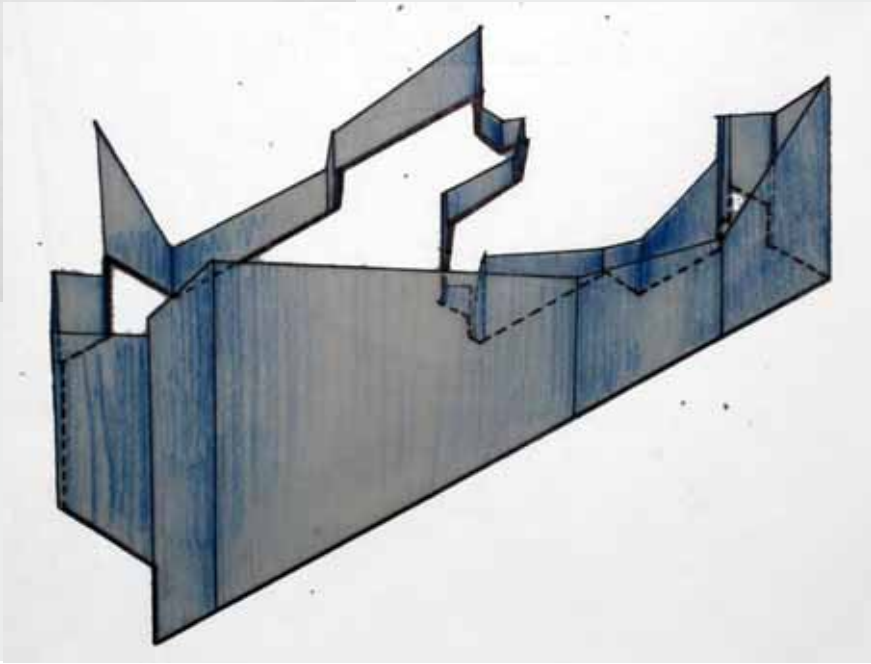
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.4





Becky Rahmlow

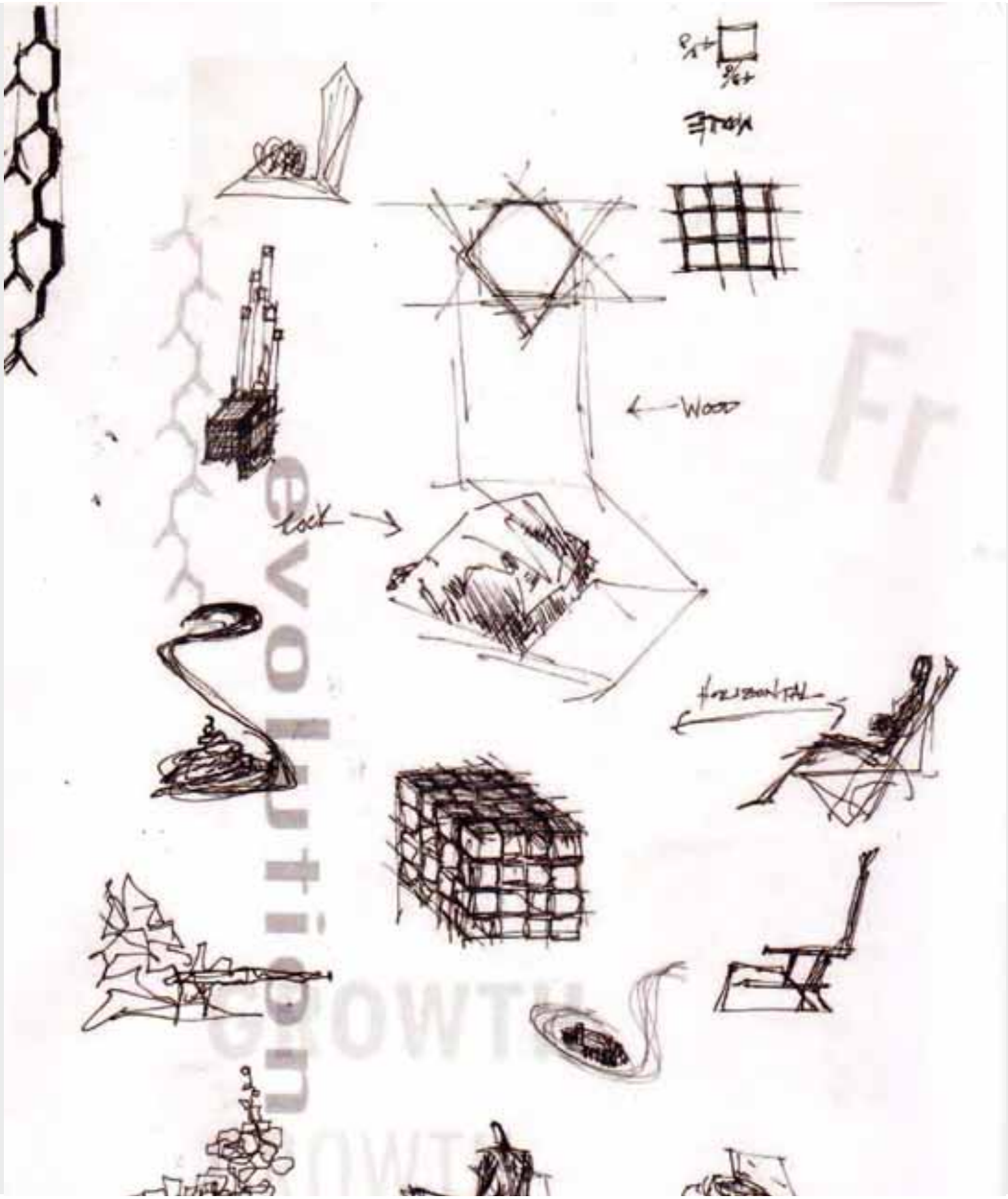
These drawings explore a visual means of representing the experience of inhabiting Kentuck Knob as a relationship between plan and section. Through graphic depiction (up representing increased experience and down representing decreased experience), they demonstrate how dynamic the relationship to nature is in each part of the house as influence by architectural elements such as windows and light, relationship of the ground plane to the house and significance of overhangs. Despite their articulation as separate objects, these diagrams begin to explore how they work dynamically to draw the user through the space and restrict the user from accessing the private zones of the house by experiential rather than physical barriers.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.5



Josh Cummings
Chair Design

TRANSFORMATION

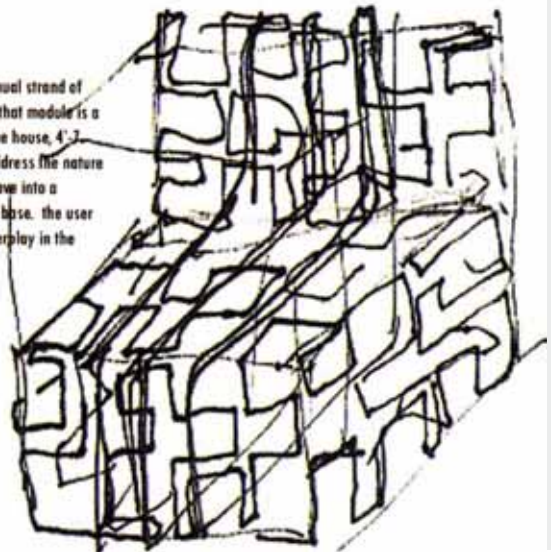
ENKEBOLL FOUNDATION
PROJECT PHASE III

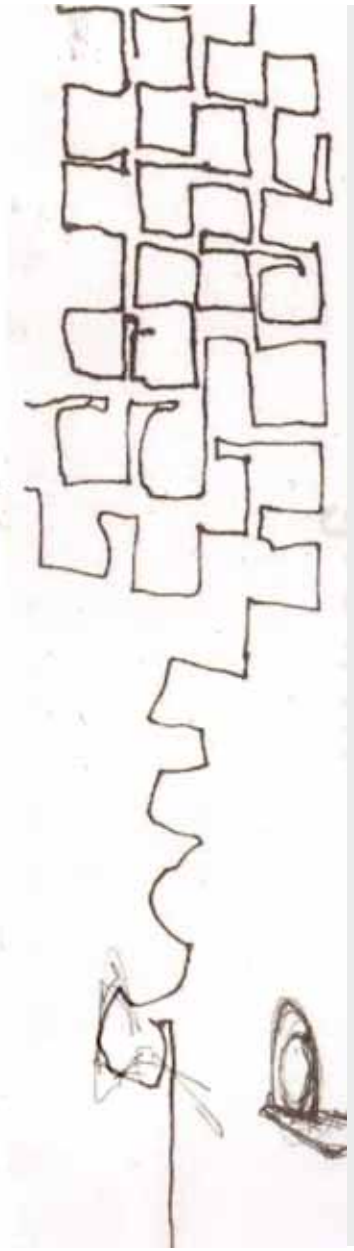
Carnegie Mellon University
Architecture

2.6

concept::
kentuck knob is a unique combination of stone and wood placed in a way to grow out of the natural landscape into an organic wrightian architecture. therefore i wanted the chair to embody principles of these materials and create an experience of siting that would allow the user to better understand the qualities of the kentuck knob house.

result::
the chair i designed is both linear and fractal. it utilizes a continual strand of copper tude bent into cubic frames based on a specific module. that module is a translation of the primary module used in the construction of the house, 4'-7 375" the linear nature of the continual woven tube begins to address the nature of wood employed in the house while the complexity of the weave into a volumetric shape and structure creates an experiance of a solid base. the user begins to understand how the solid stone and wood begin to interplay in the house systems based on this chair.





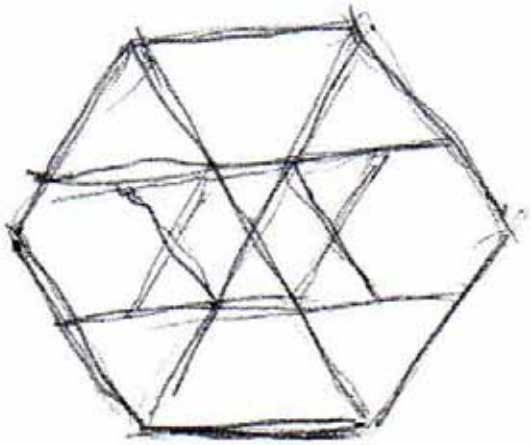
Josh Cummings
Chair Design

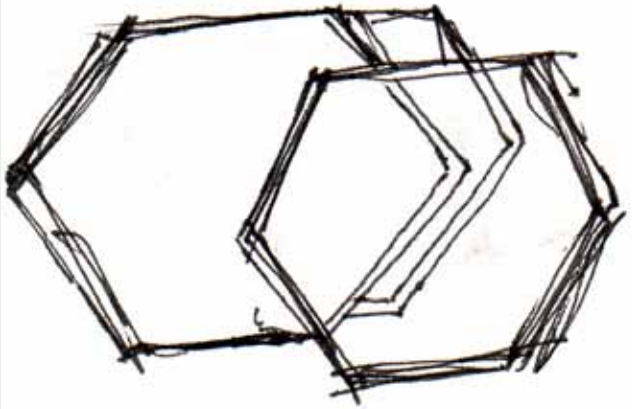
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.7





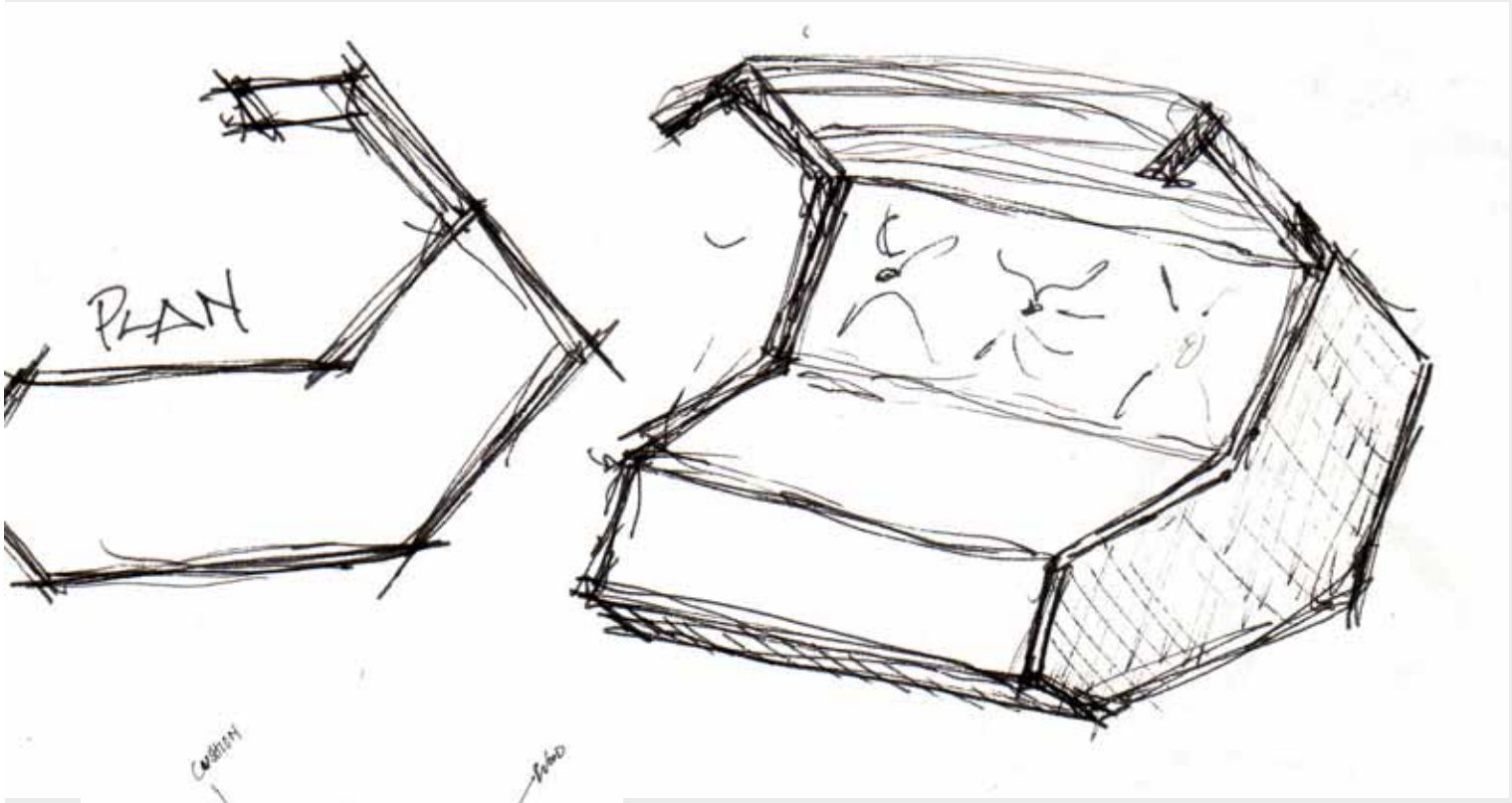
Kiko Restrepo

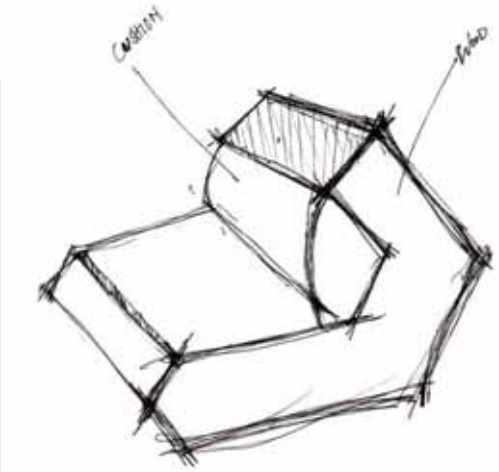
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.8





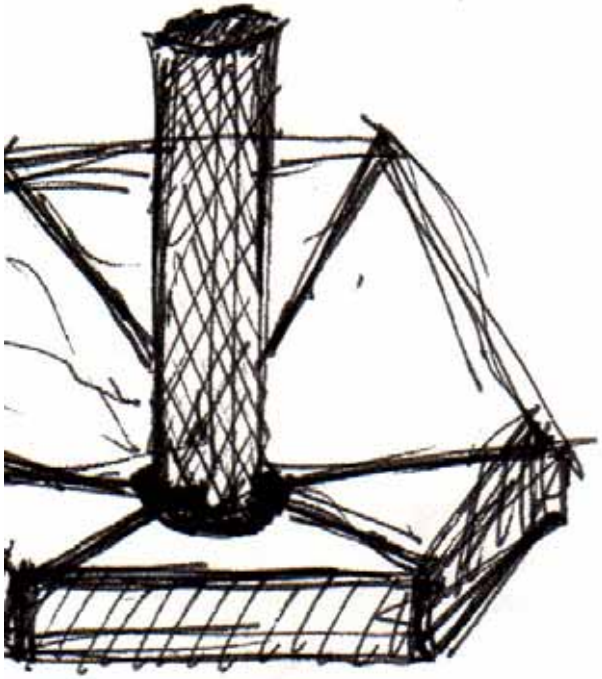
Kiko Restrepo

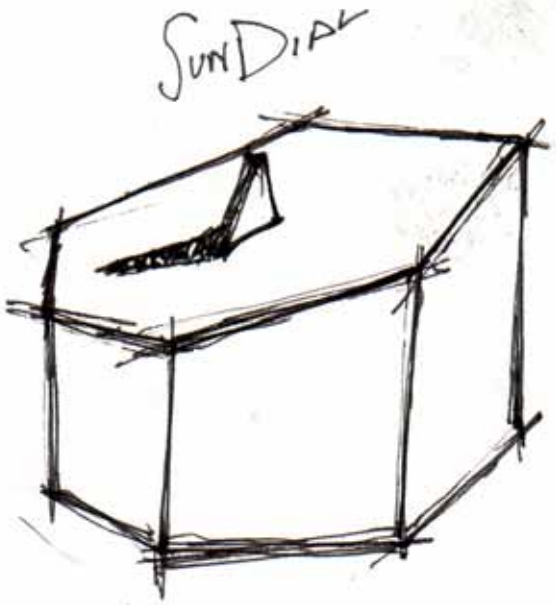
TRANSFORMATION

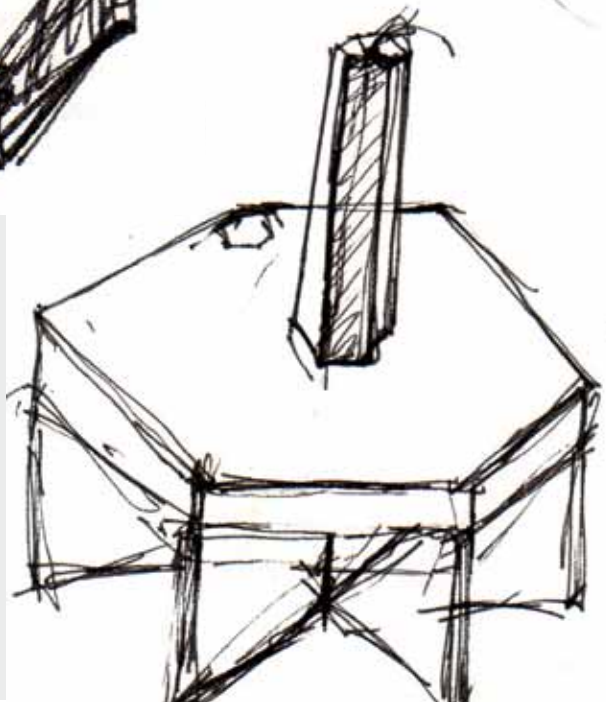
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.9







Kiko Restrepo

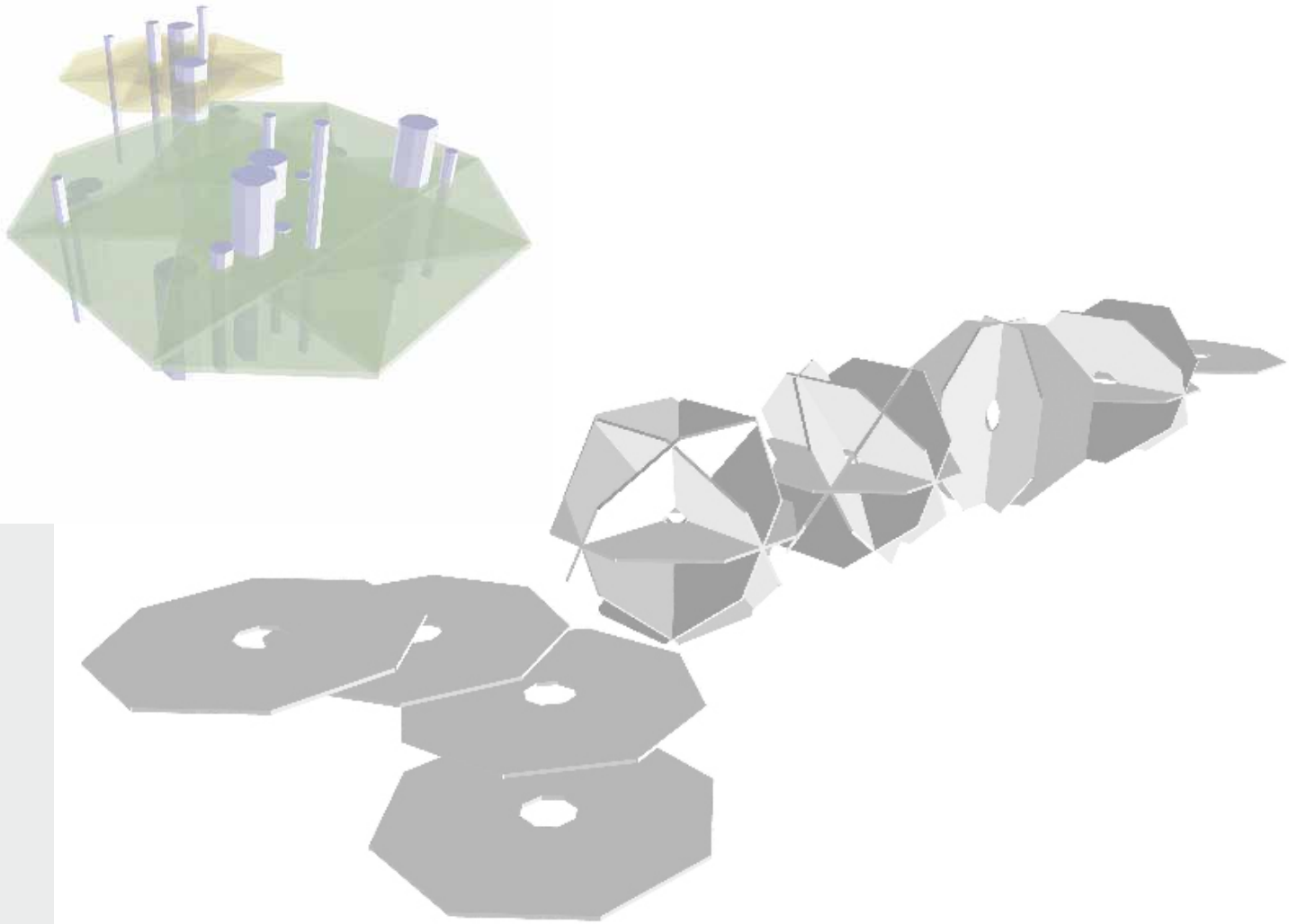
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.10

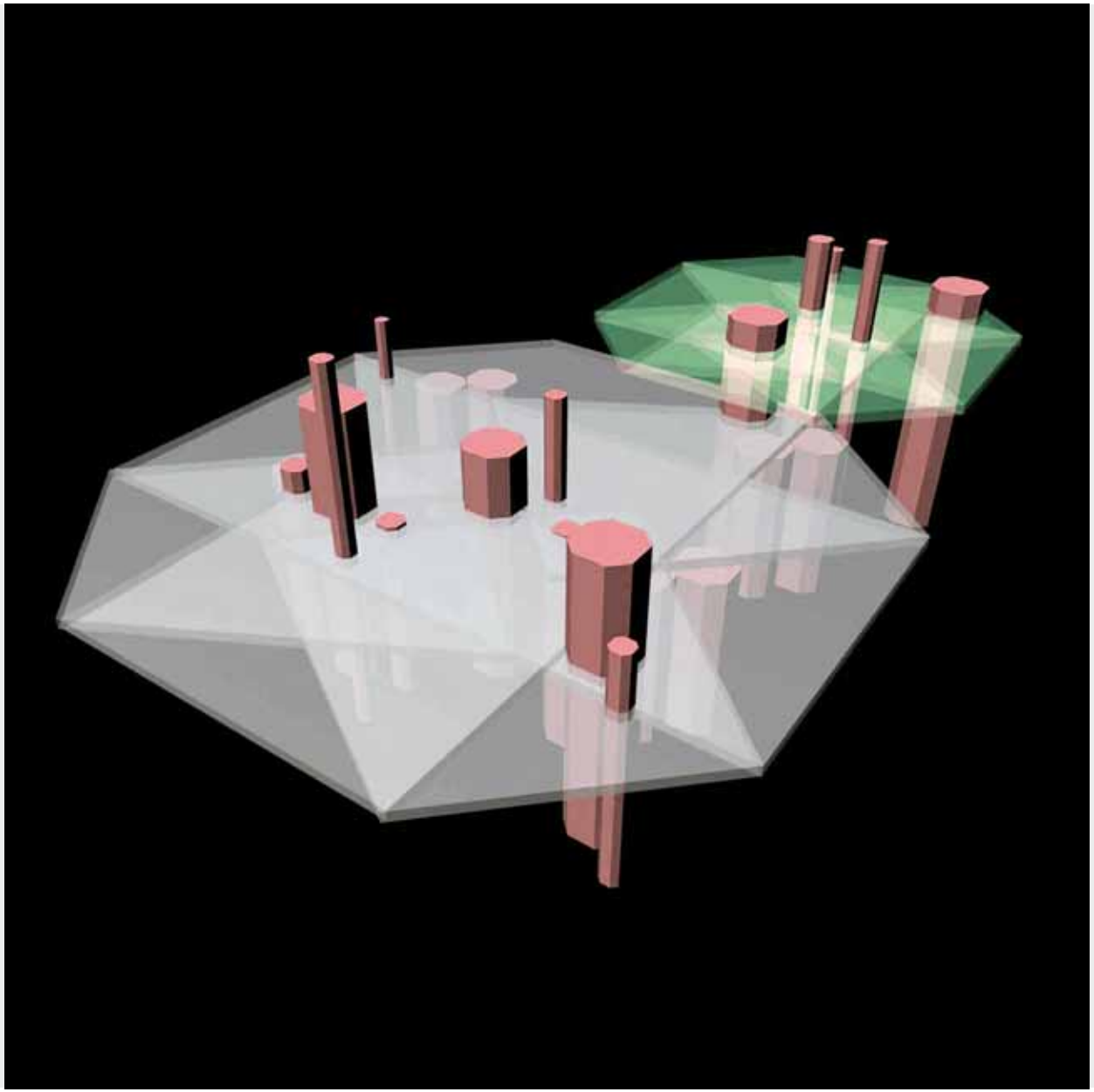
Kiko Restrepo



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.11**



Kiko Restrepo

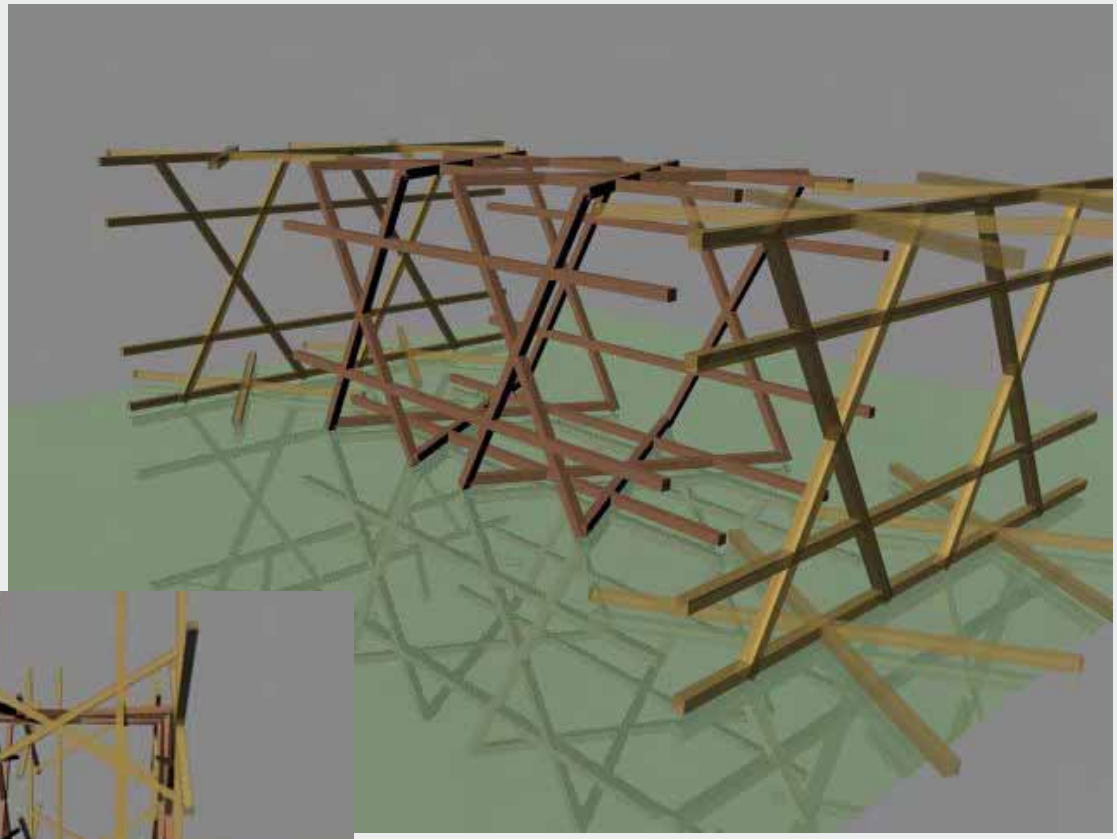
TRANSFORMATION

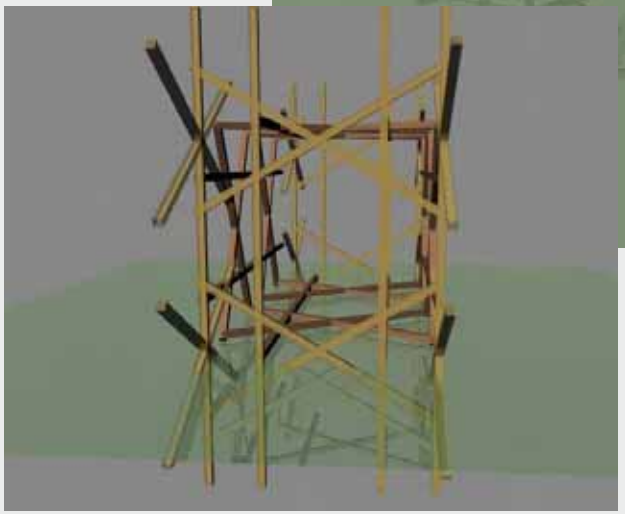
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.12

Zach Hartle



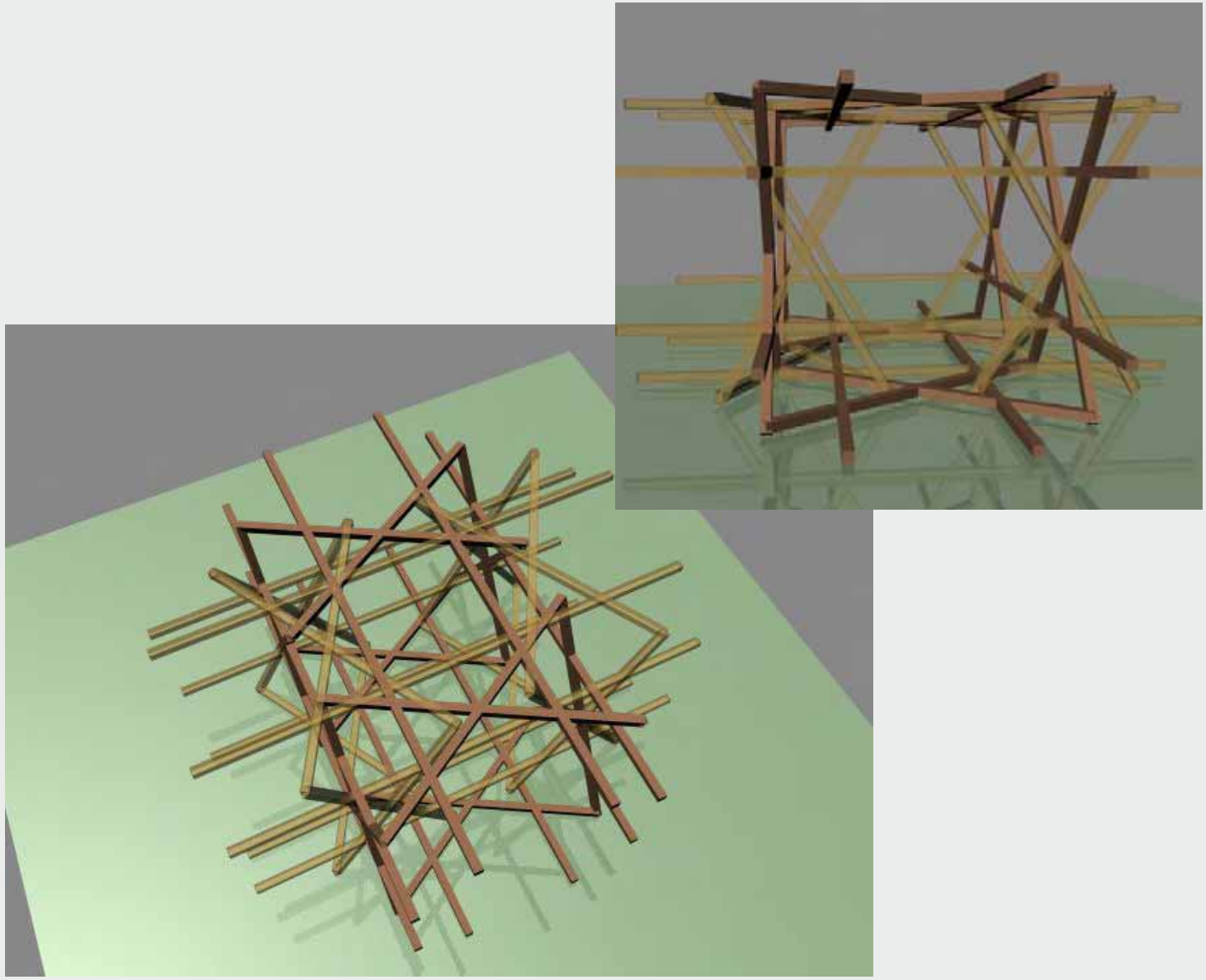


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.13



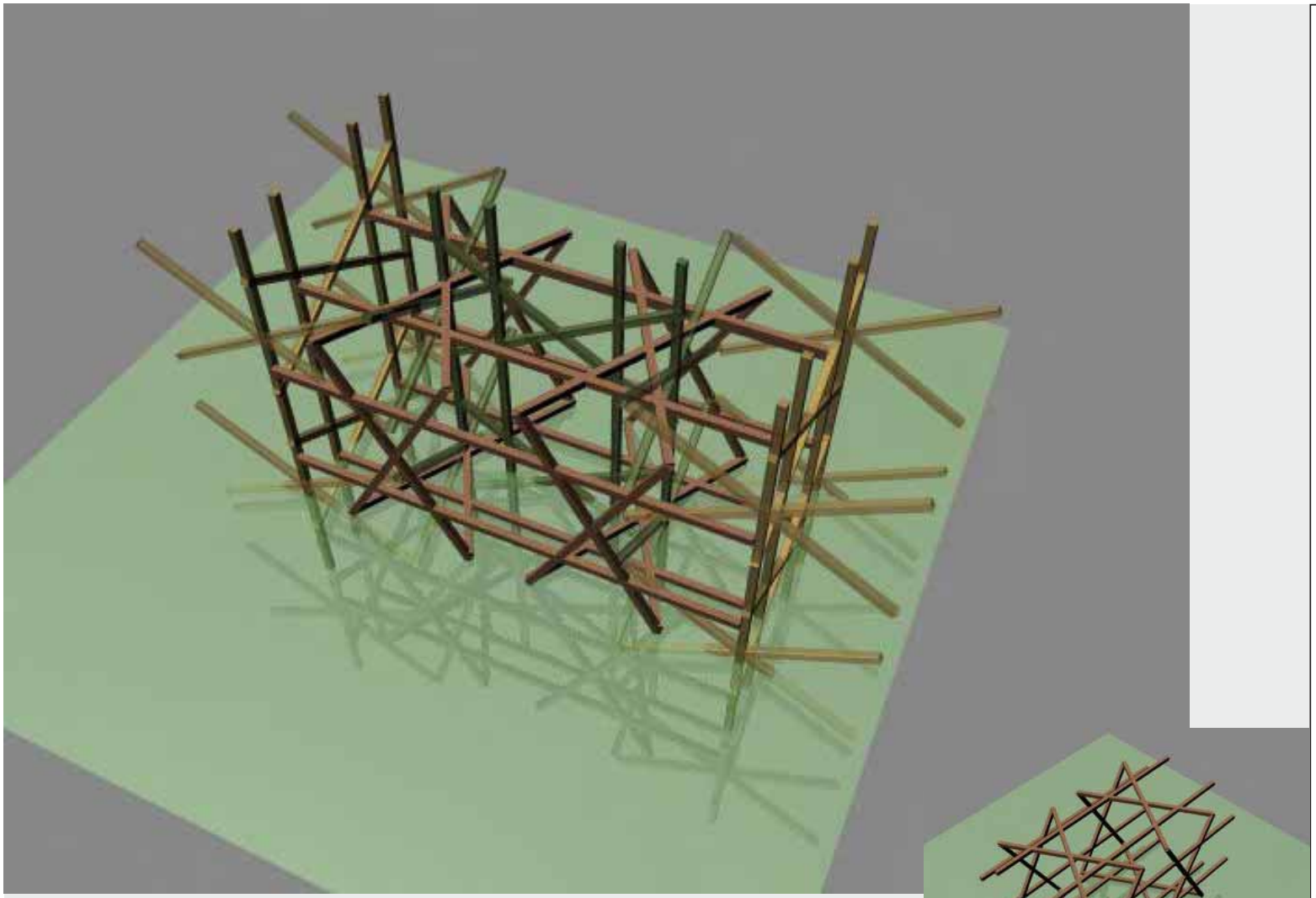
Zach Hartle

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

2.14



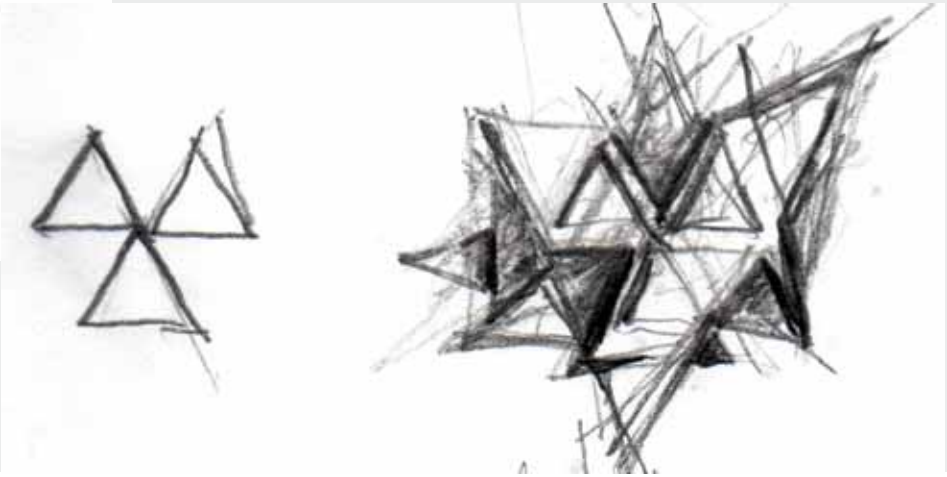
Zach Hartle

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

2.15

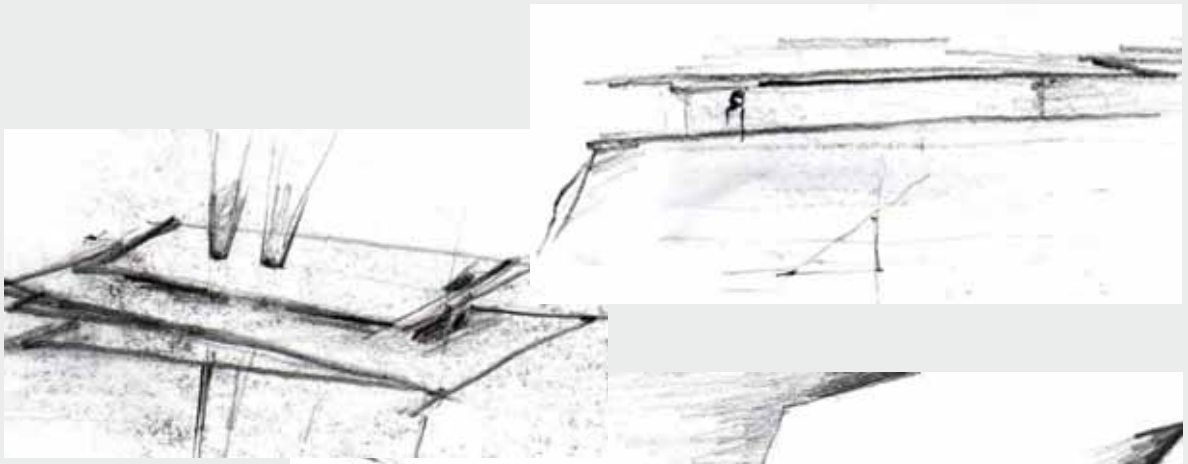


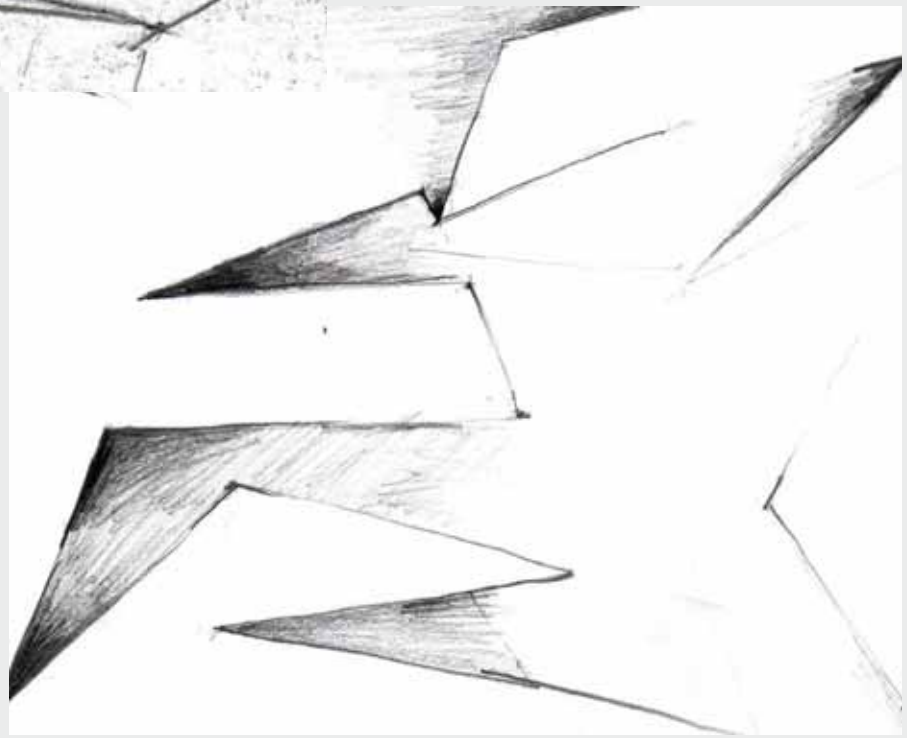
Jared Langevin

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.16**





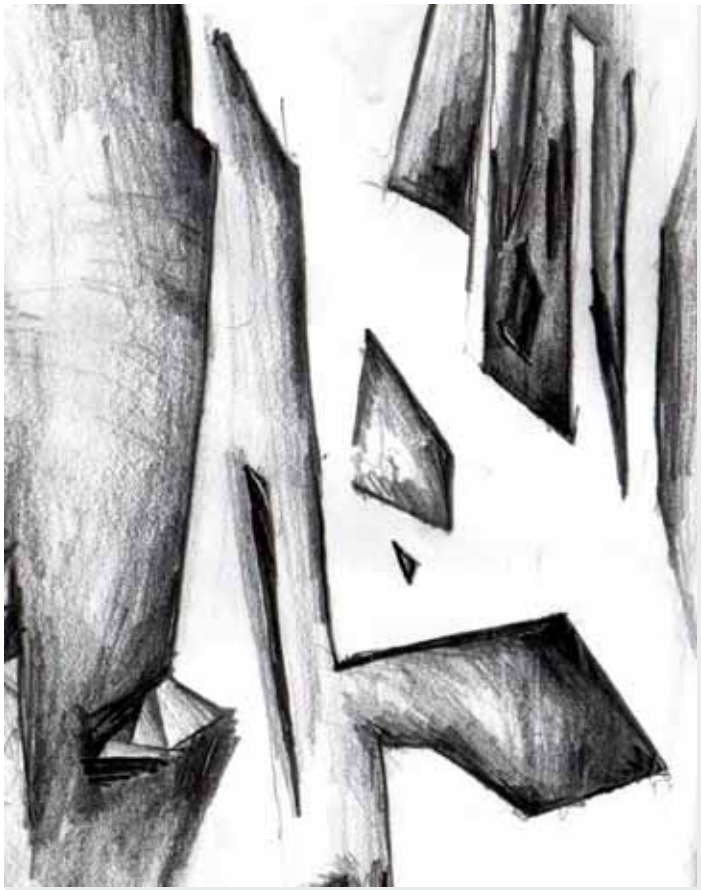
Jared Langevin

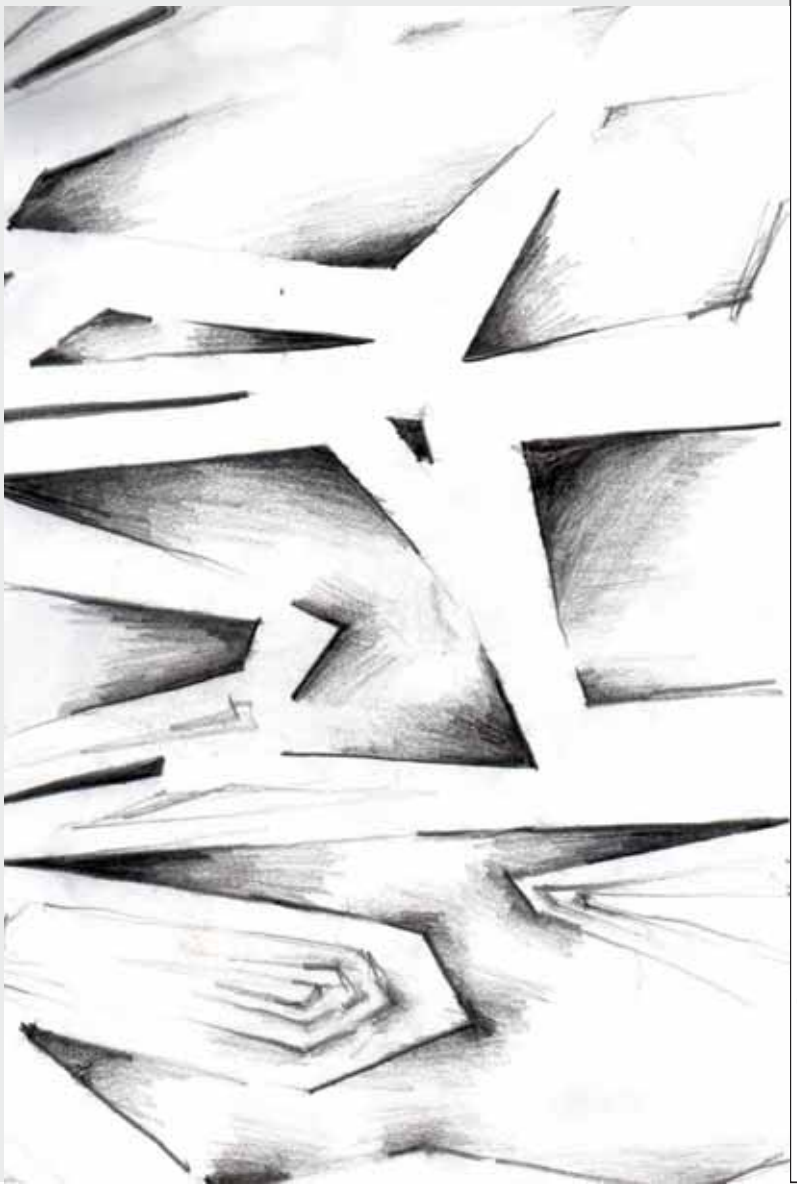
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.17





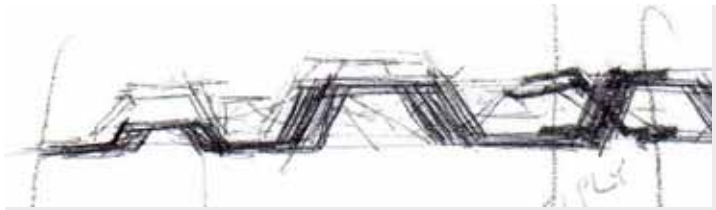
Jared Langevin

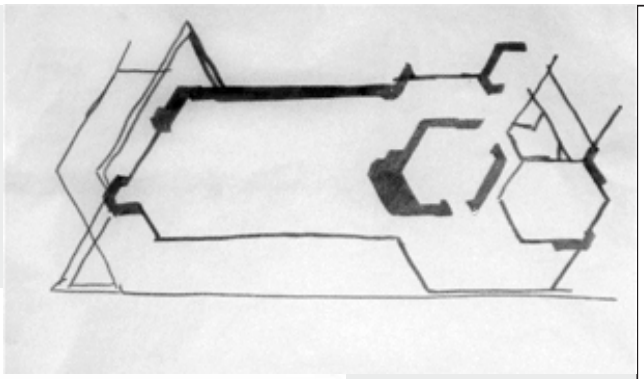
TRANSFORMATION

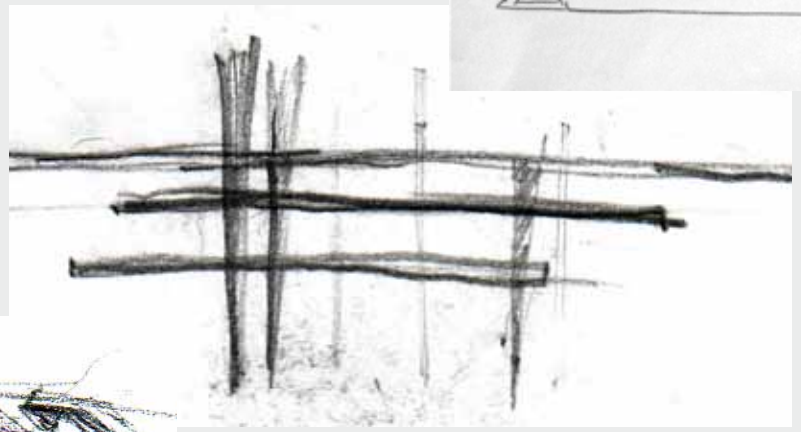
ENKEBOLL FOUNDATION
PROJECT PHASE III

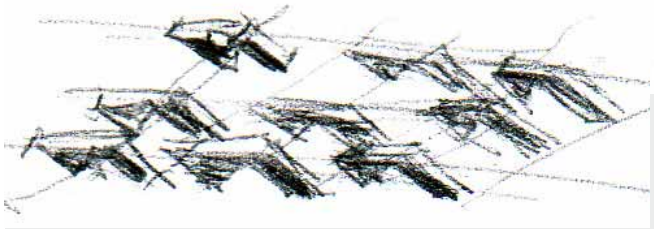
Carnegie Mellon University **Architecture**

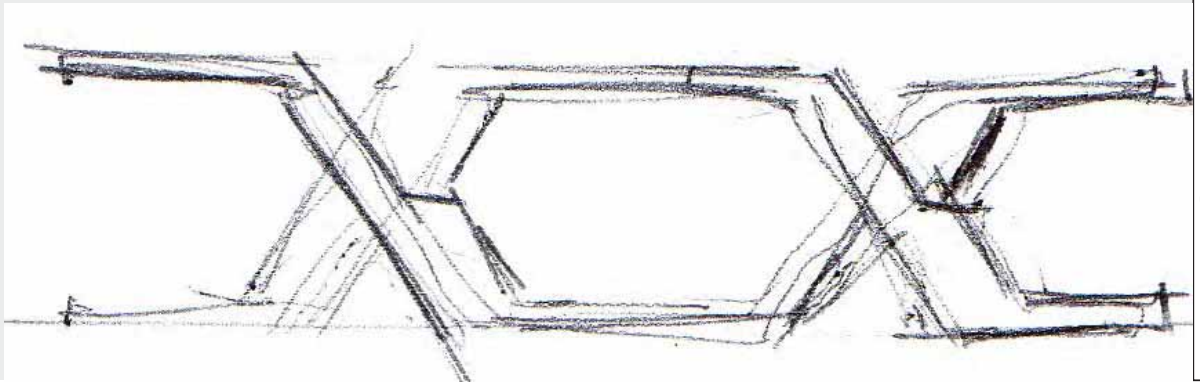
2.18











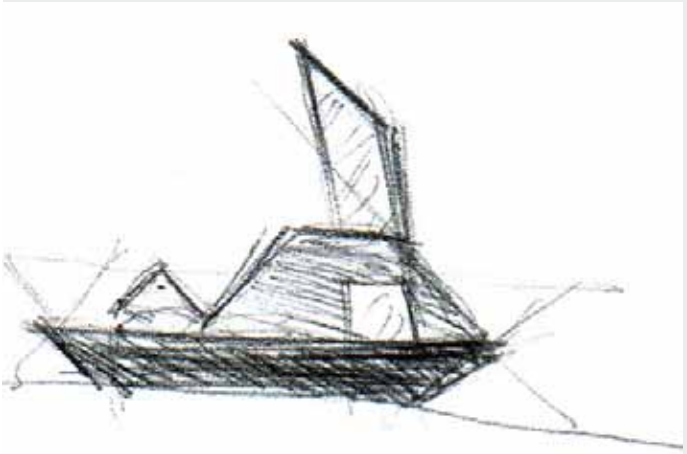
Josh Cummings

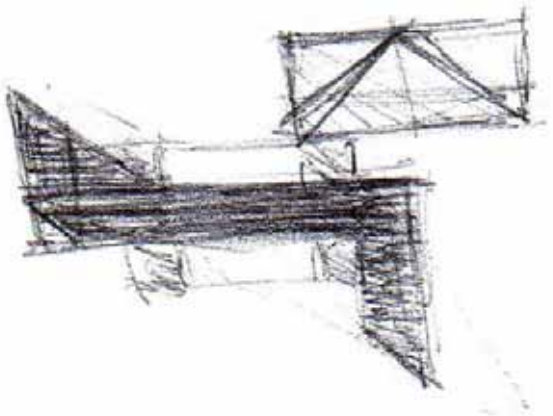
TRANSFORMATION

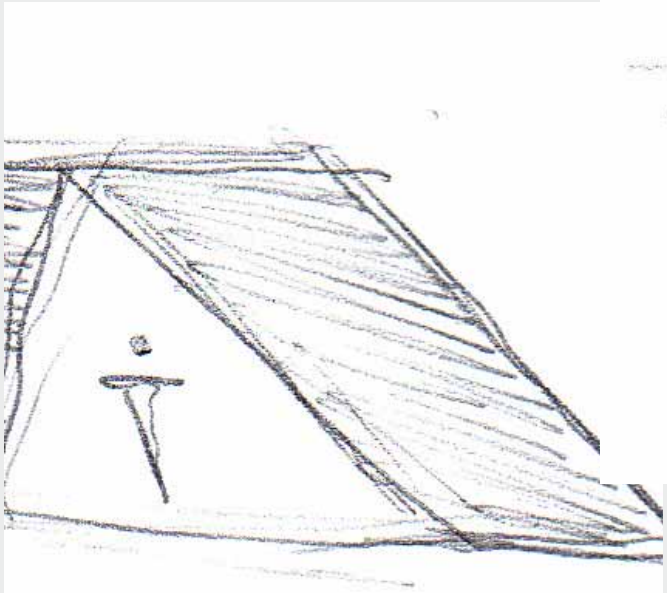
ENKEBOLL FOUNDATION
PROJECT PHASE III

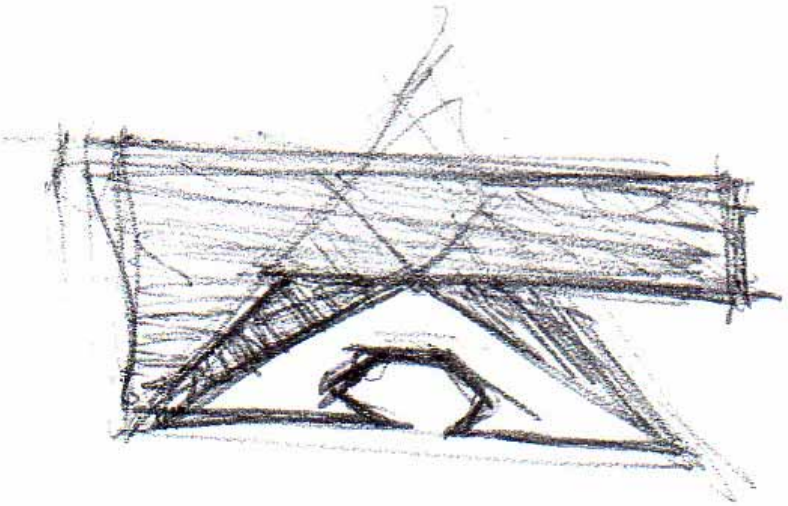
Carnegie Mellon University
Architecture

2.19









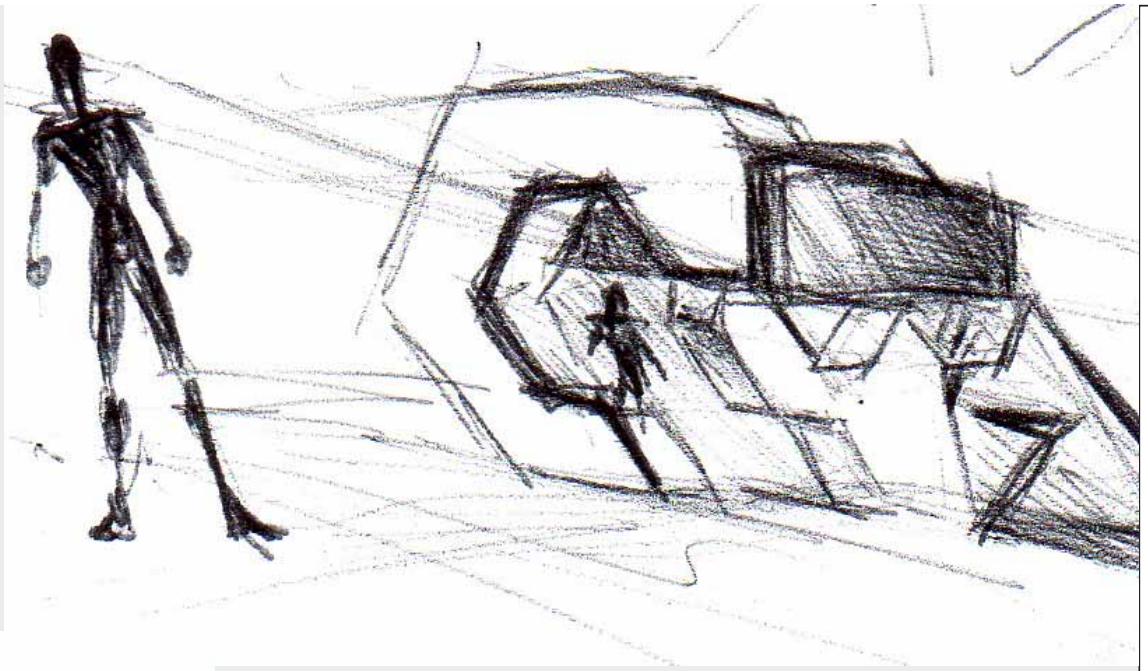
Josh Cummings

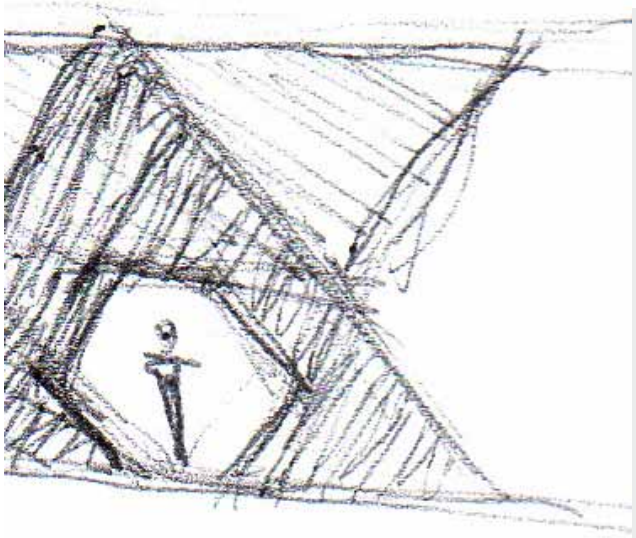
TRANSFORMATION

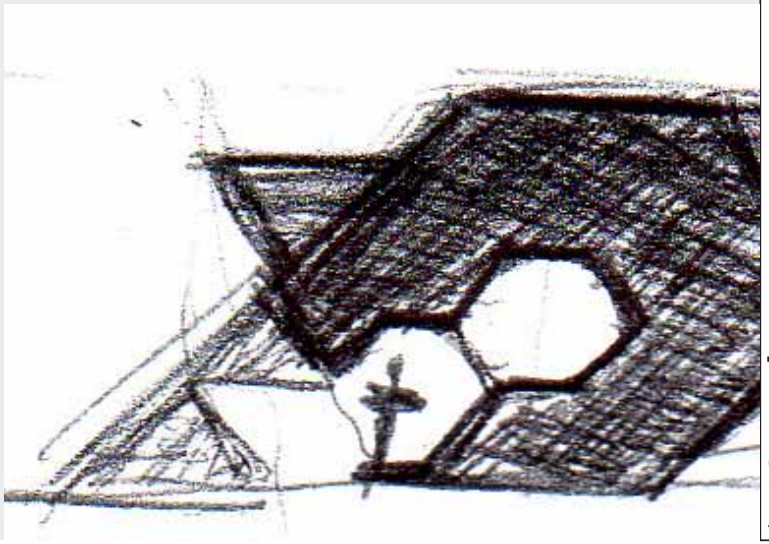
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.20





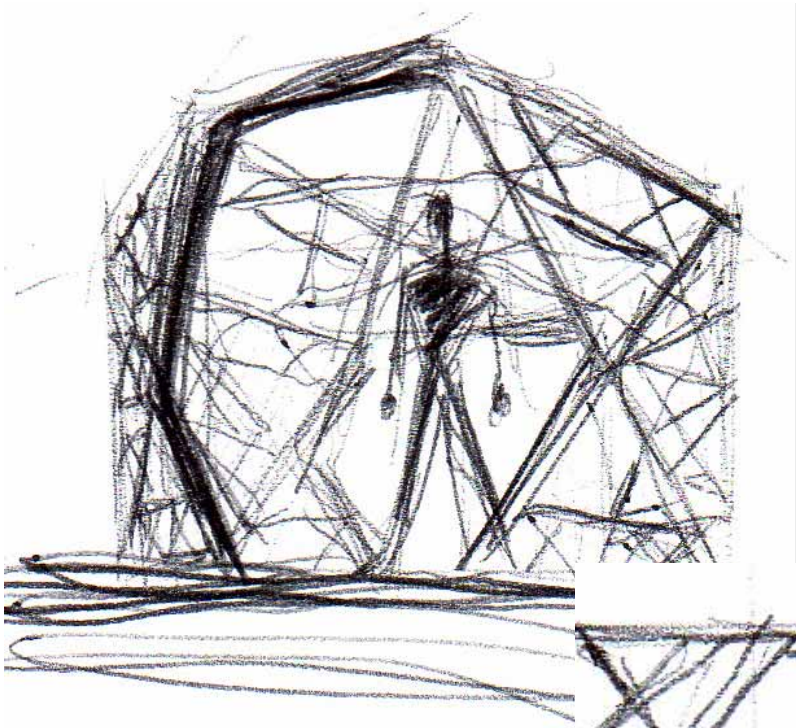


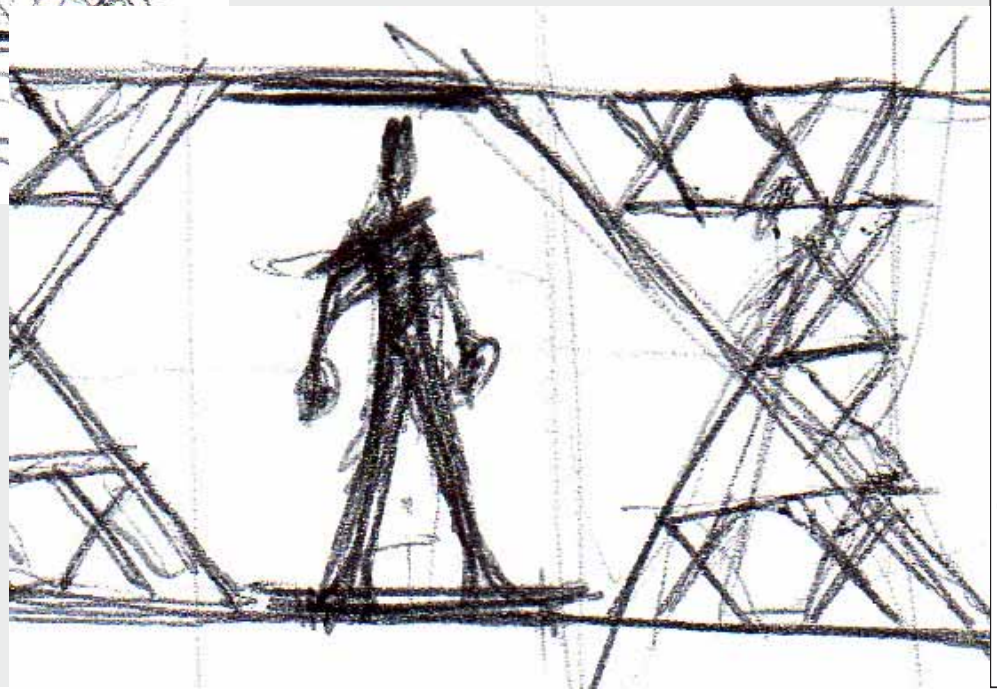
Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.21**



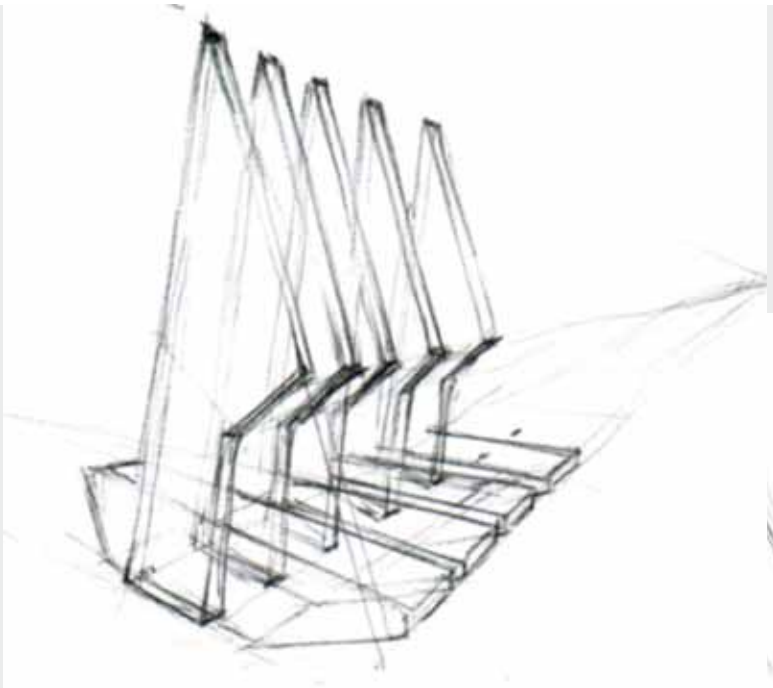


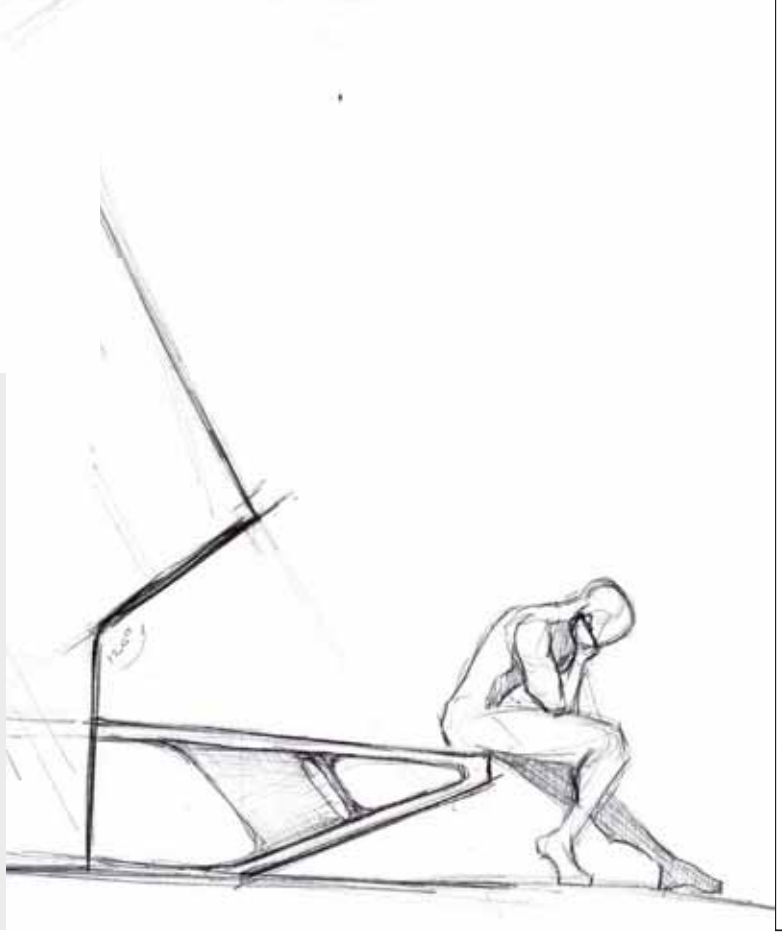
Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.22**





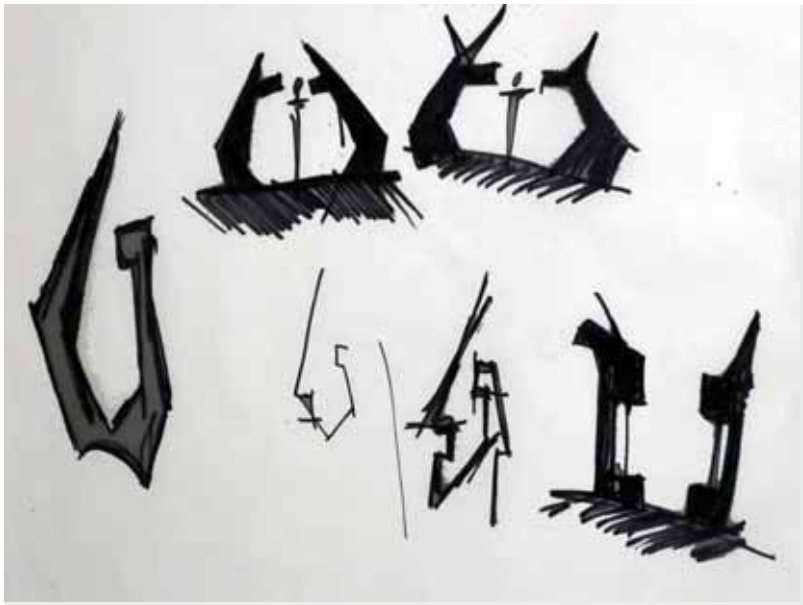
Josh Cummings

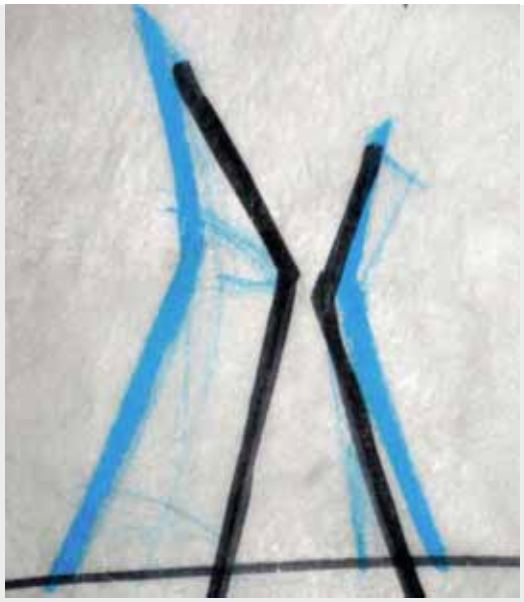
TRANSFORMATION

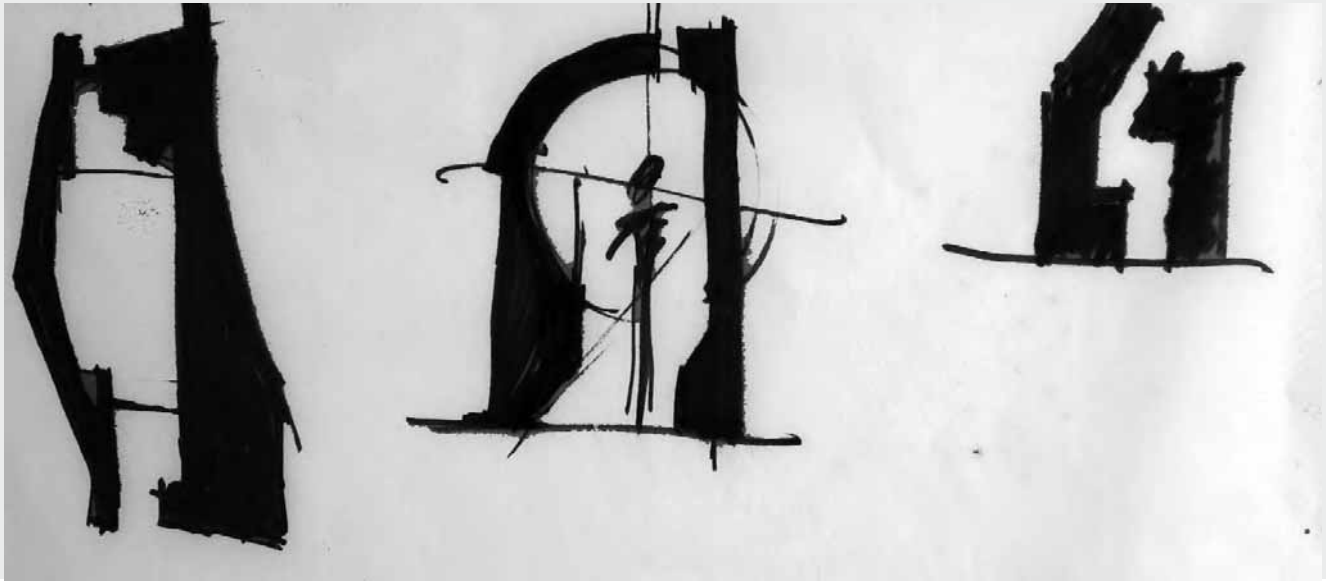
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.23







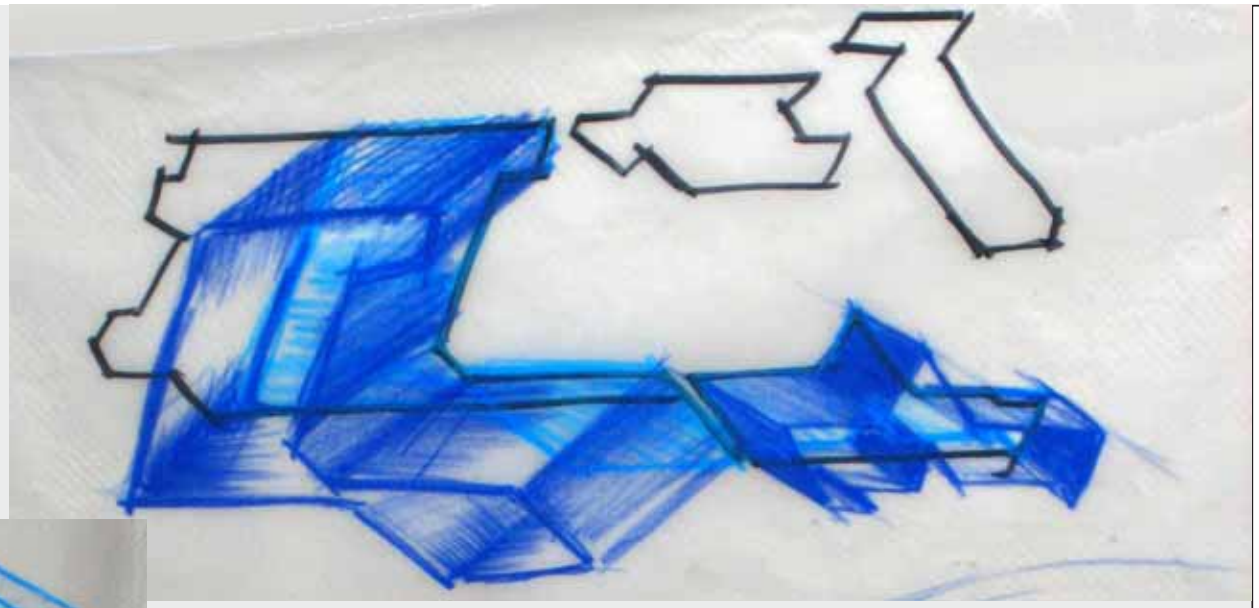
Josh Cummings

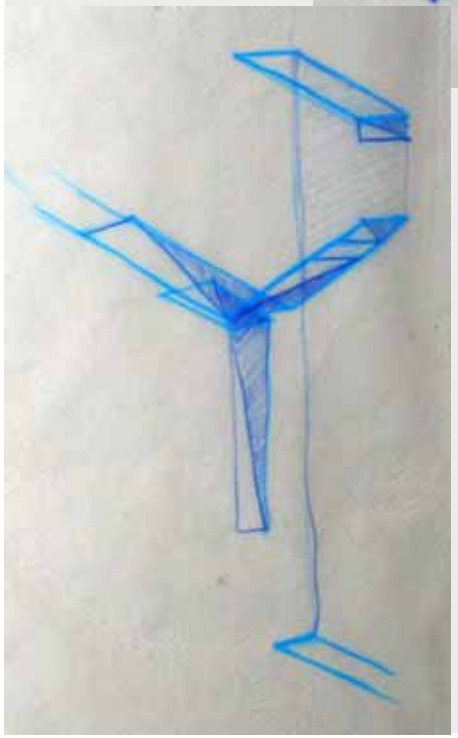
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.24



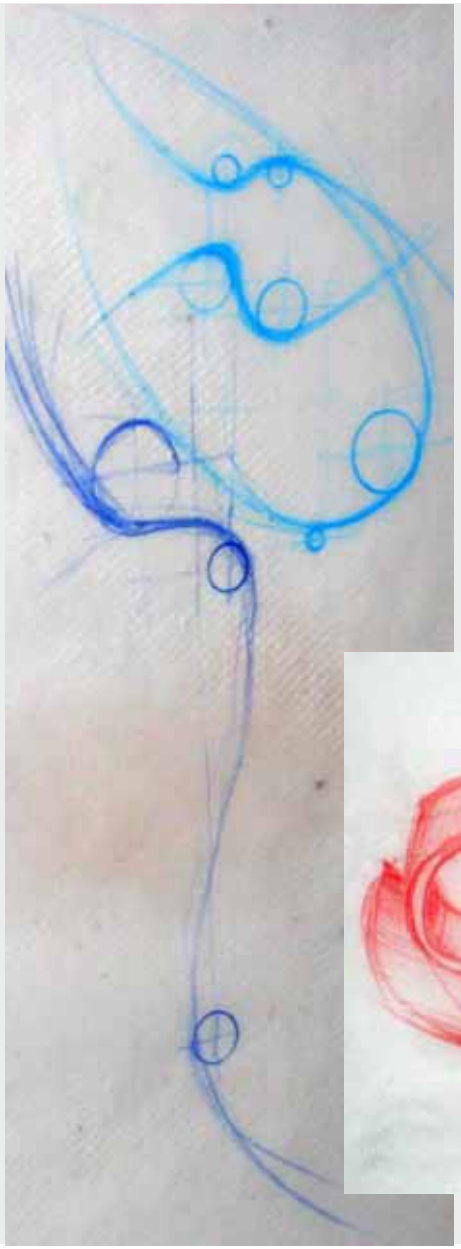


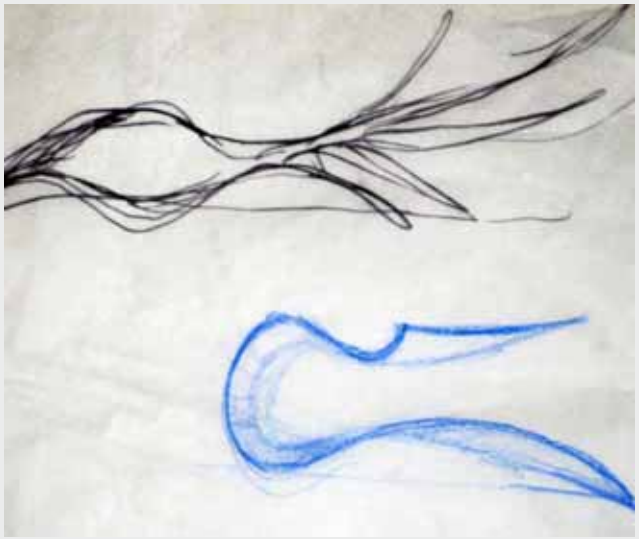
Josh Cummings

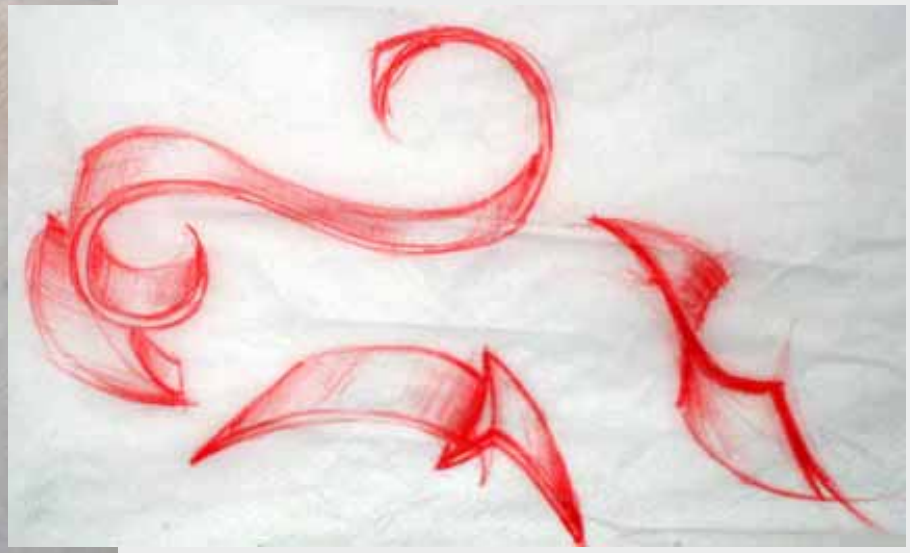
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.25**







Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.26

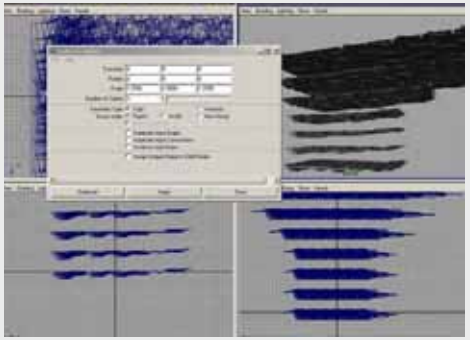
Josh Cummings

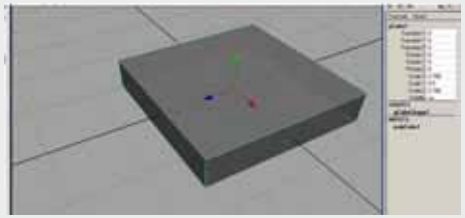
TRANSFORMATION

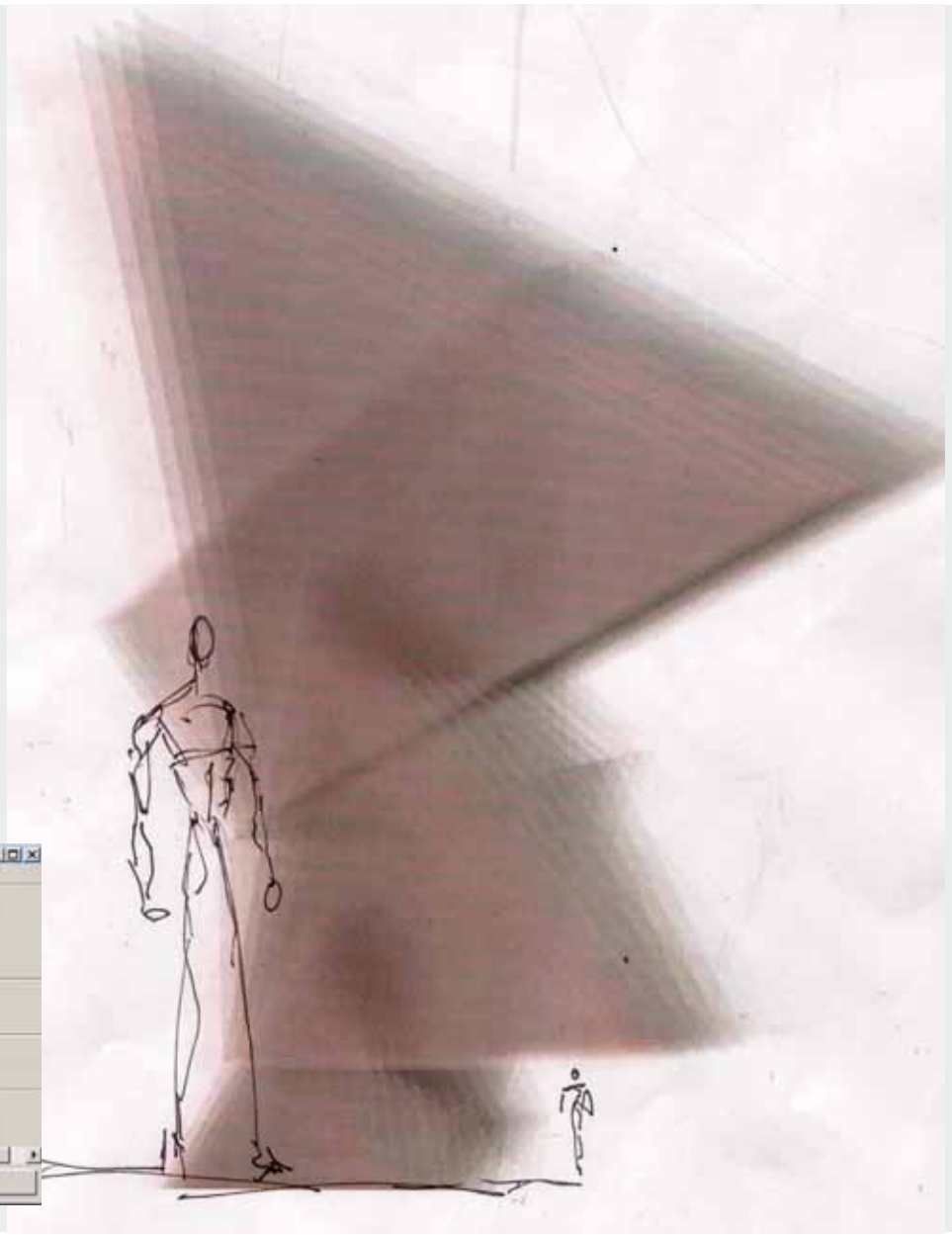
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.27





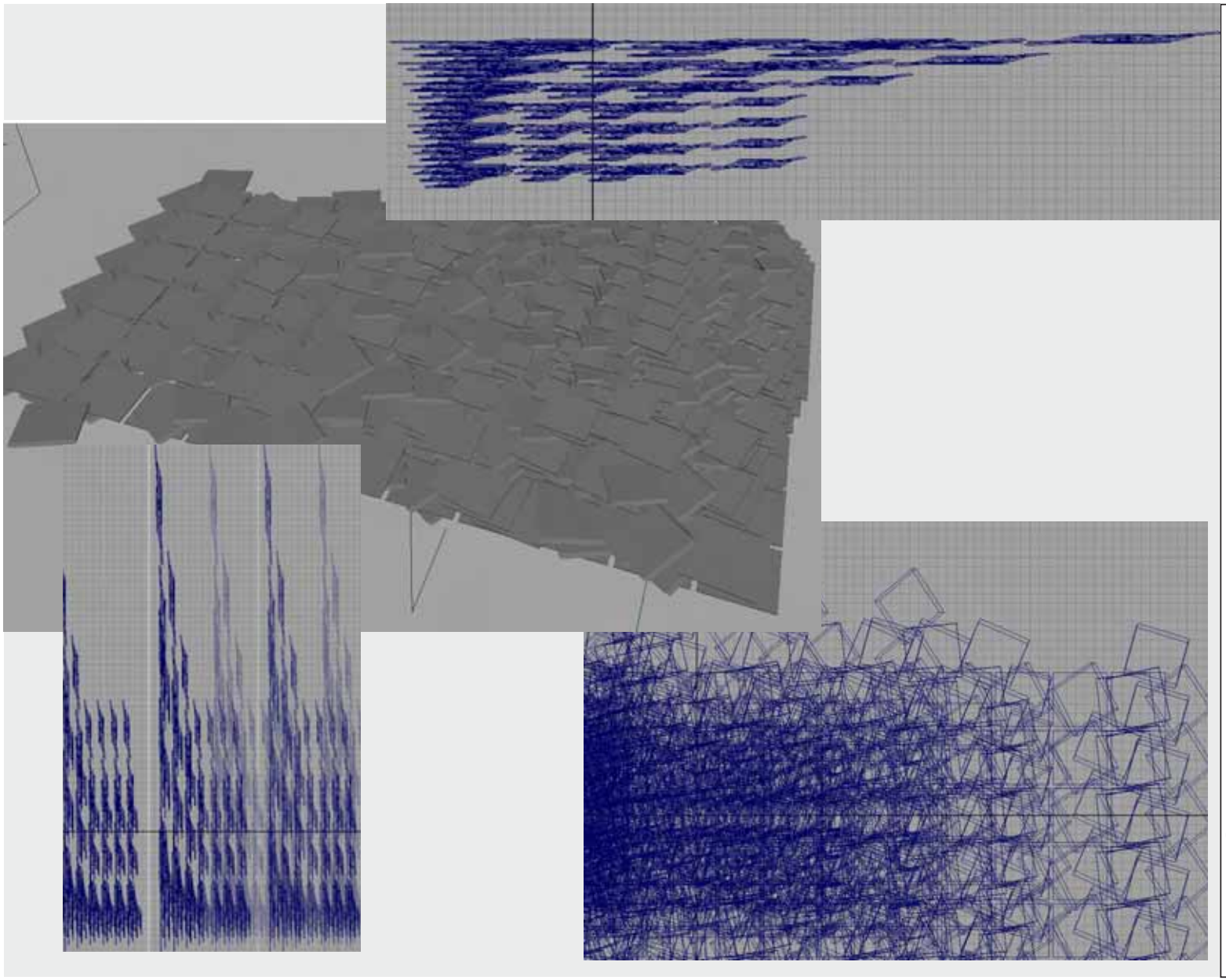


Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.28**



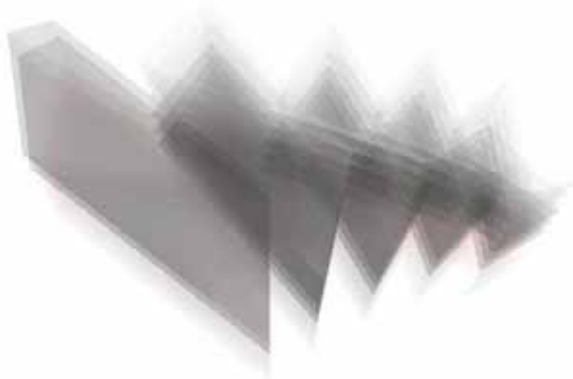
Josh Cummings

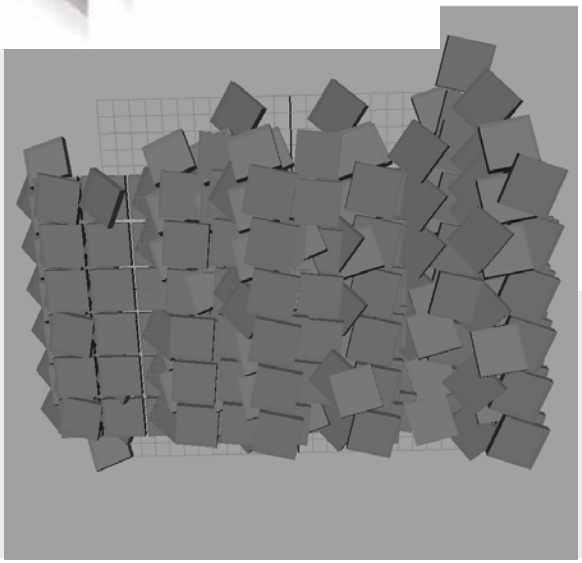
TRANSFORMATION

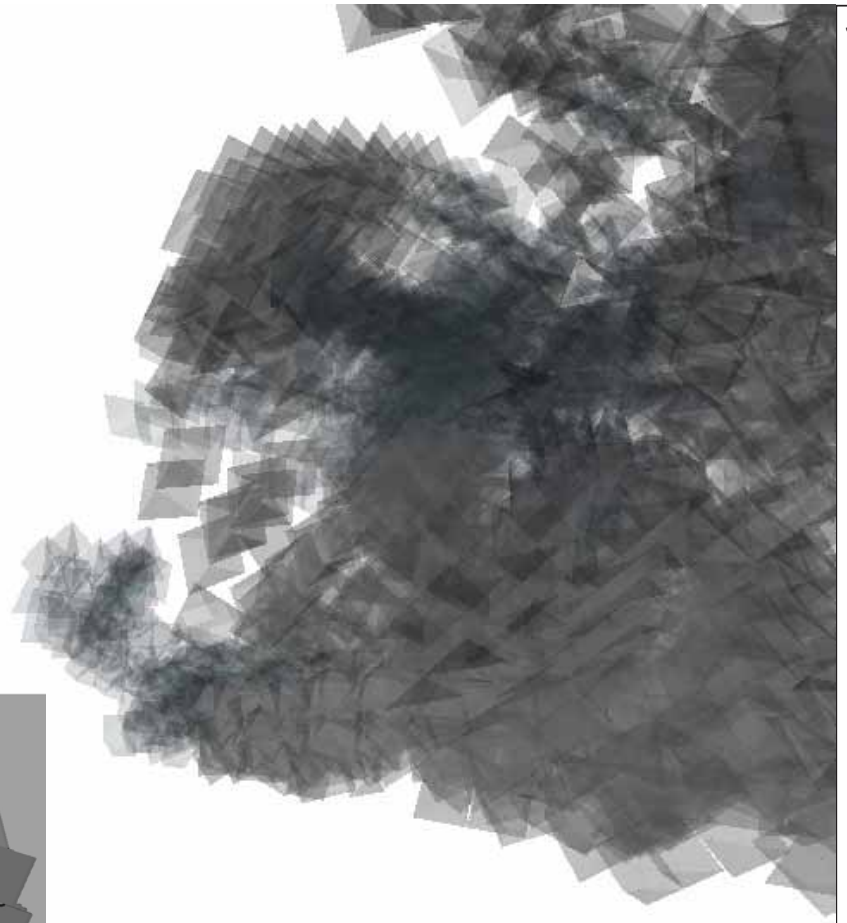
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

2.29





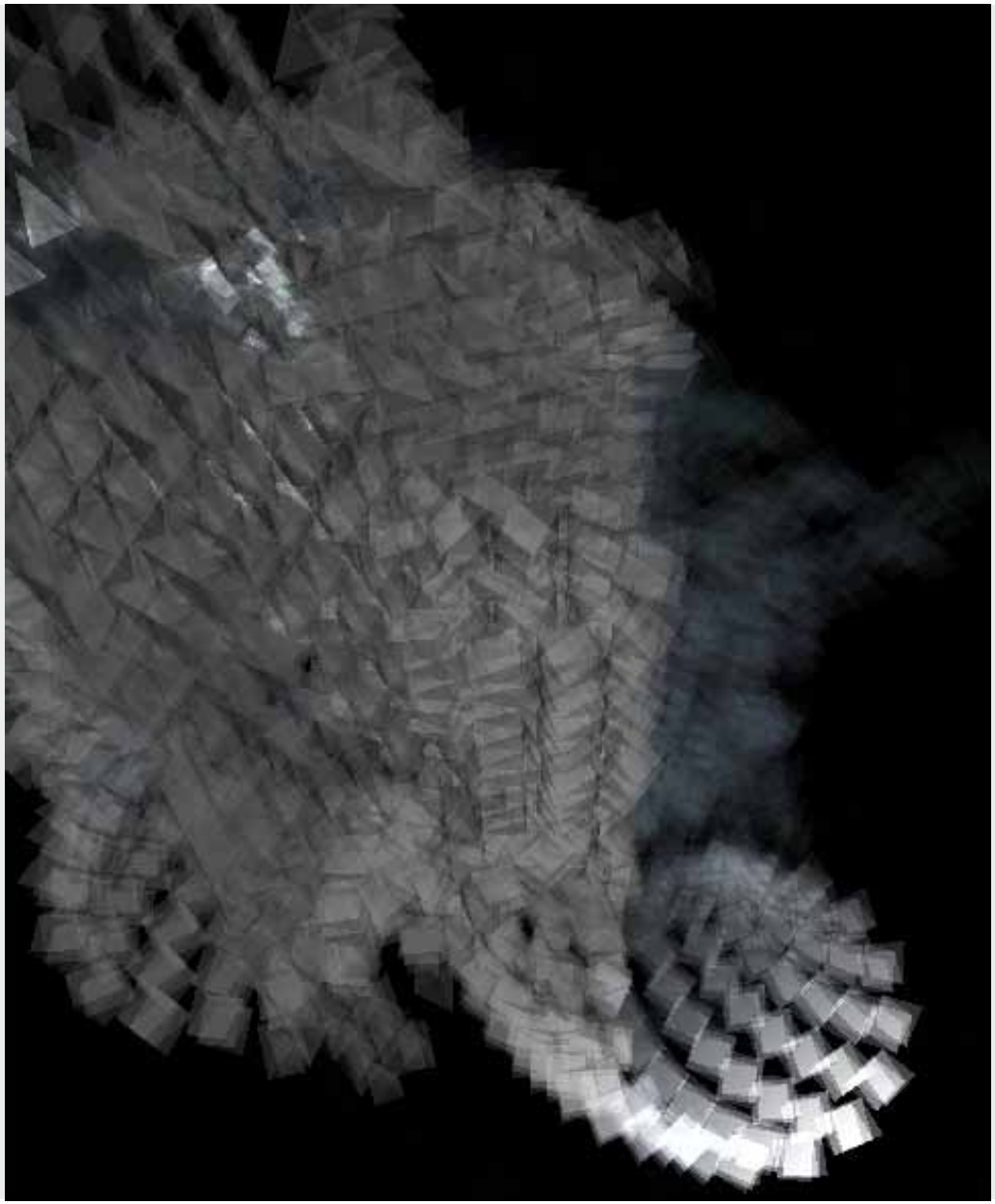


Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.30**



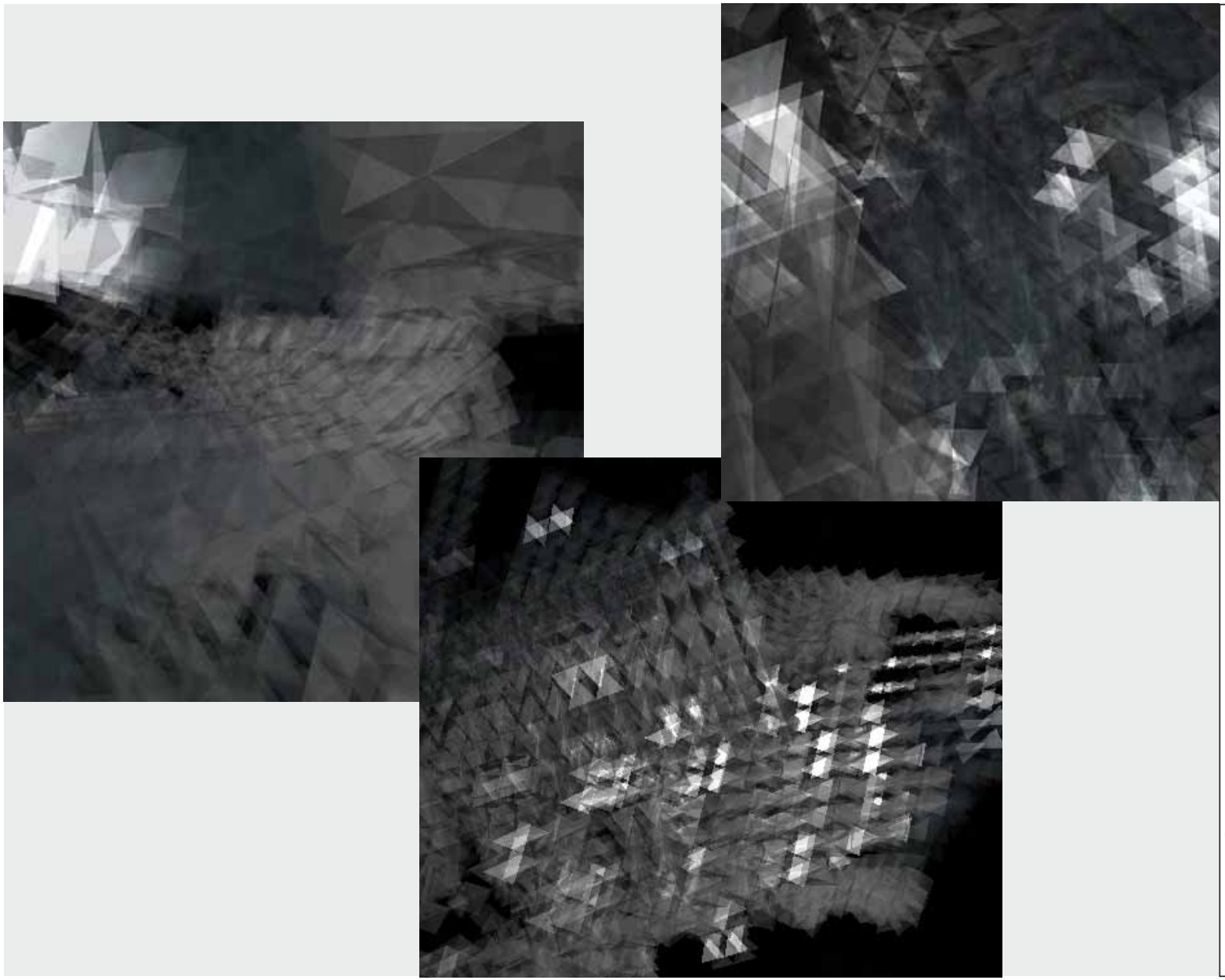
Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

2.31



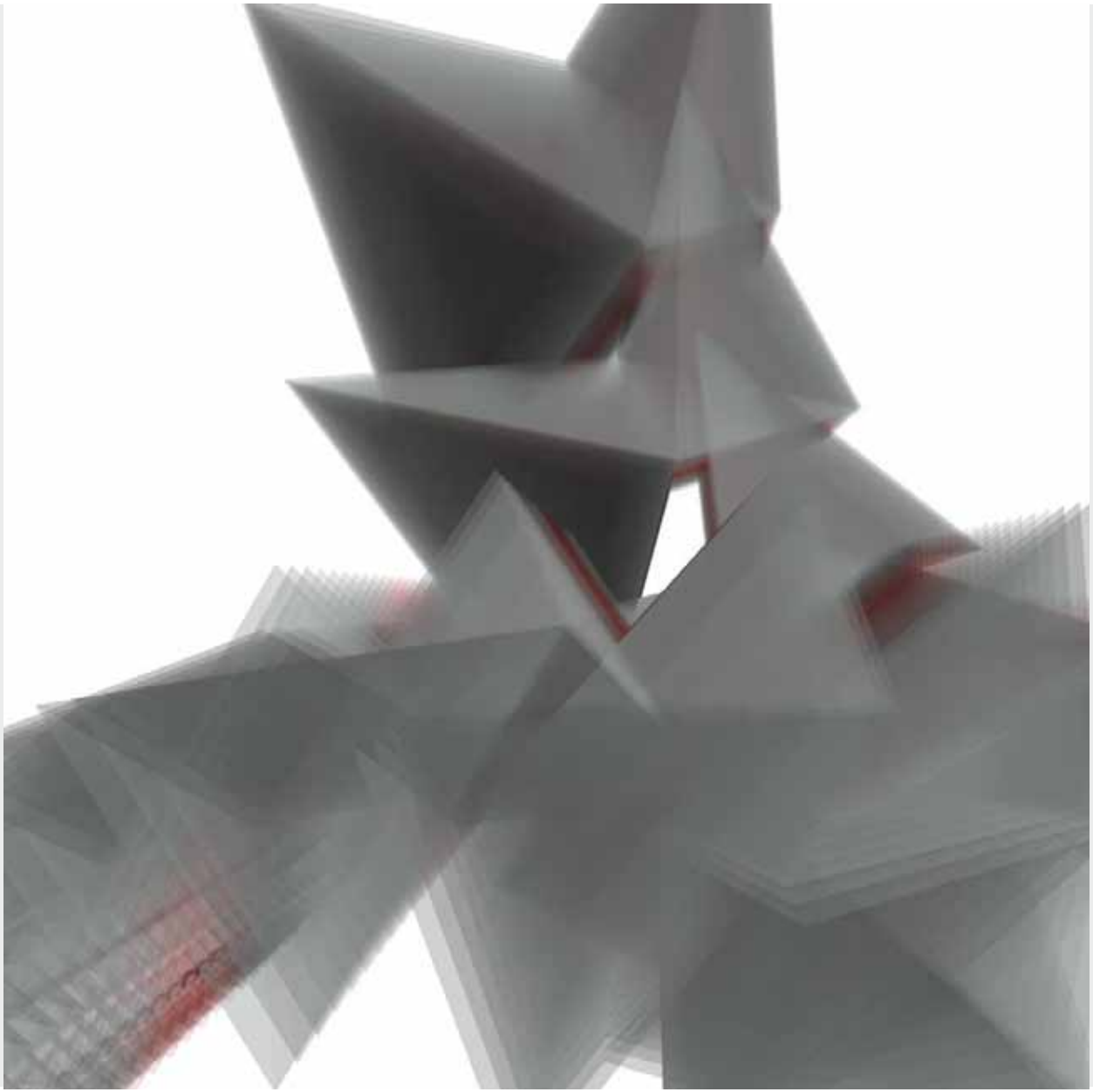
Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

2.32



Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **2.33**

Josh Cummings

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

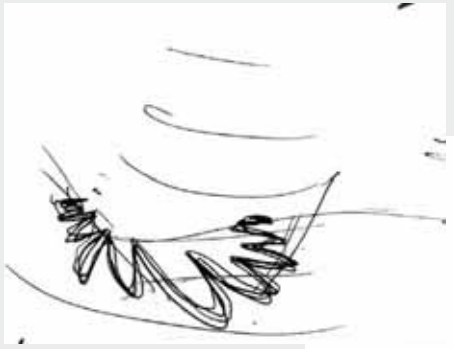
Carnegie Mellon University **Architecture** **2.34**

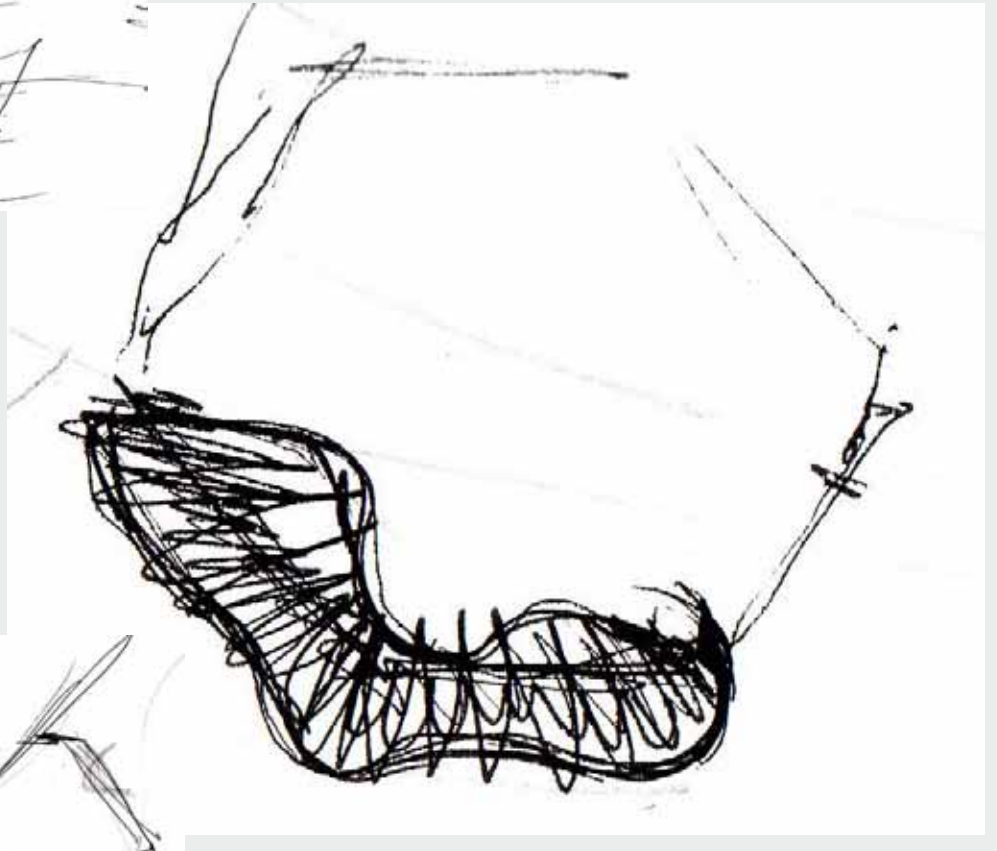
J.W. Cummings
Third Year, Architecture

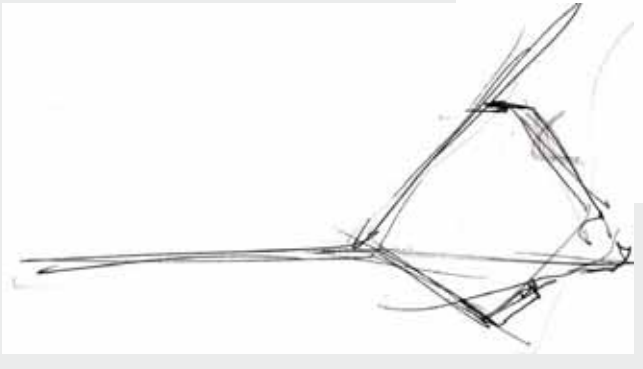
TRANSFORMATION
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie
Mellon
University
Architecture

3.0







TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.1

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

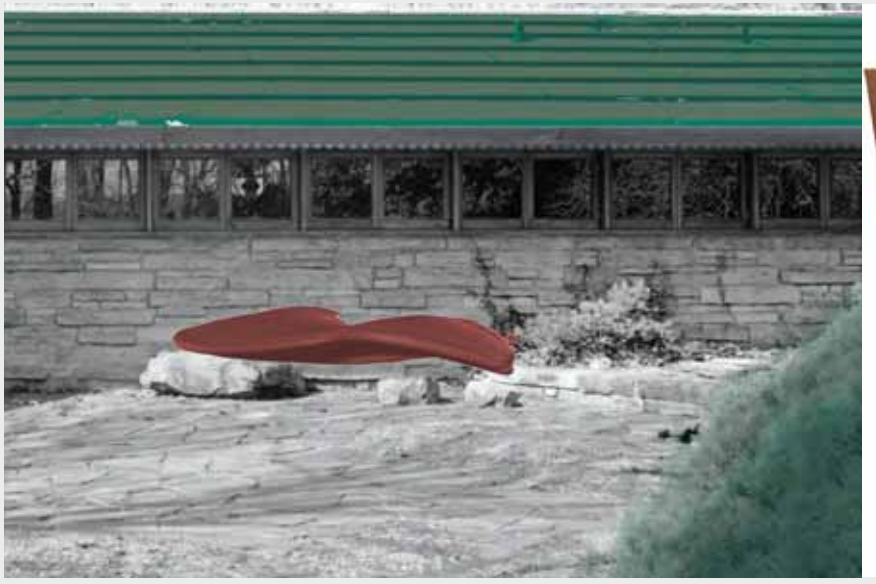
3.2

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.3

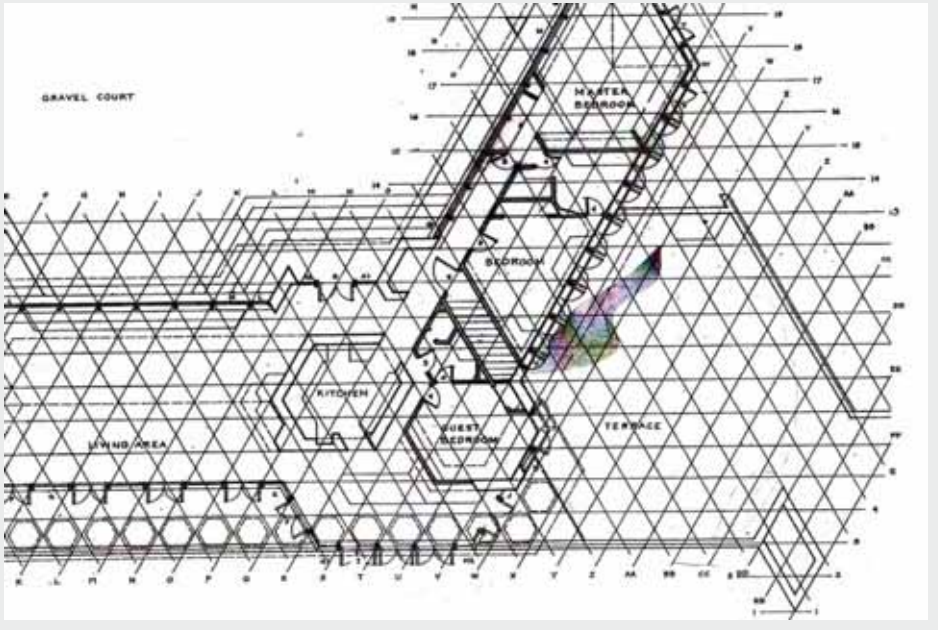


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

3.4

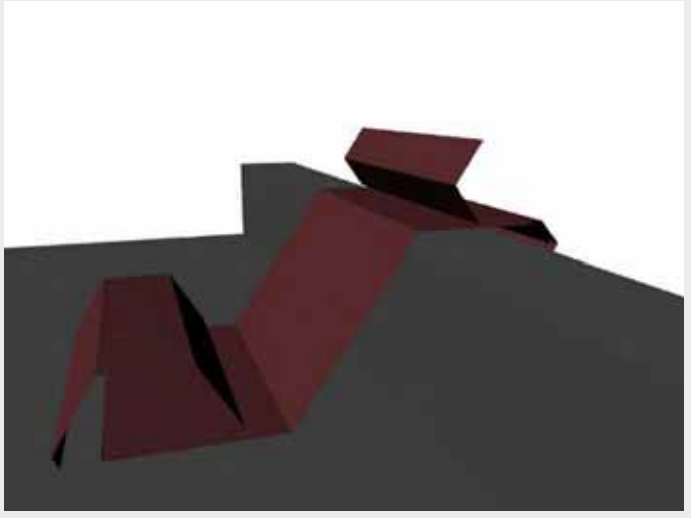


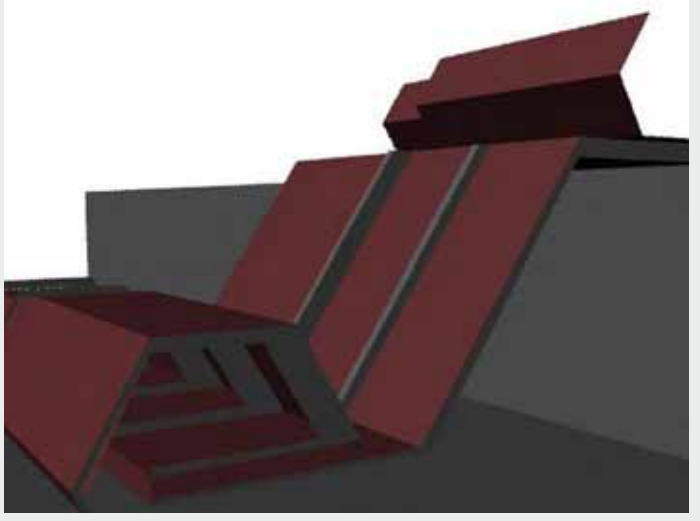
TRANSFORMATION

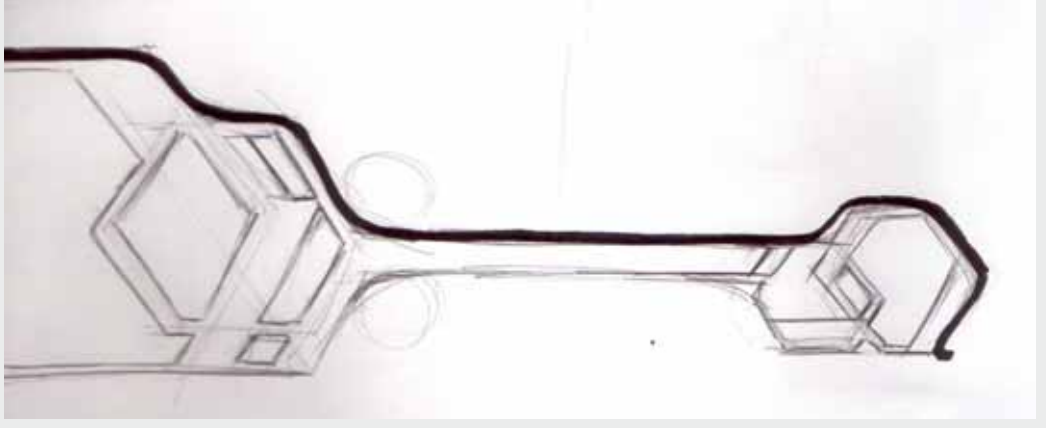
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

3.5







TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

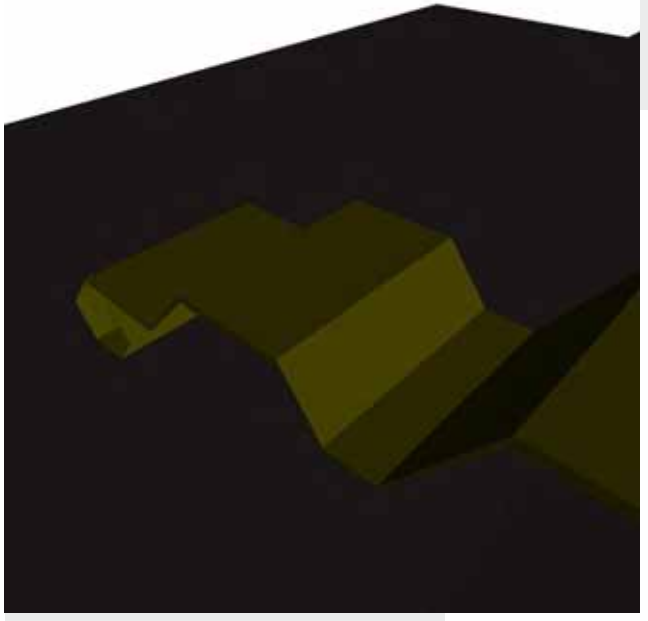
3.6

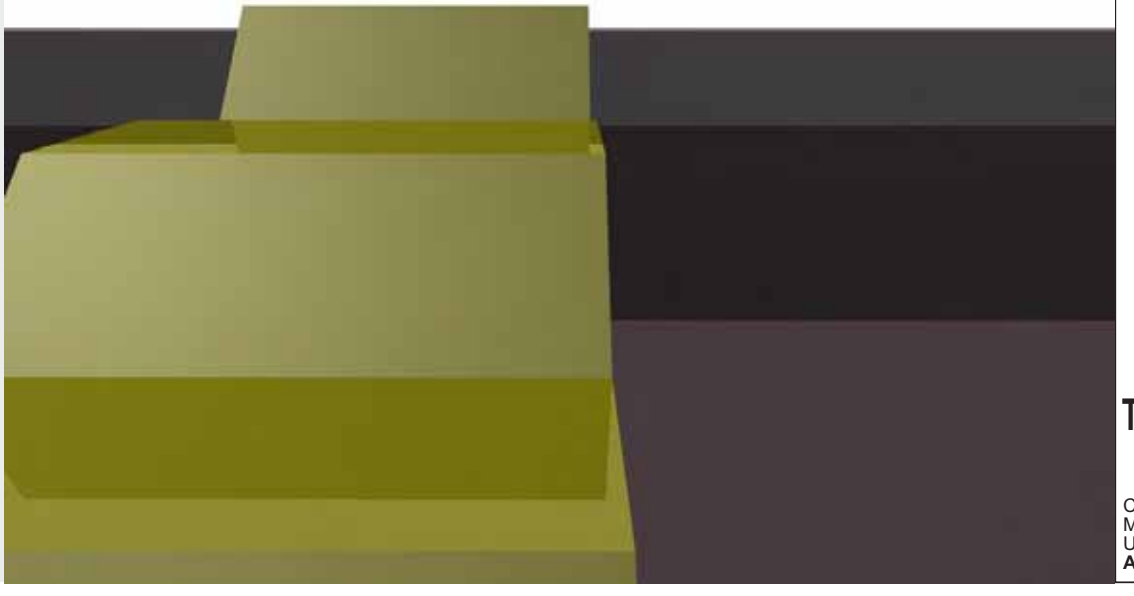
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.7



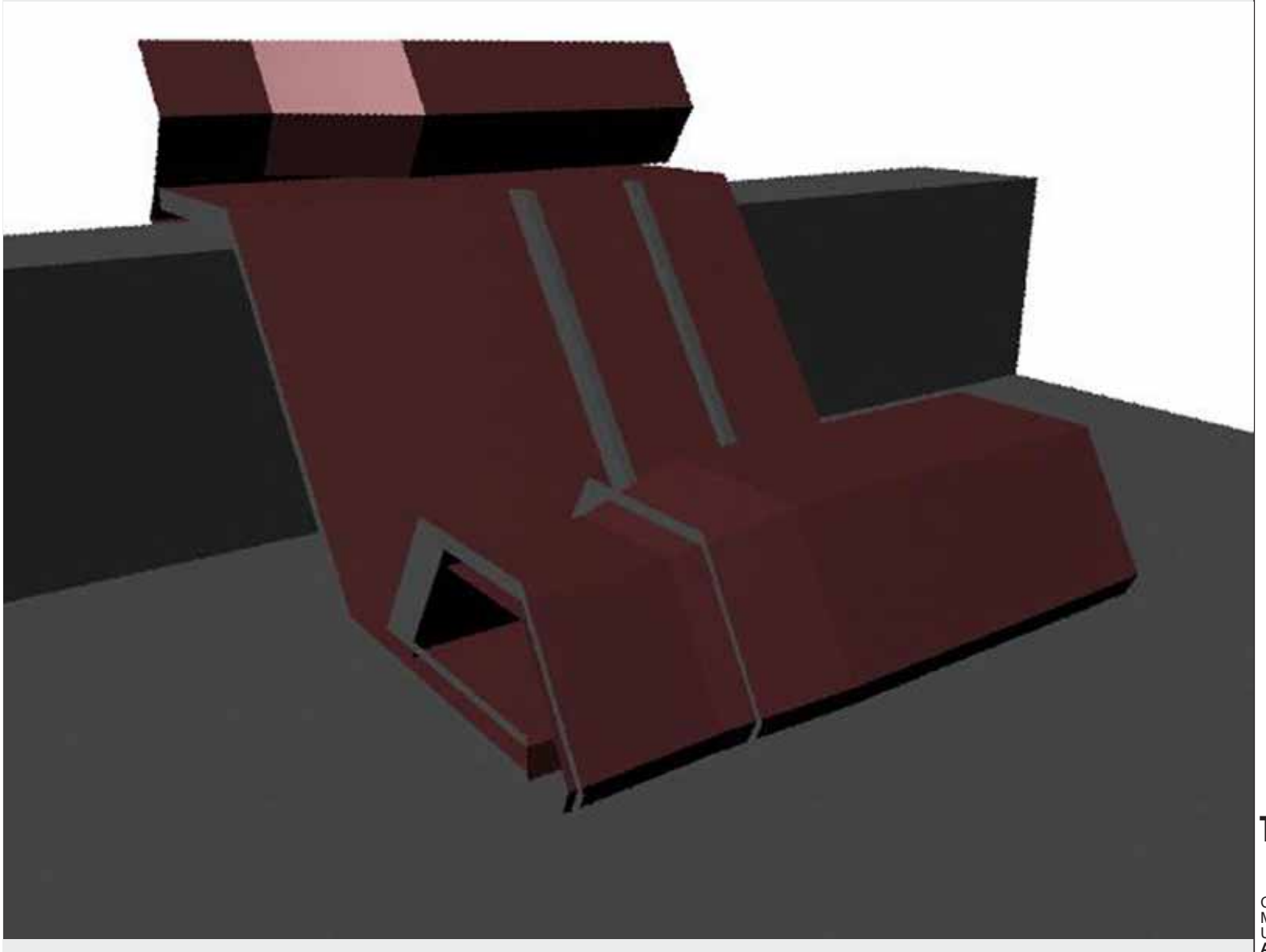


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

3.8

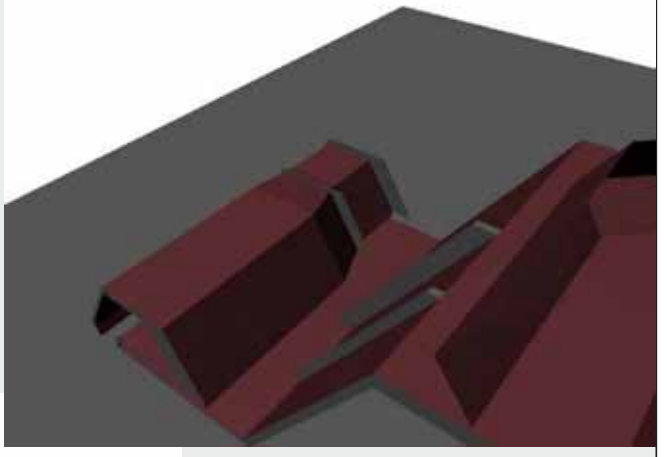


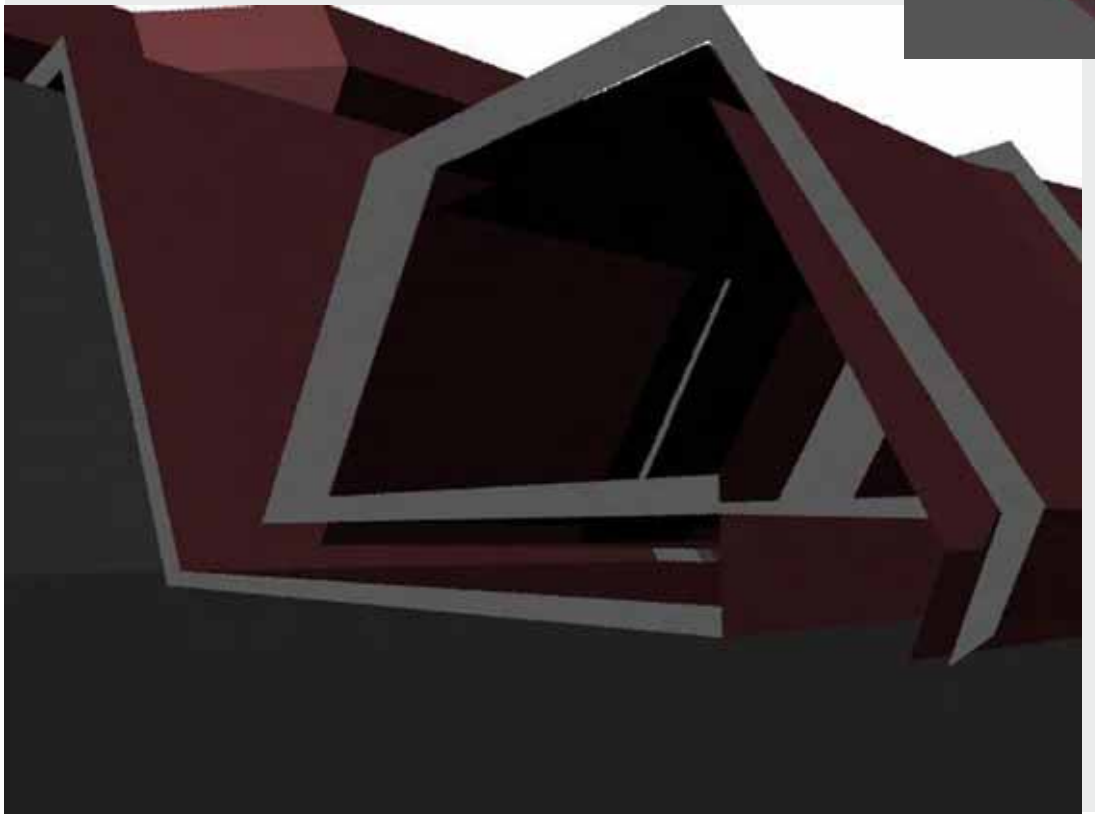
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

3.9



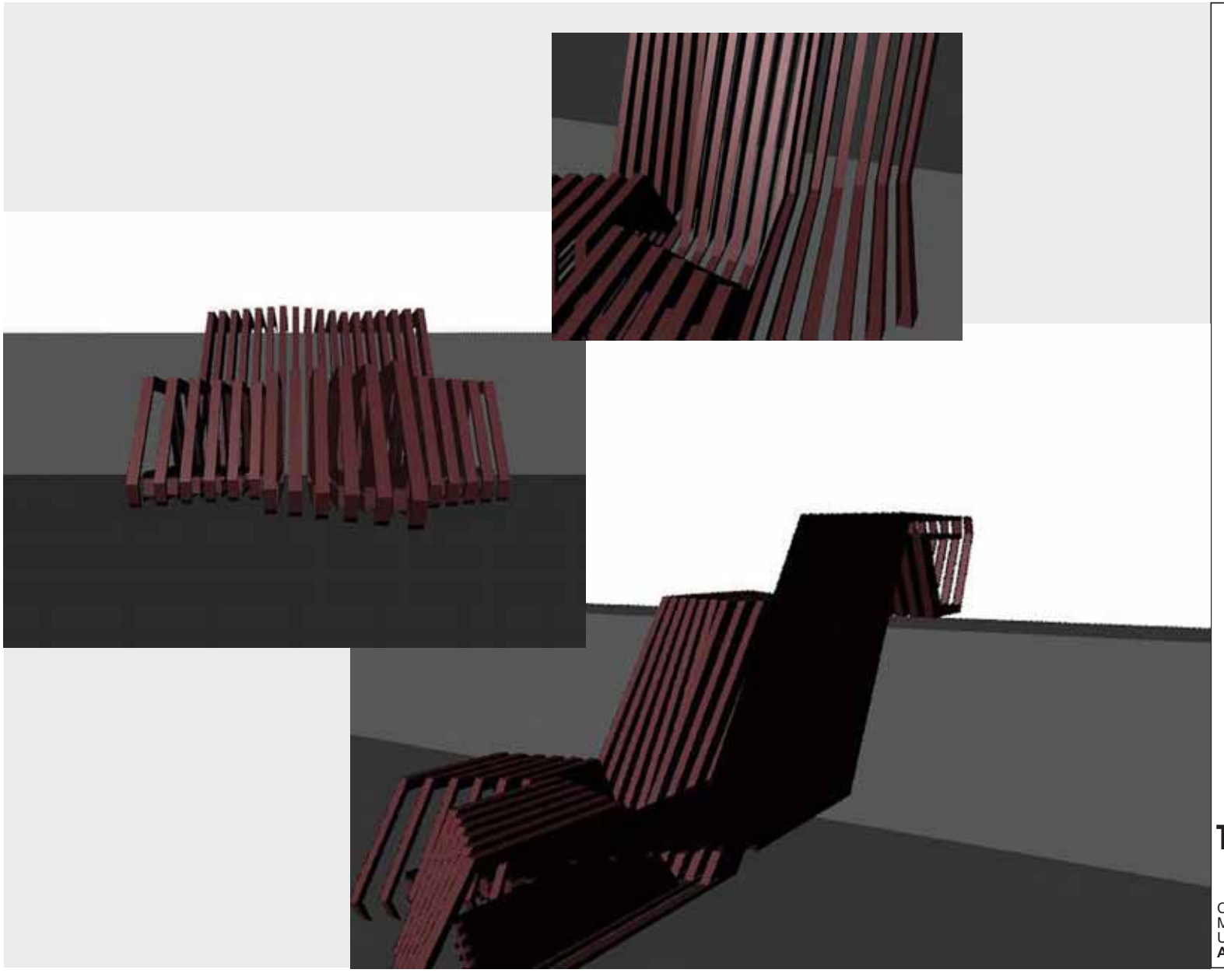


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.10

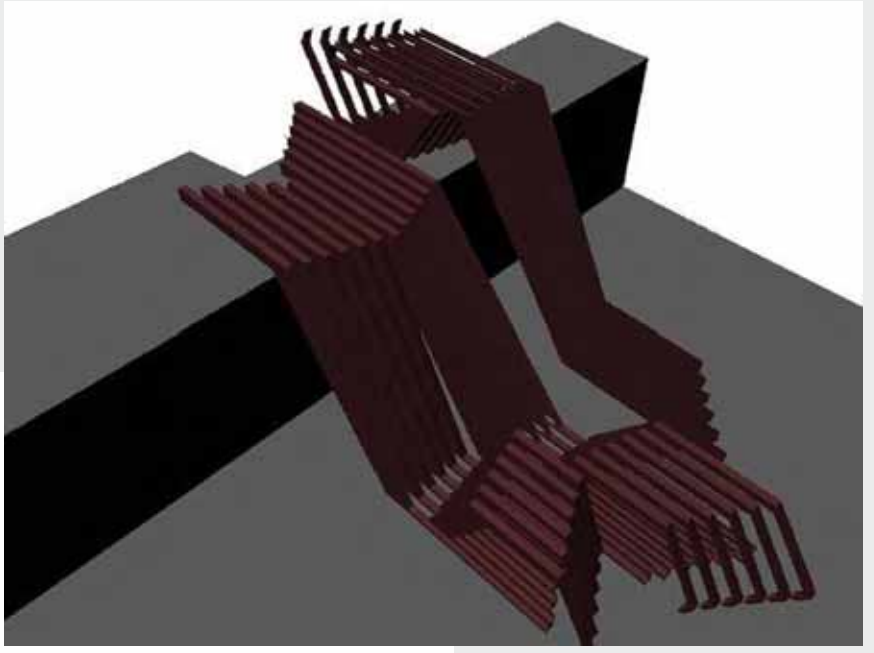


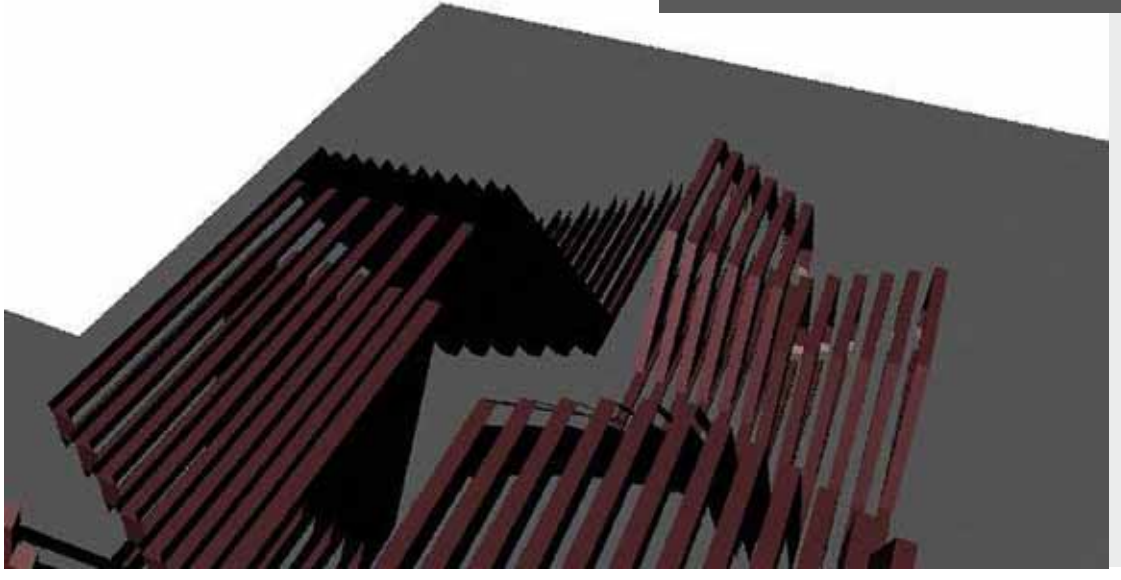
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.11



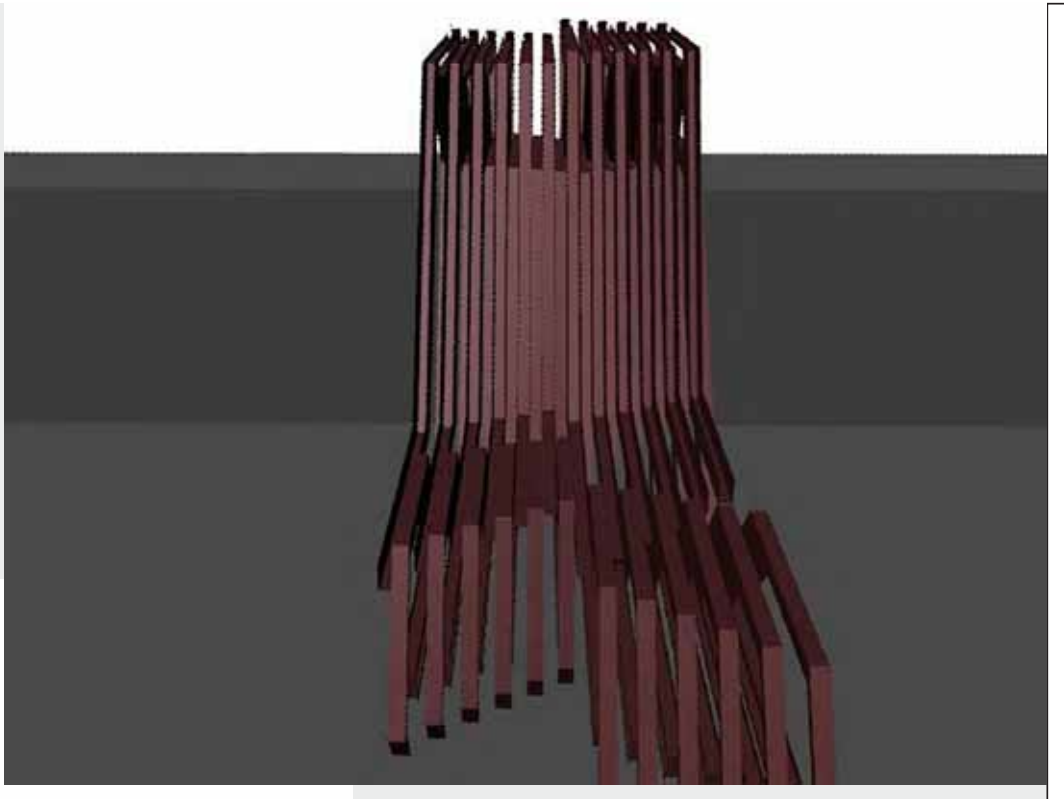


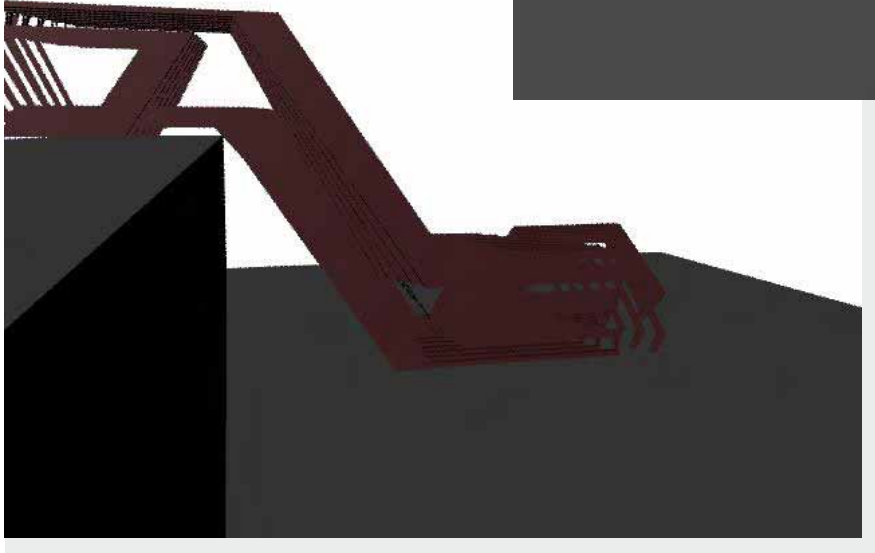
TRANSFORMATION

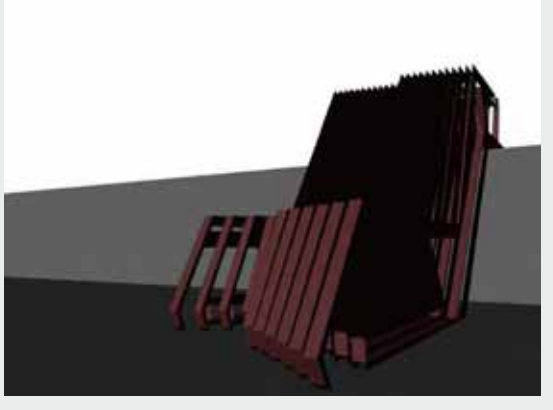
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.12





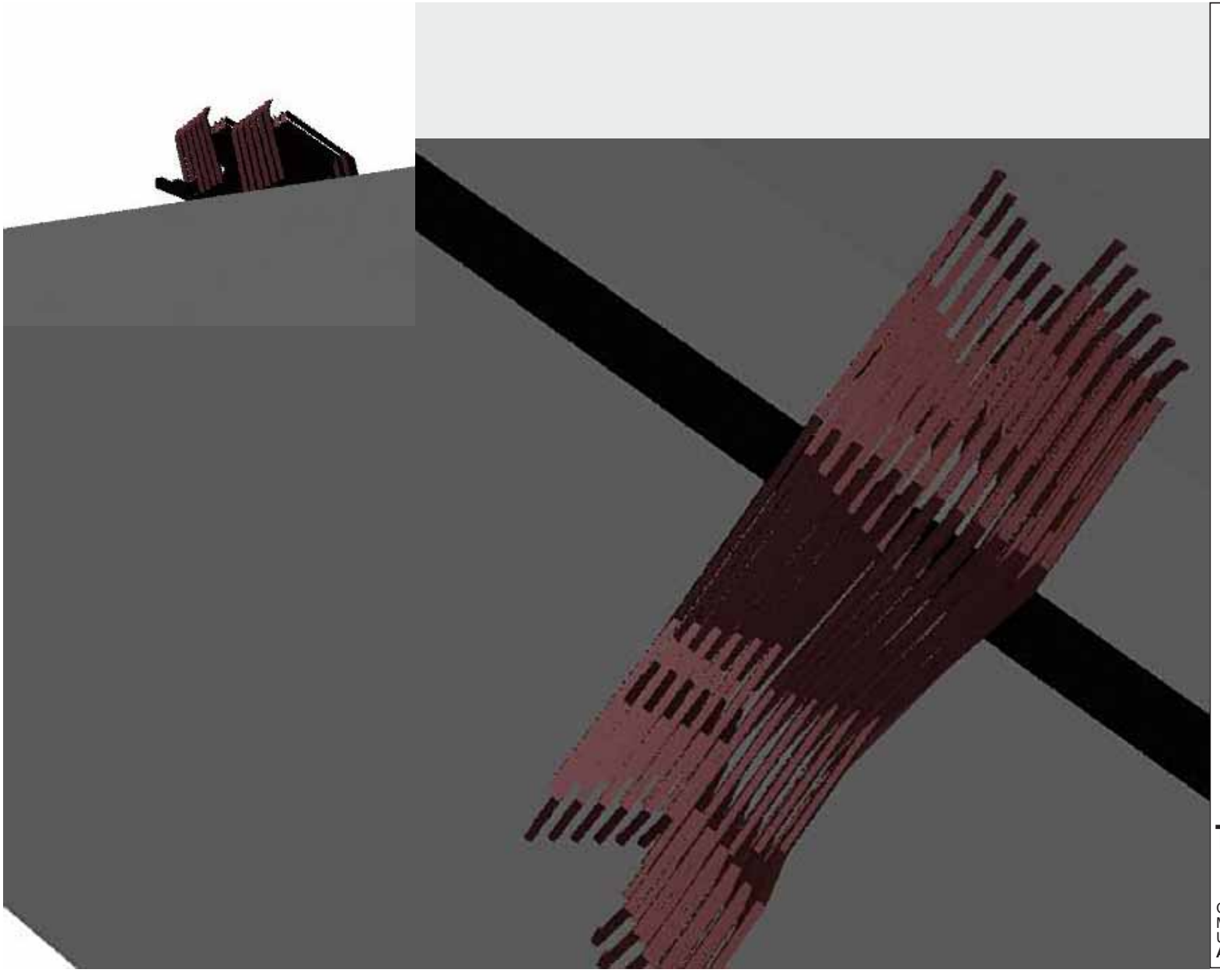


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.13

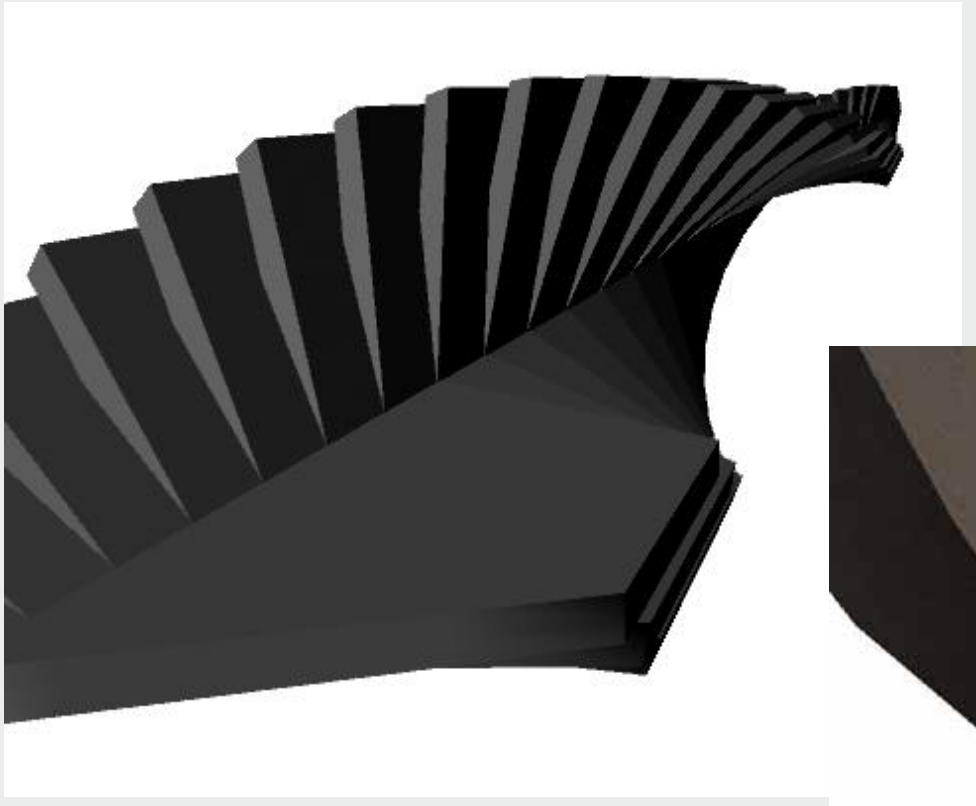


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.14



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

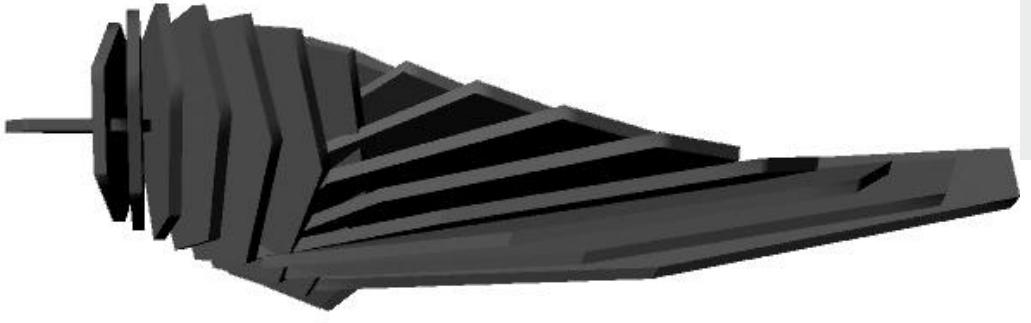
3.15

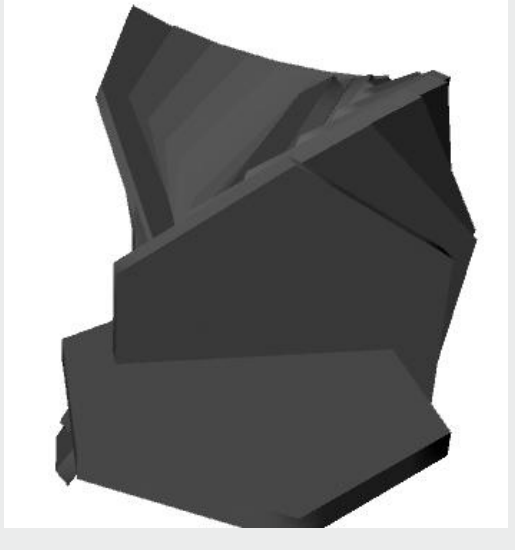
TRANSFORMATION

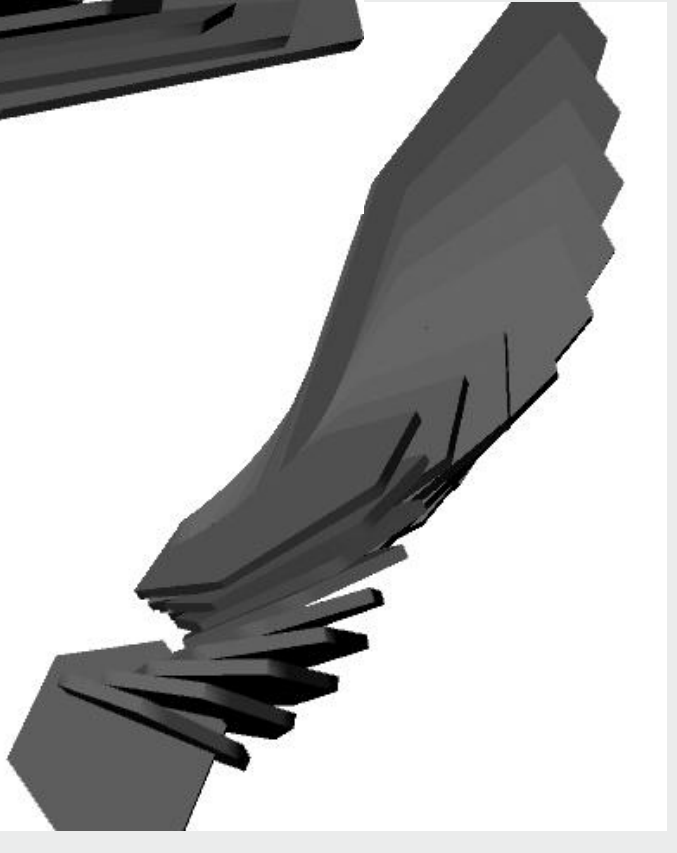
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.16





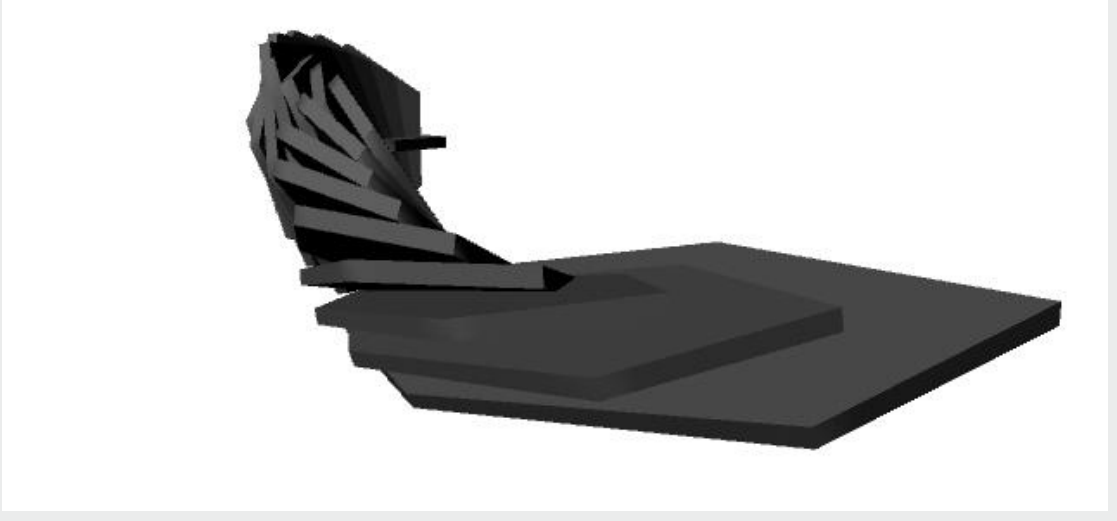


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.17

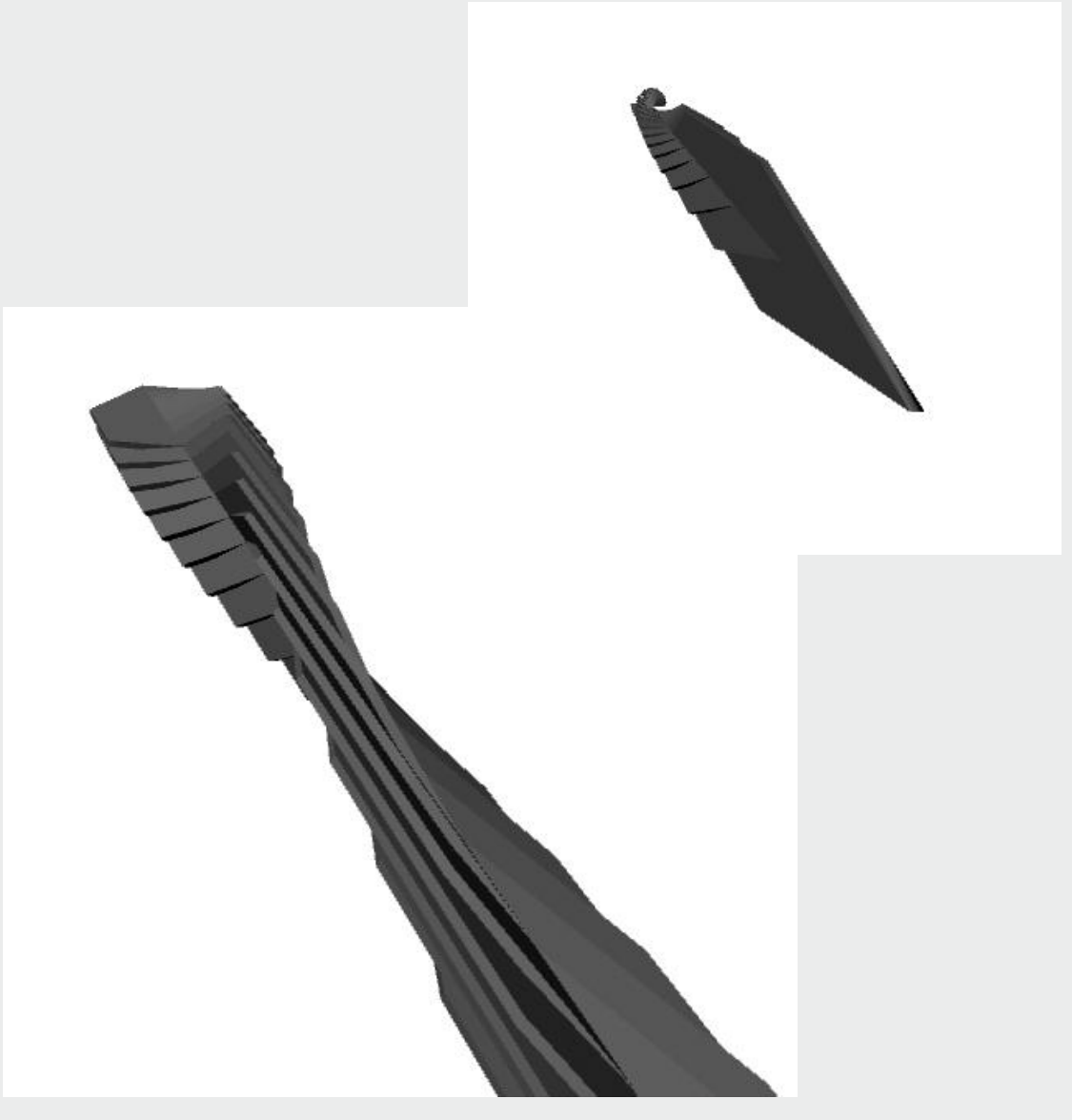


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.18



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

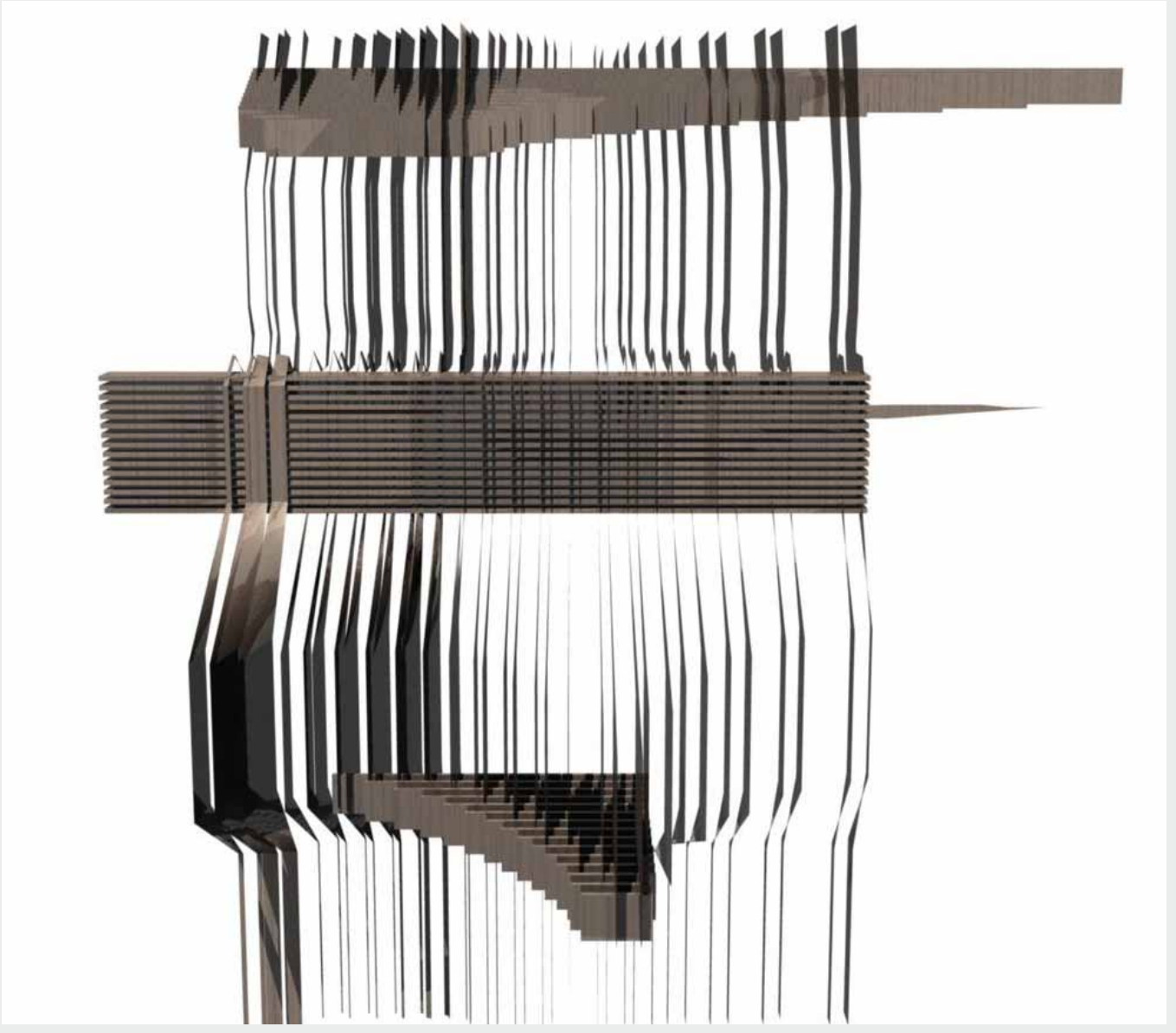
3.19

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.20

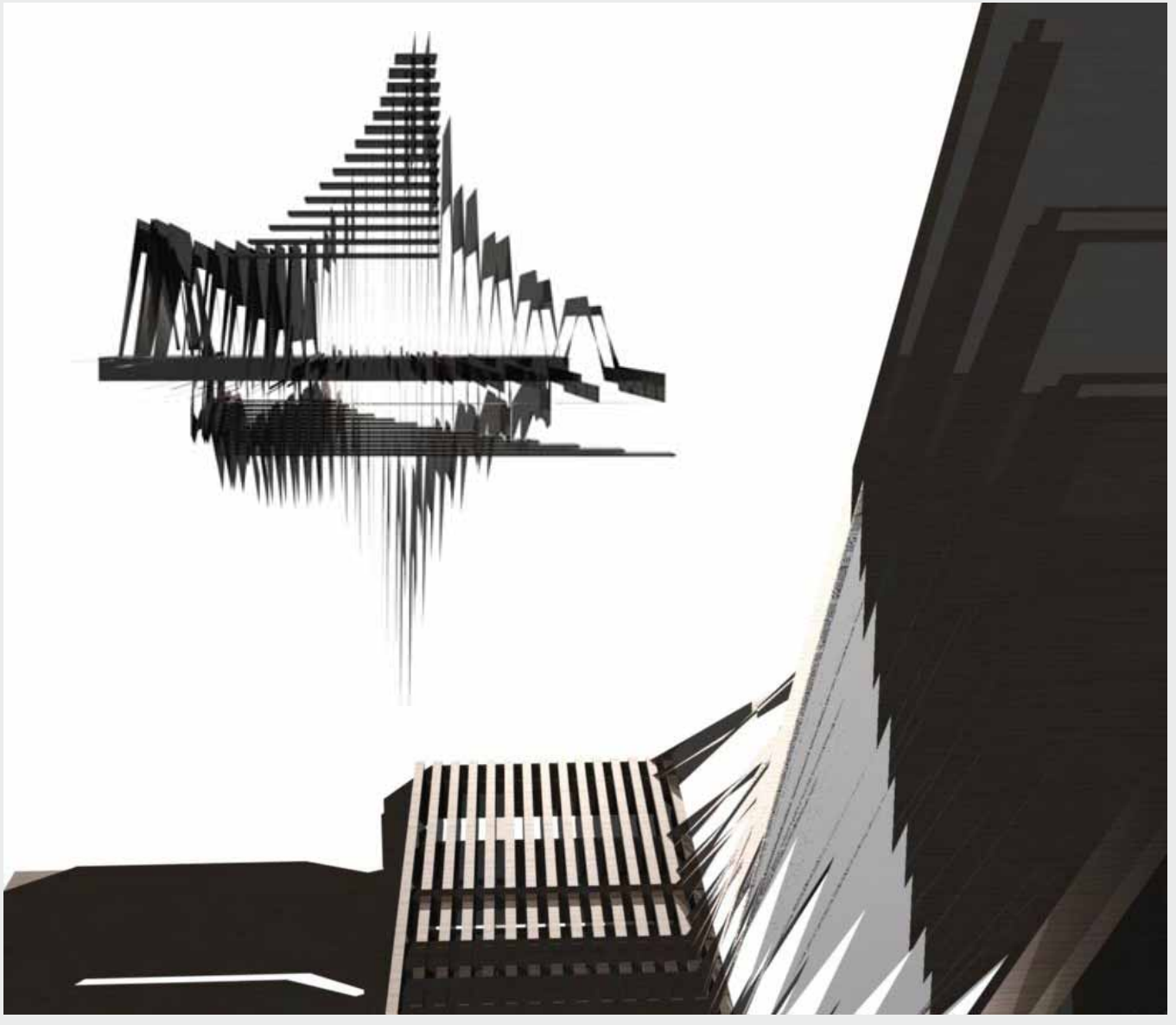


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.21

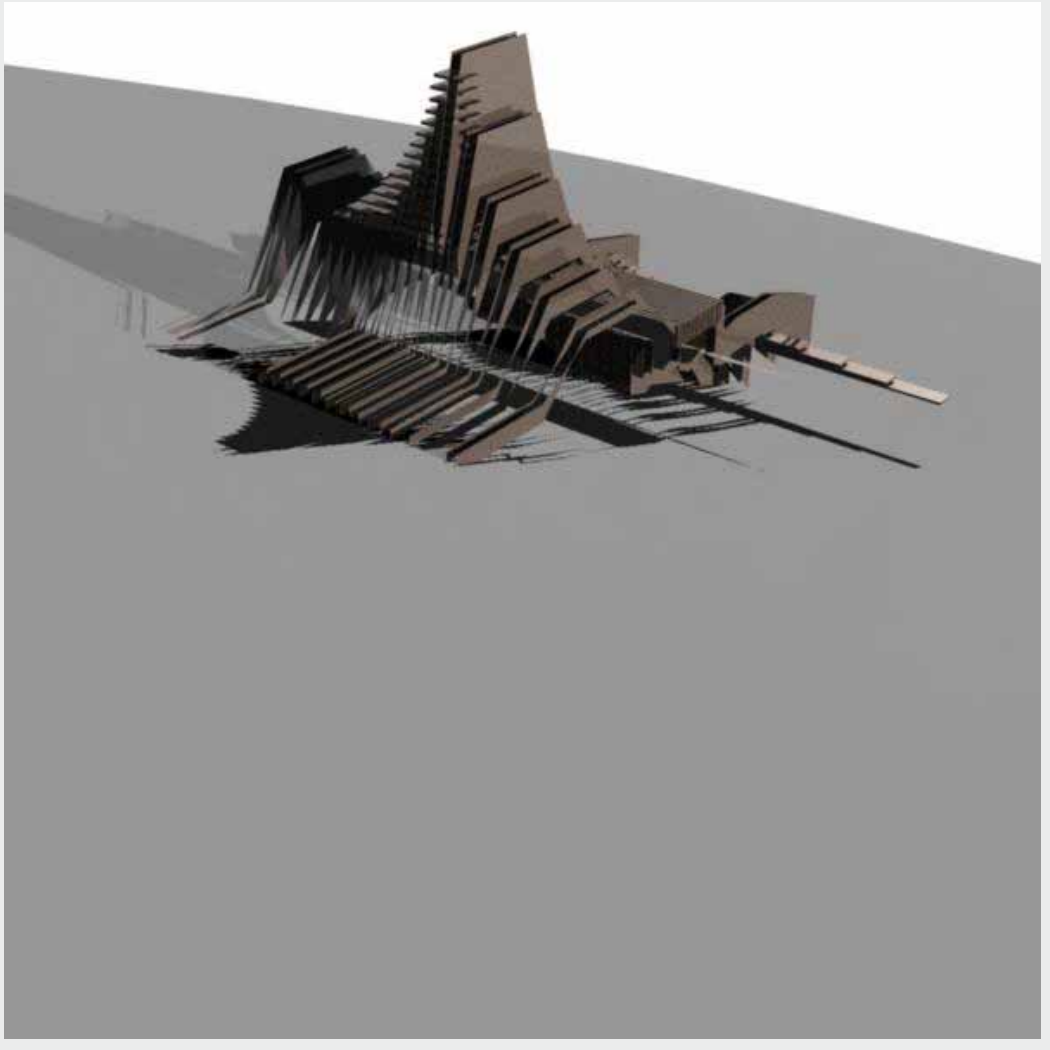


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.22

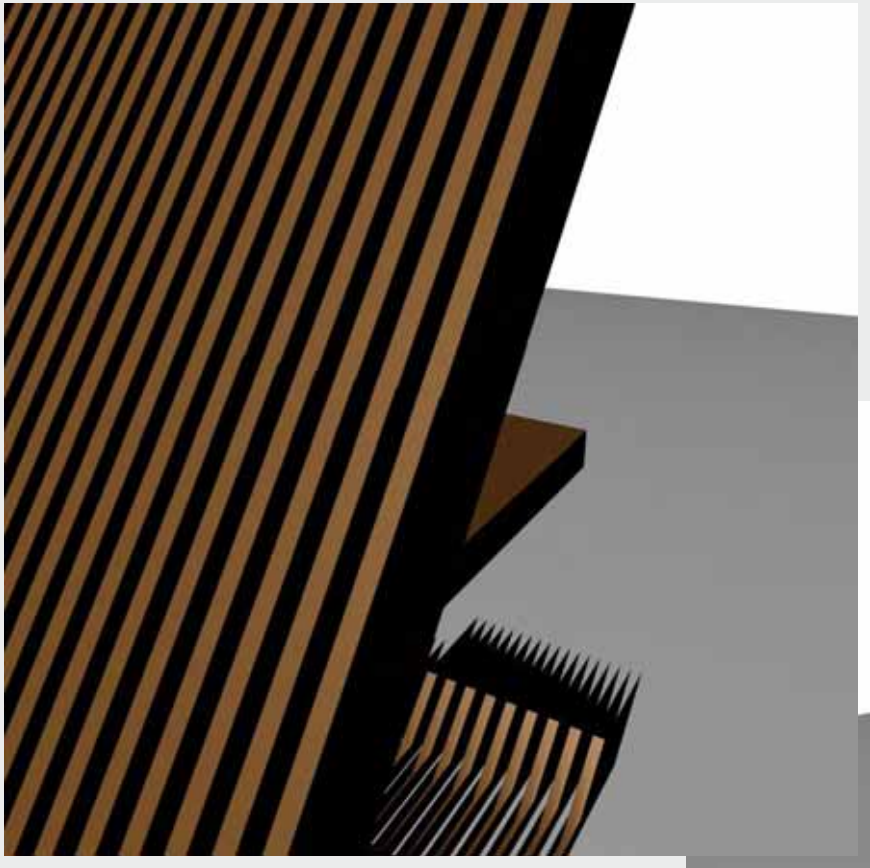


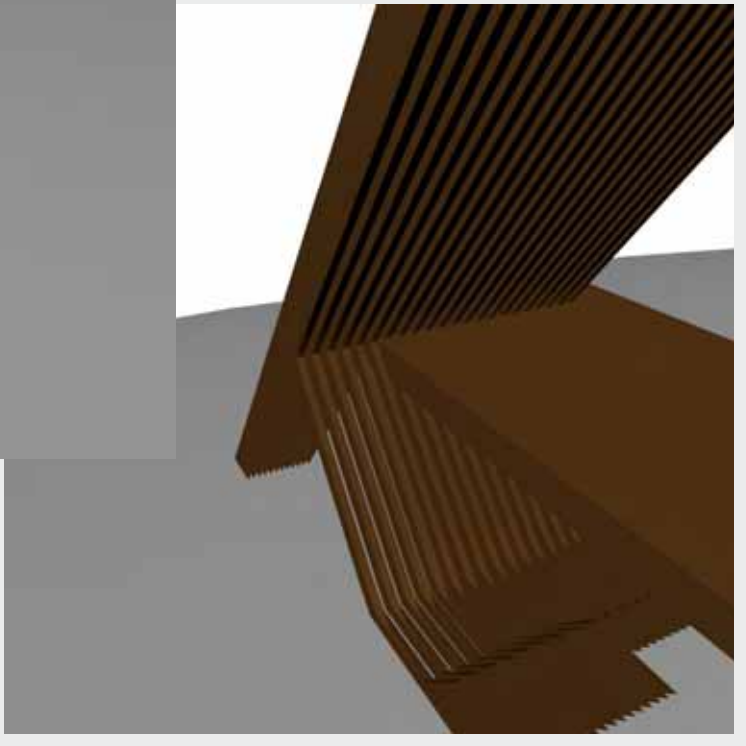
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.23



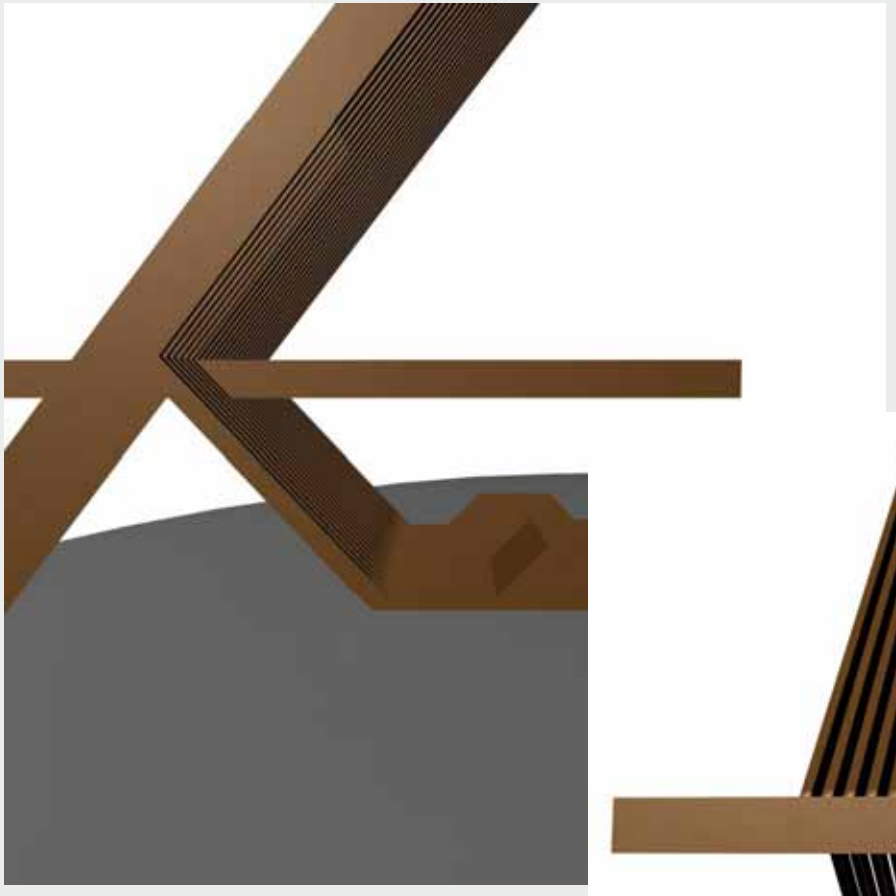


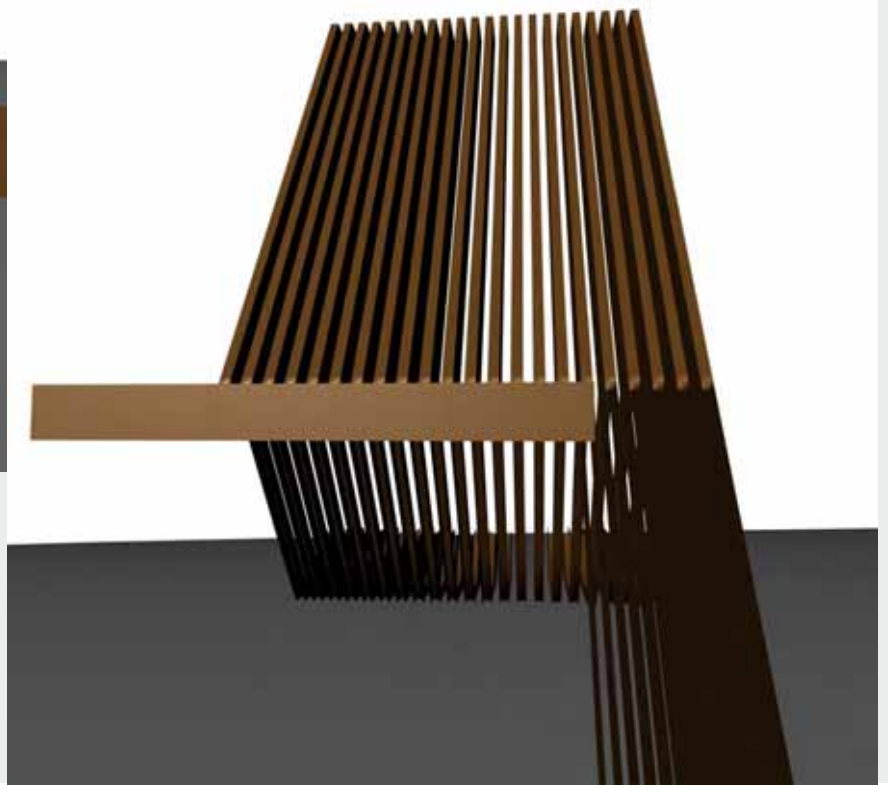
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.24



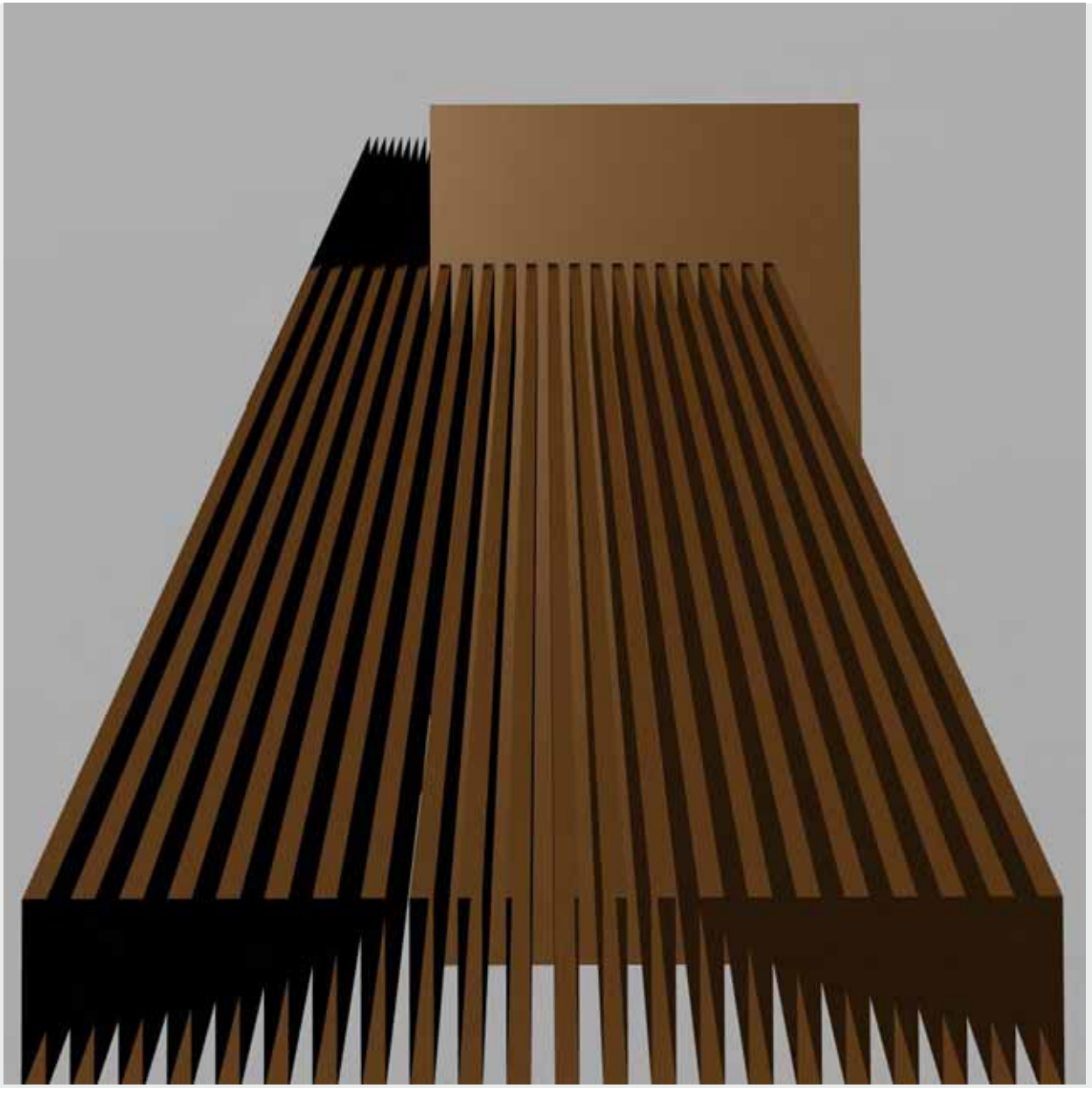


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.25

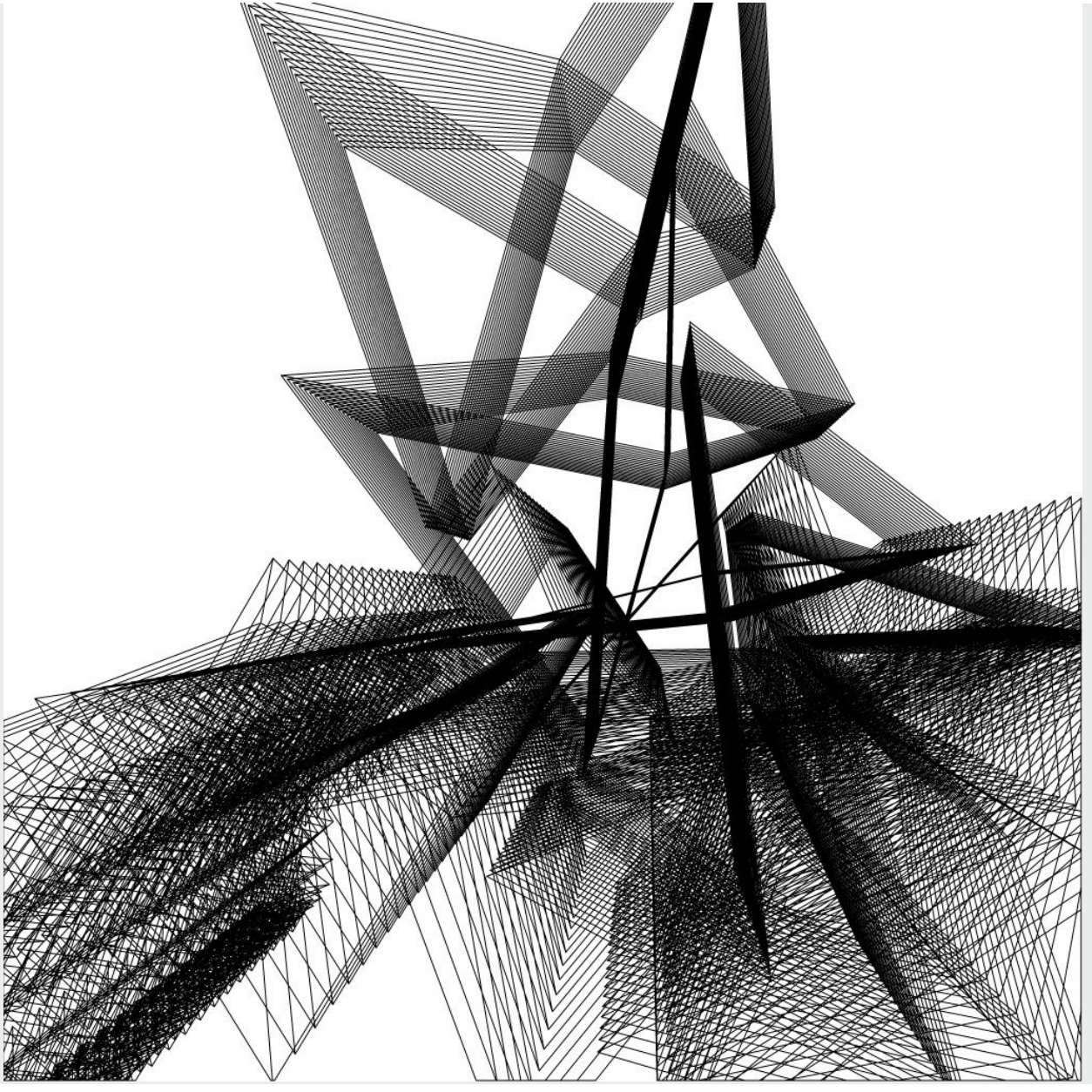


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.26

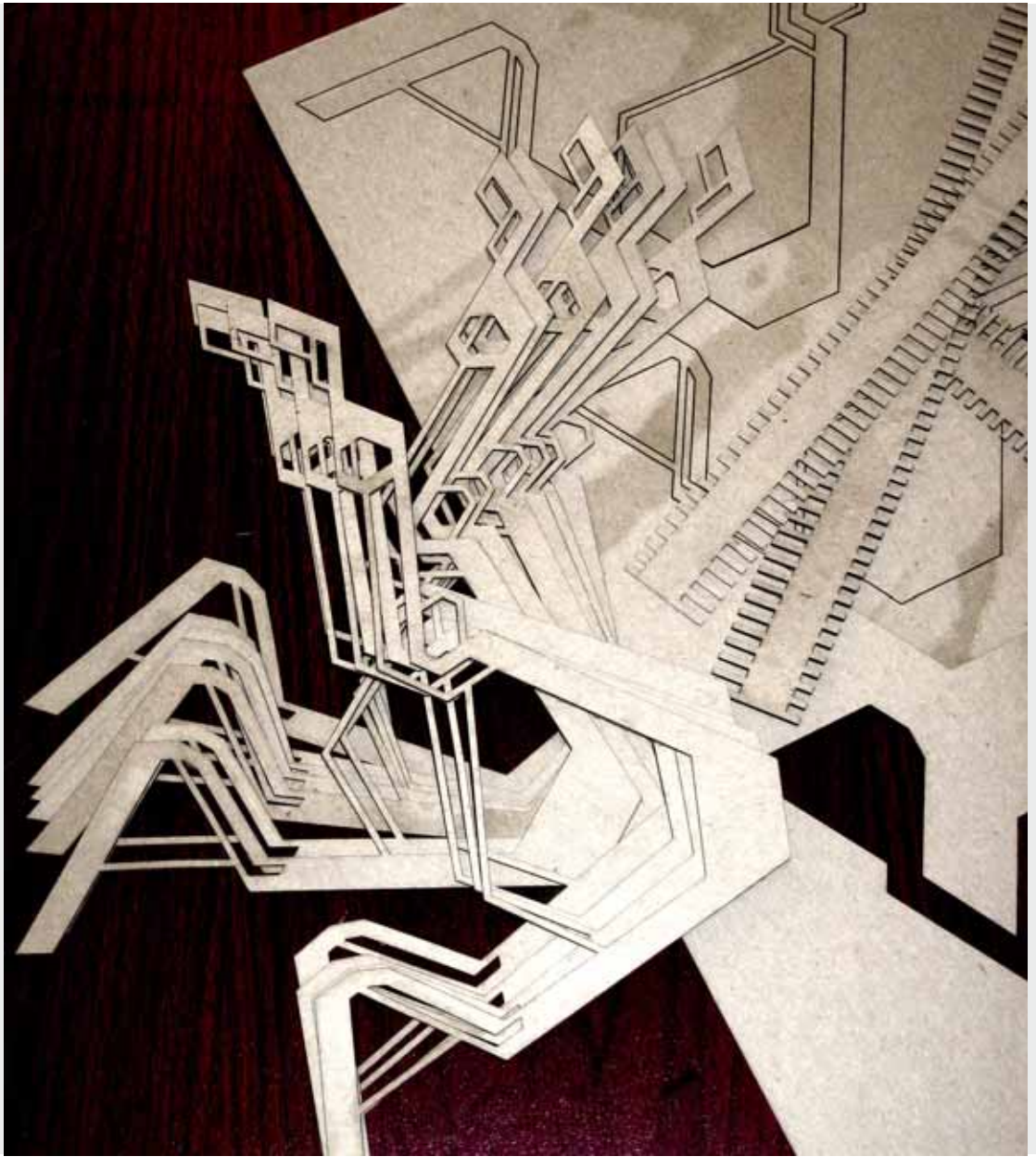


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.27



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

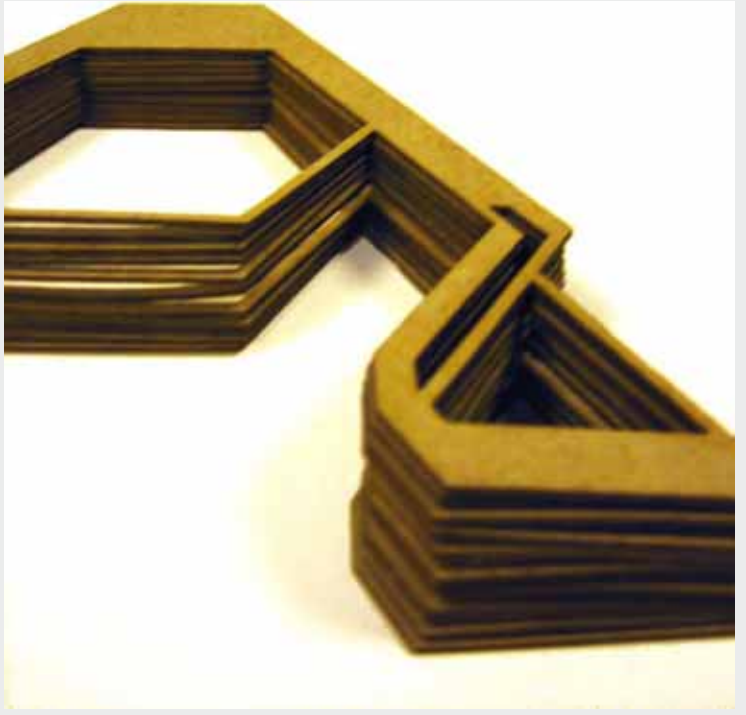
3.28

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.29

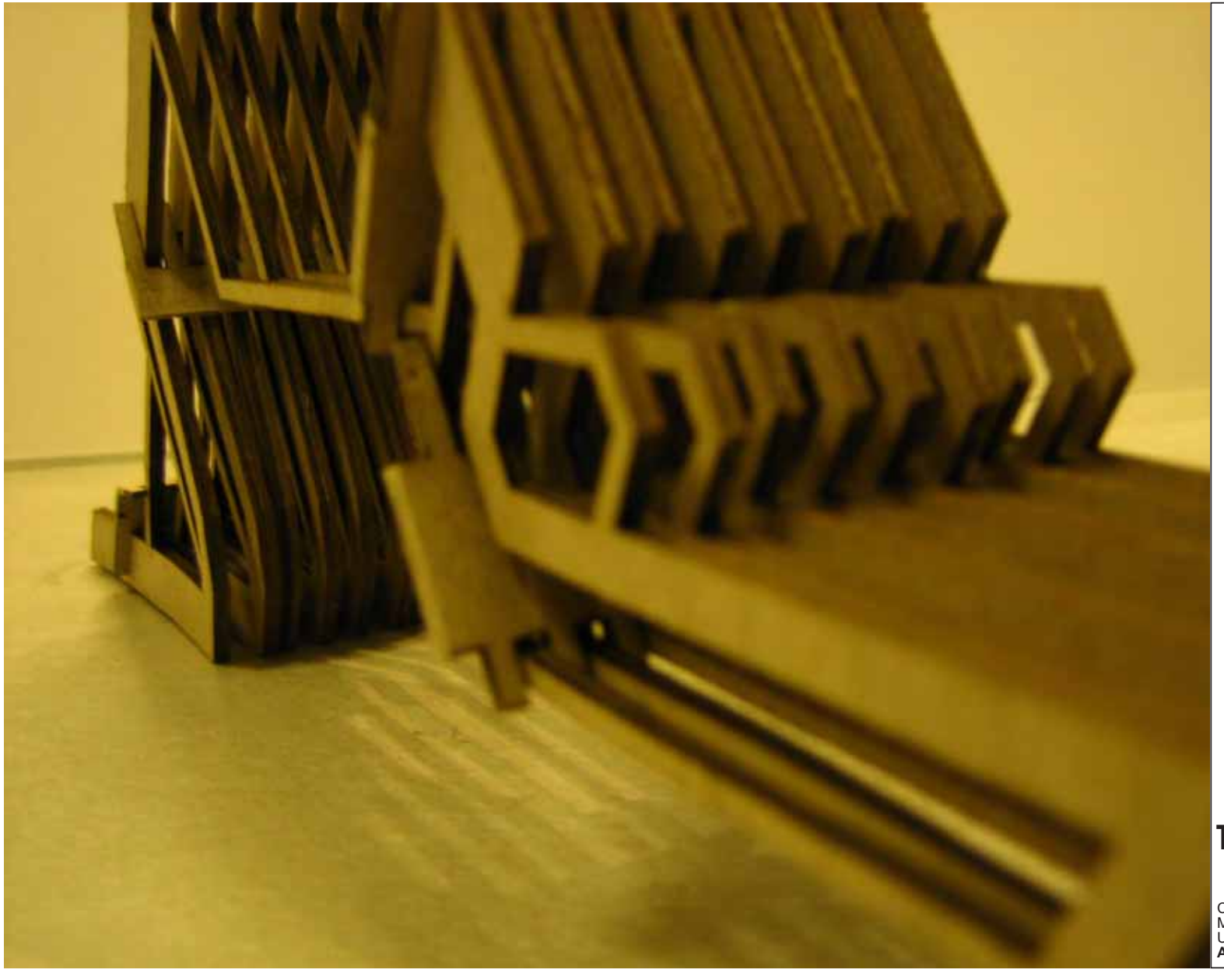


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.30

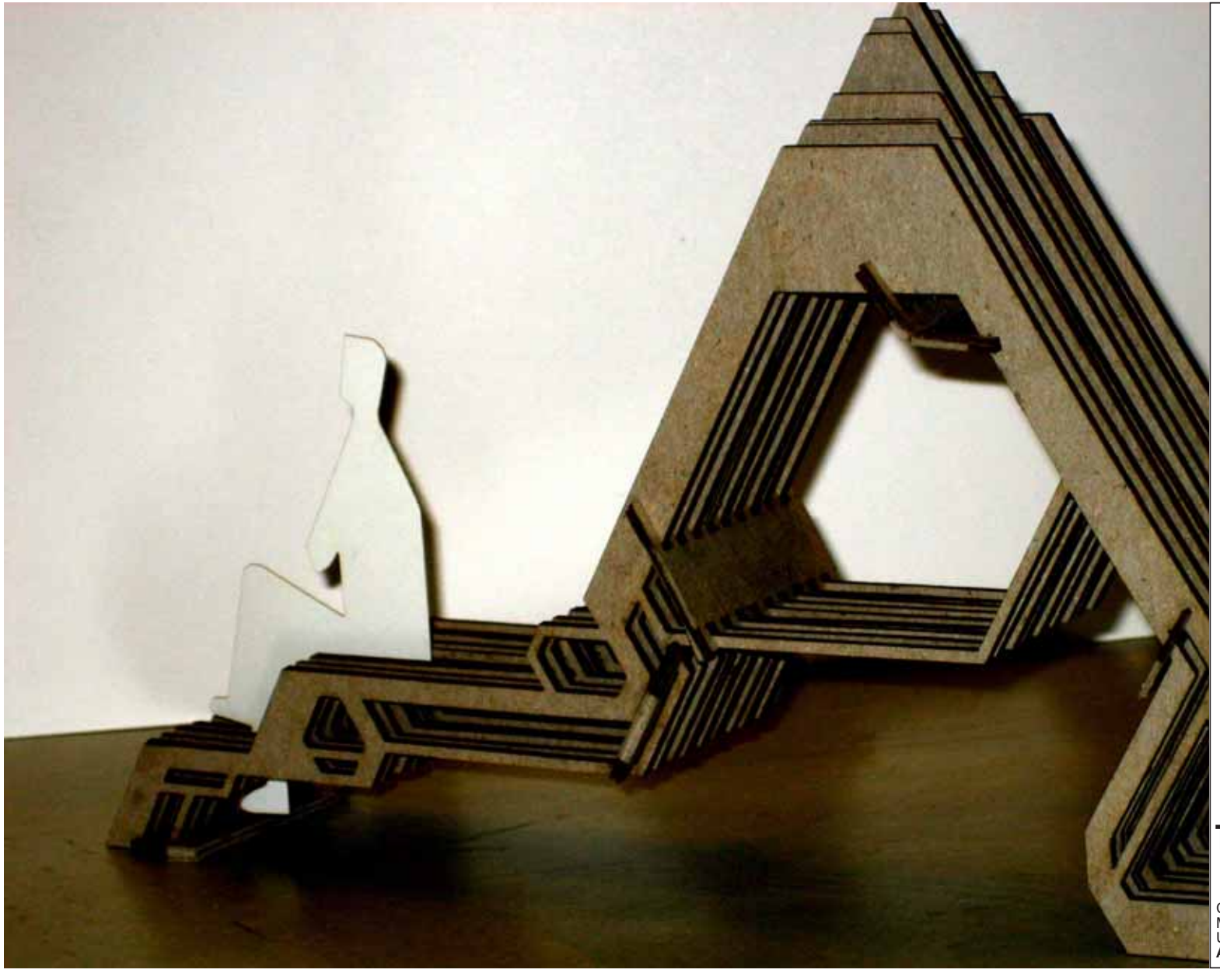


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.31

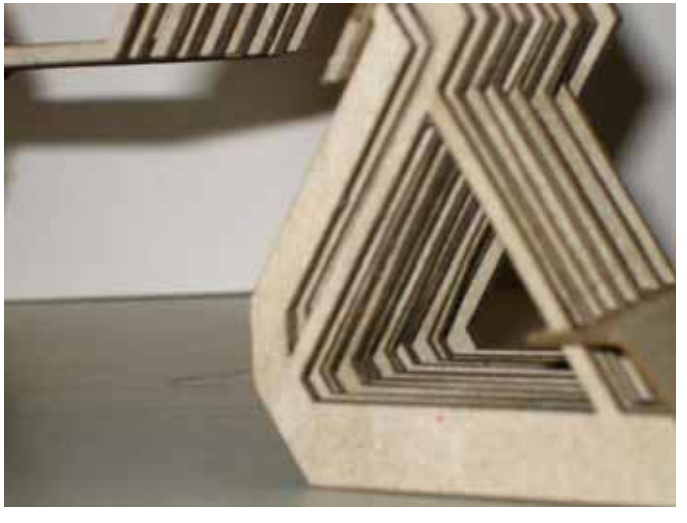


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.32



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.33

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

3.34

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

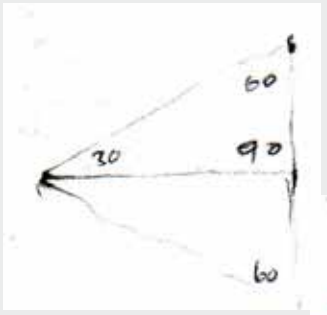
3.35

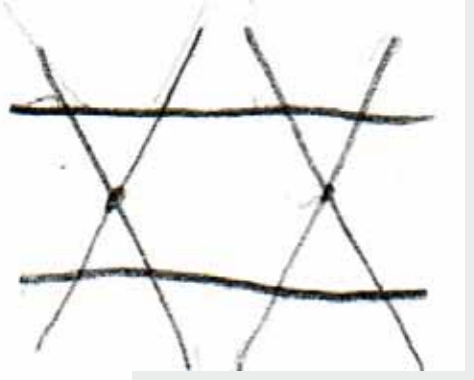
Jared Langevin
Third Year, Architecture

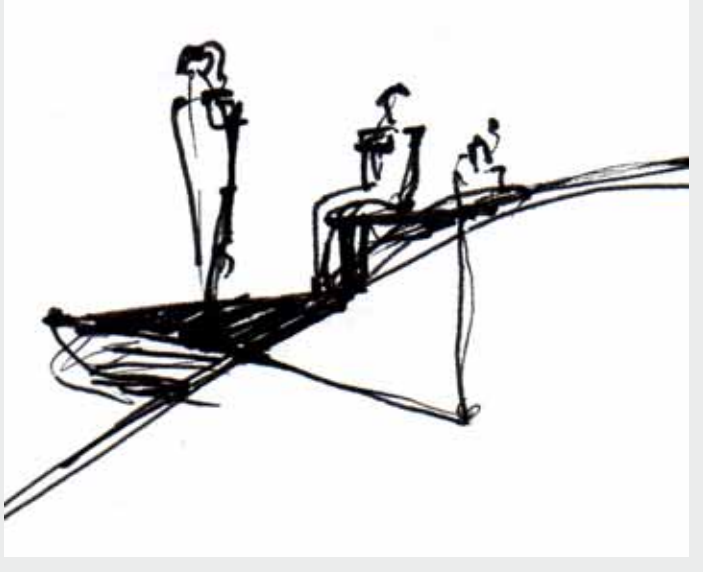
TRANSFORMATION
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie
Mellon
University
Architecture

4.0





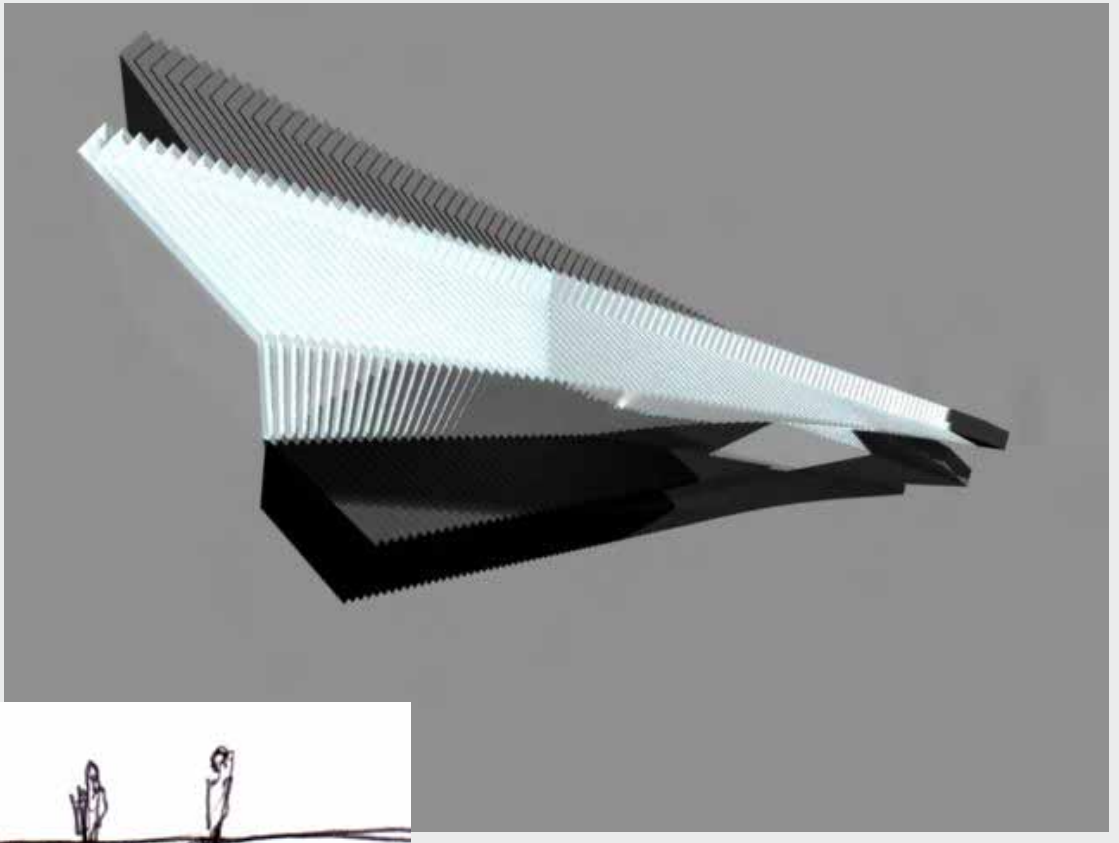


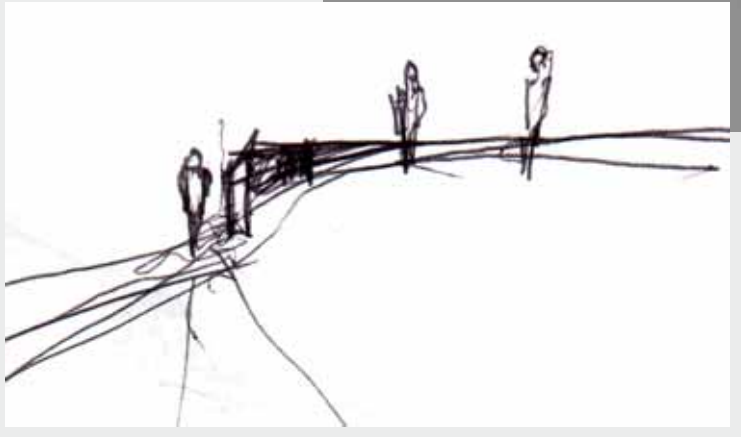
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

4.1



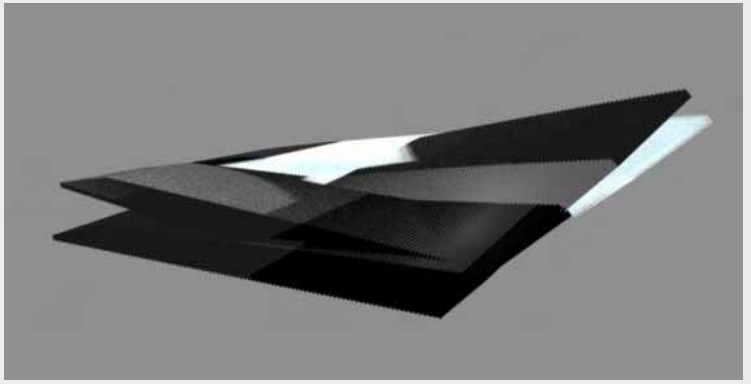


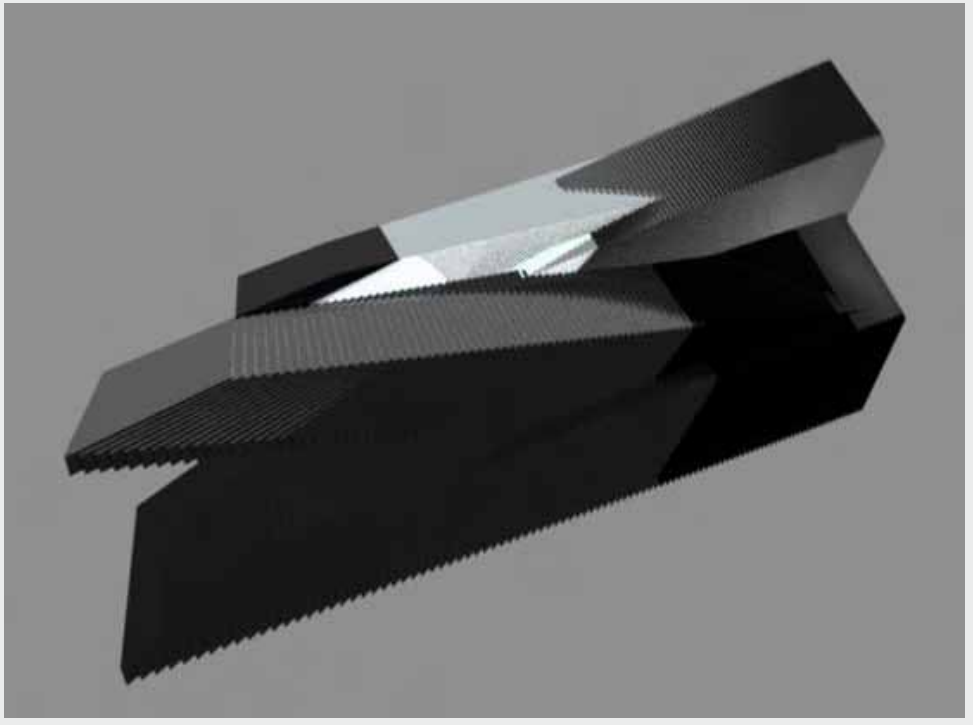
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

4.2



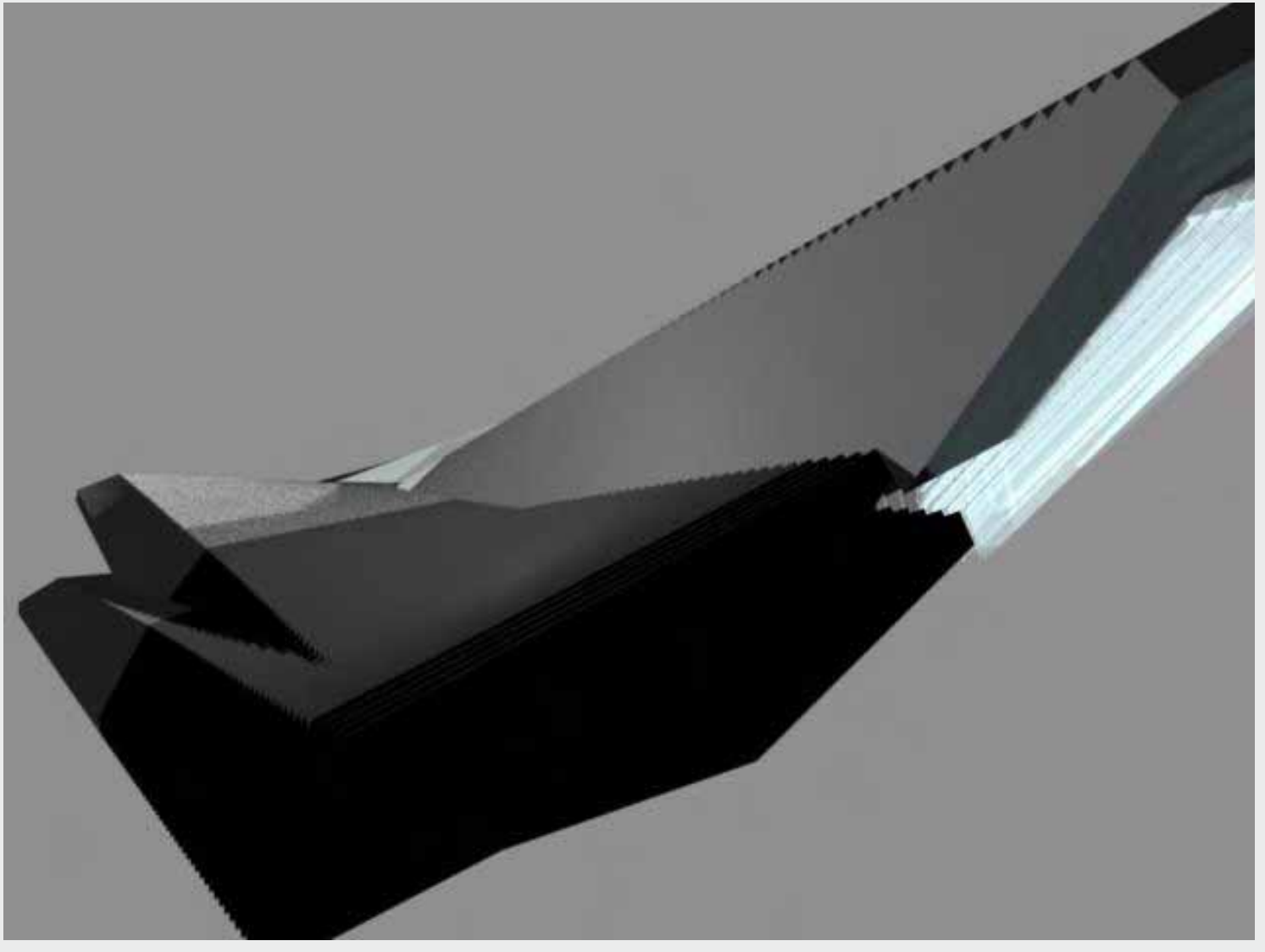


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.3

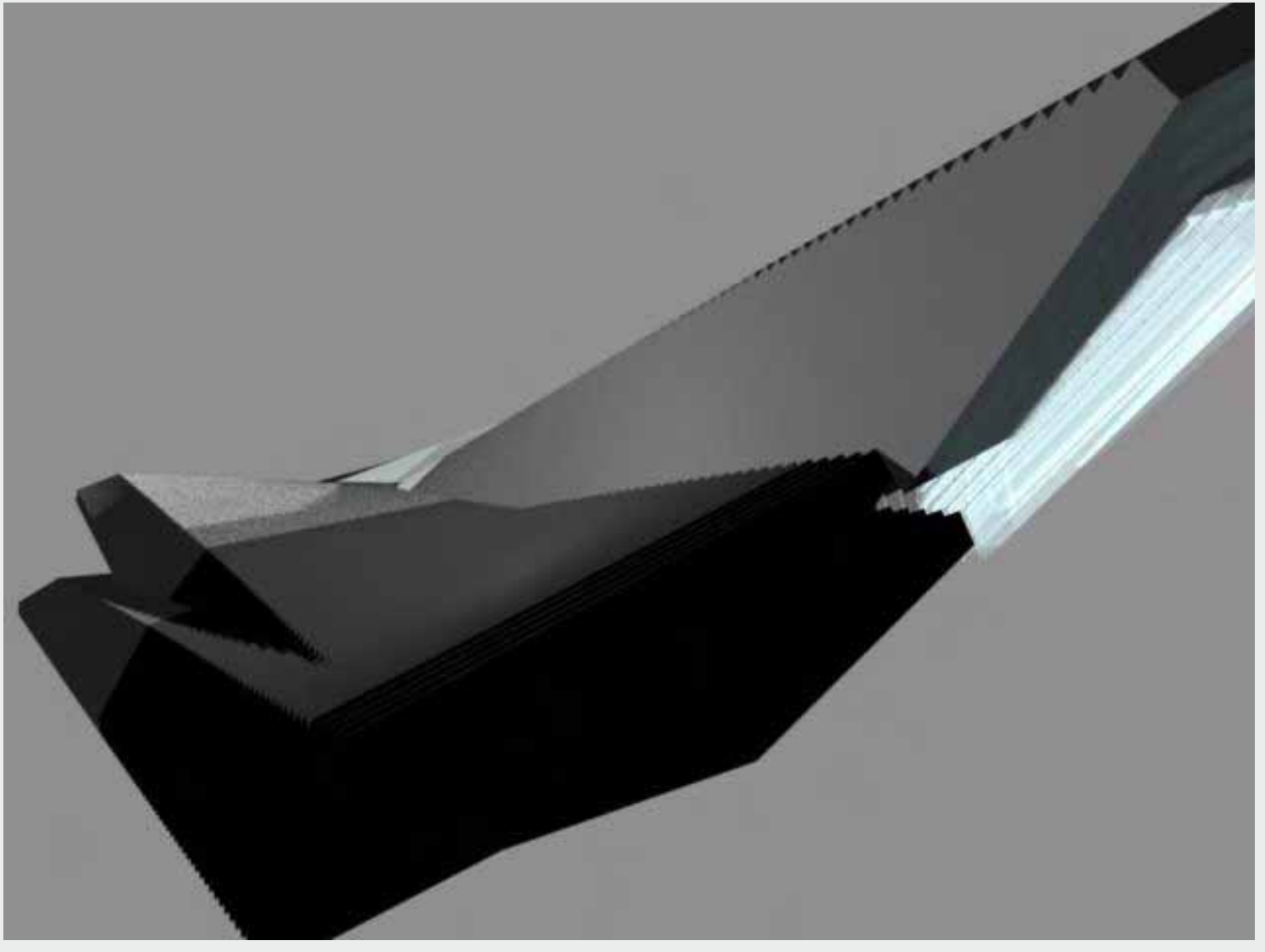


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie
Mellon
University
Architecture

4.4

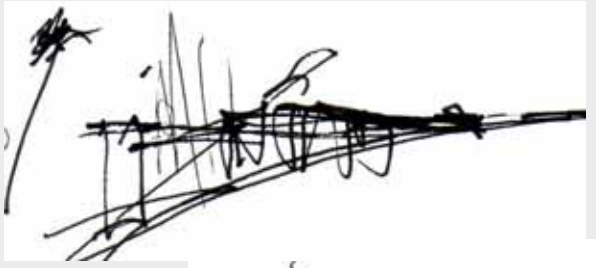


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie
Mellon
University
Architecture

4.5



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

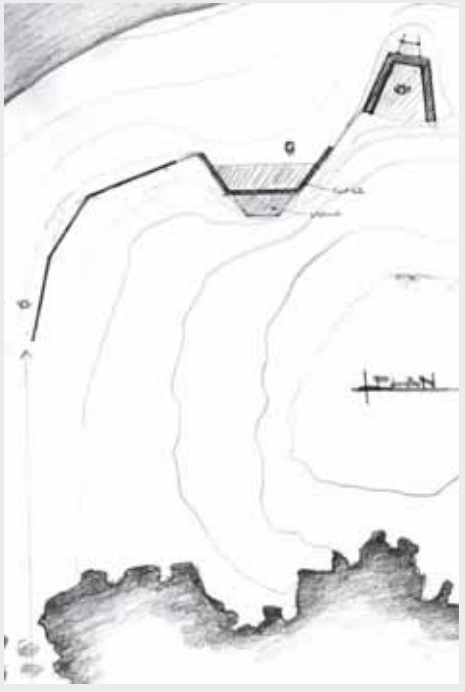
4.6

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.7

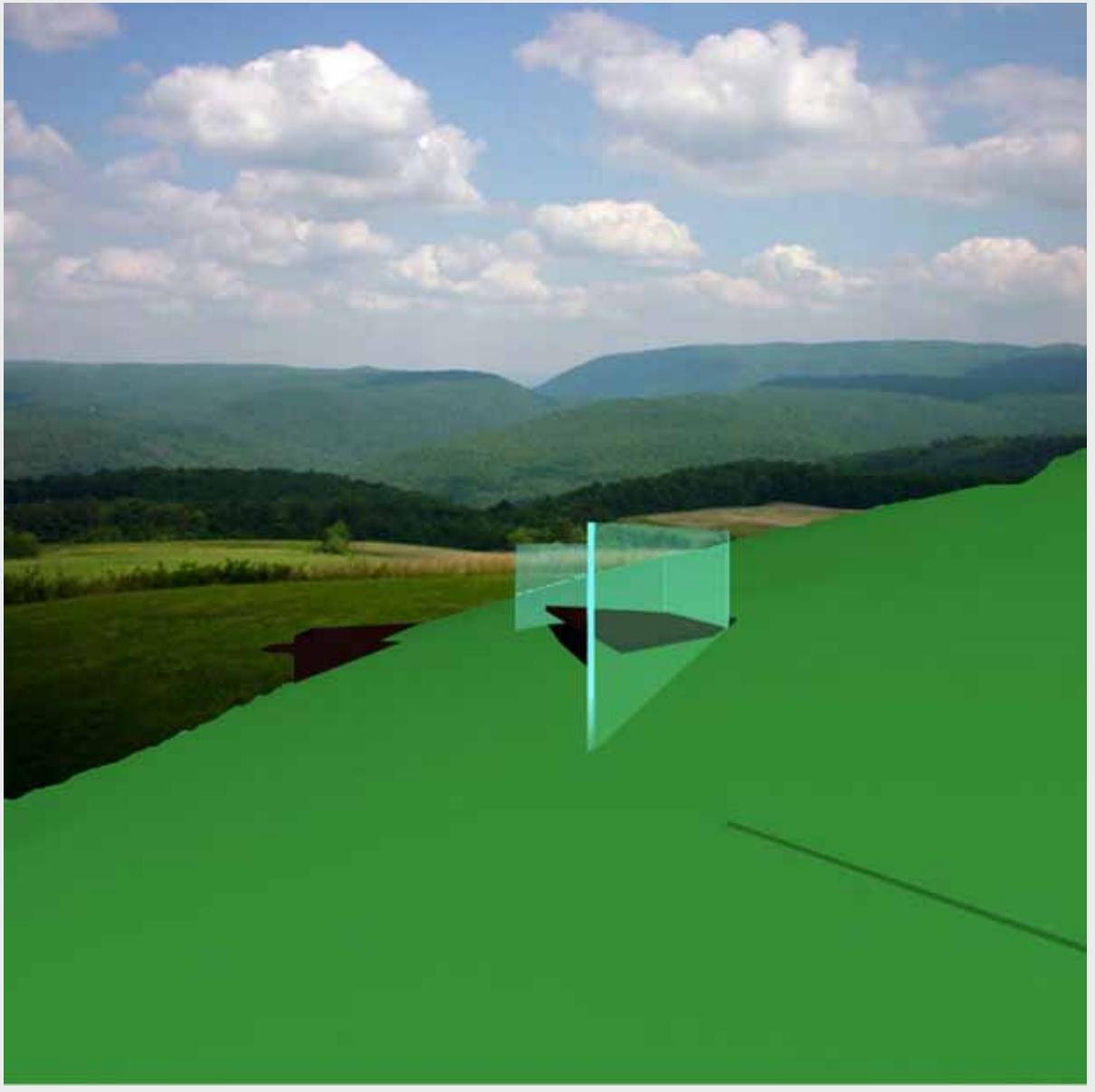


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.8

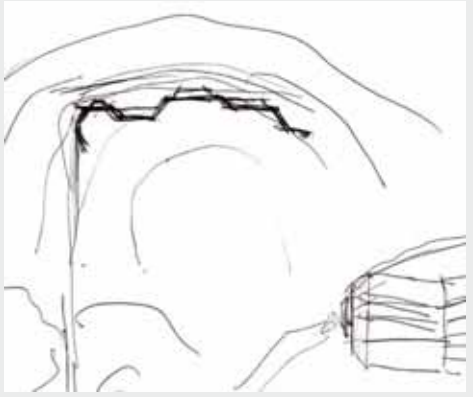


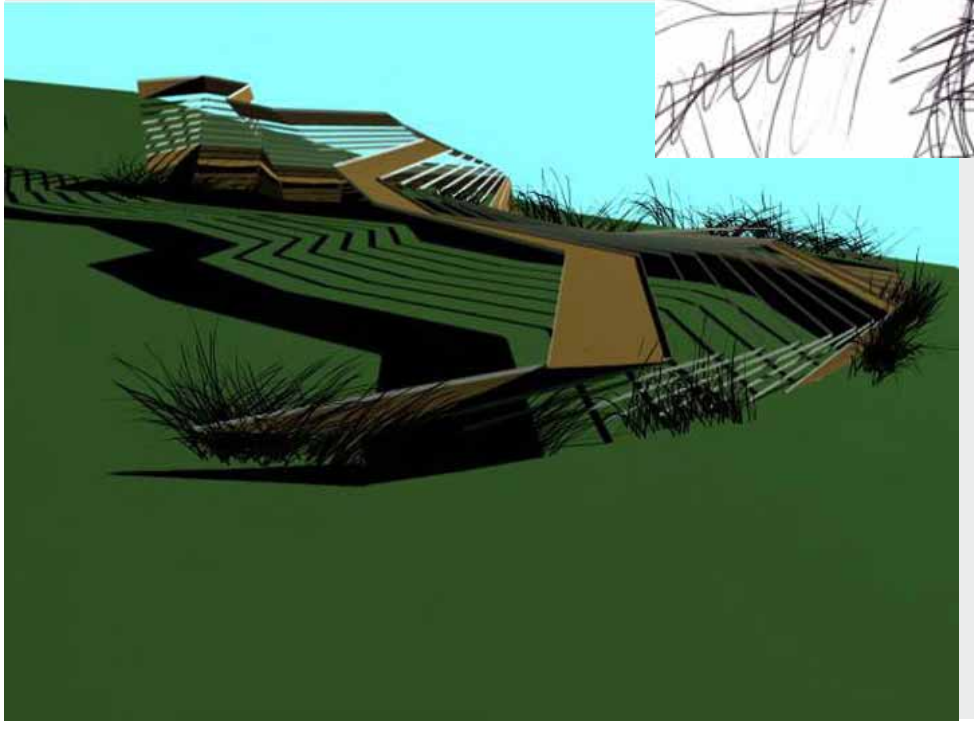
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

4.9



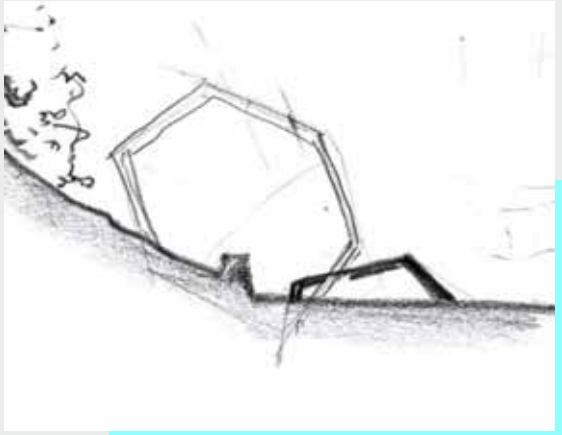


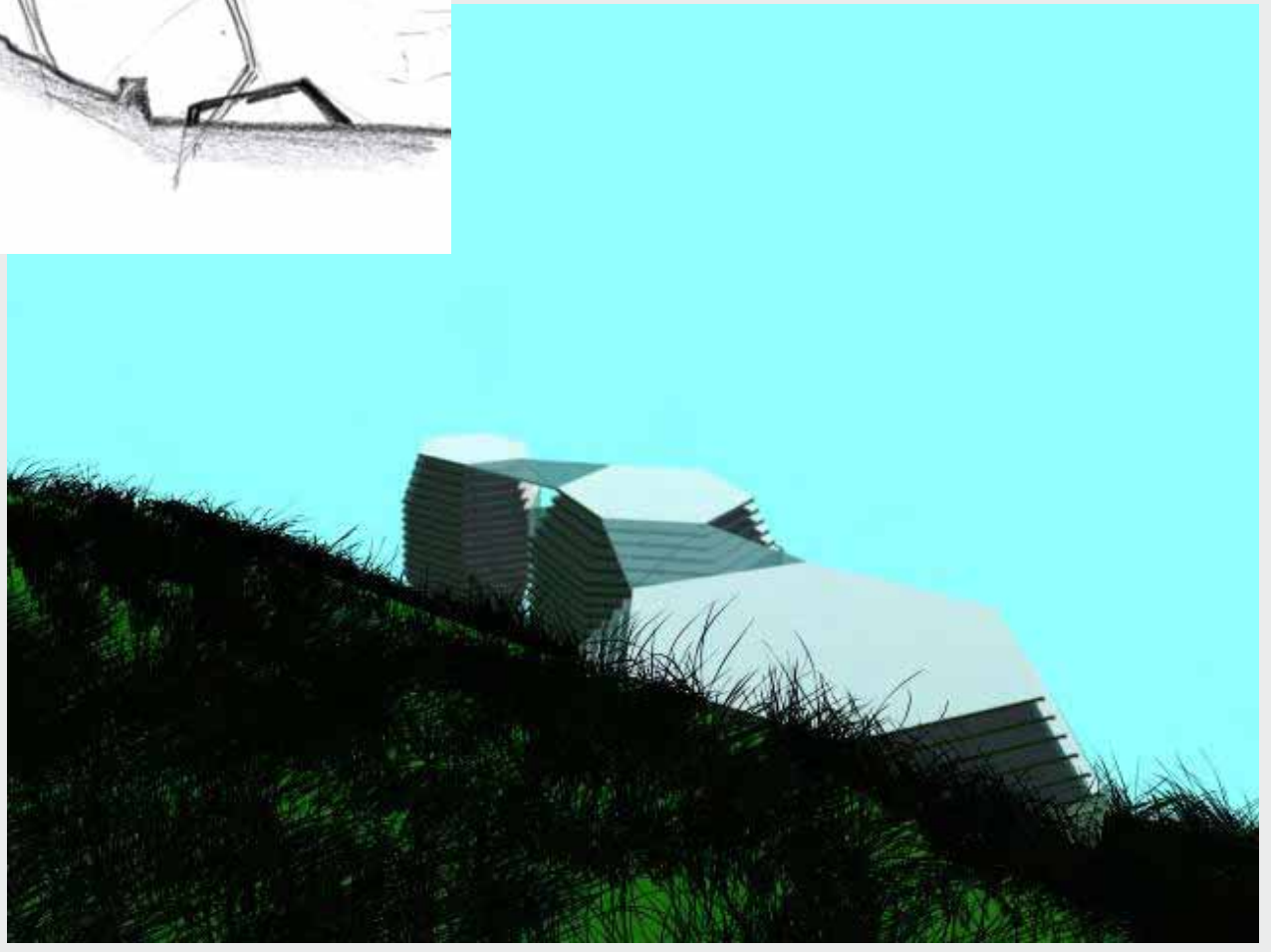
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.10



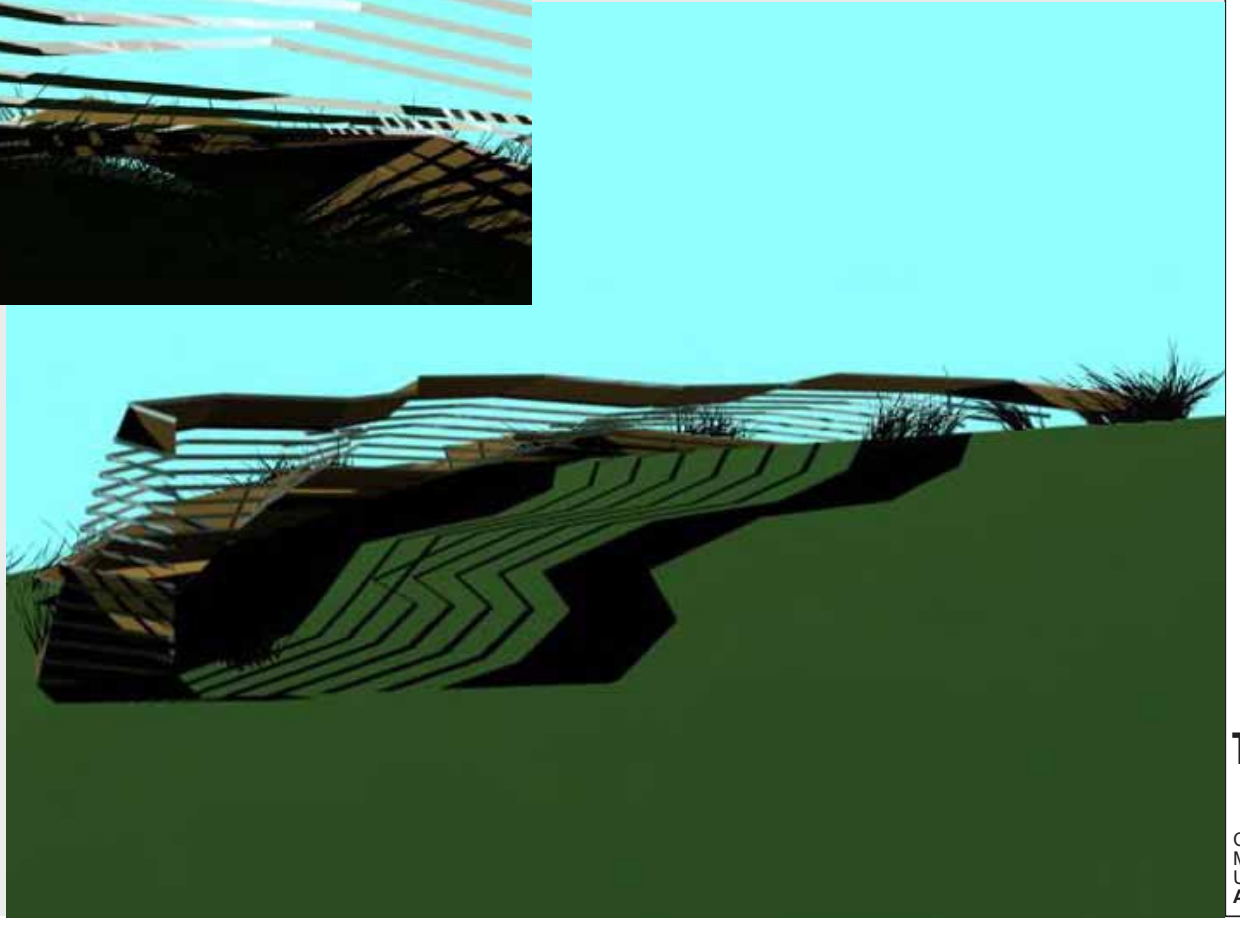


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.11

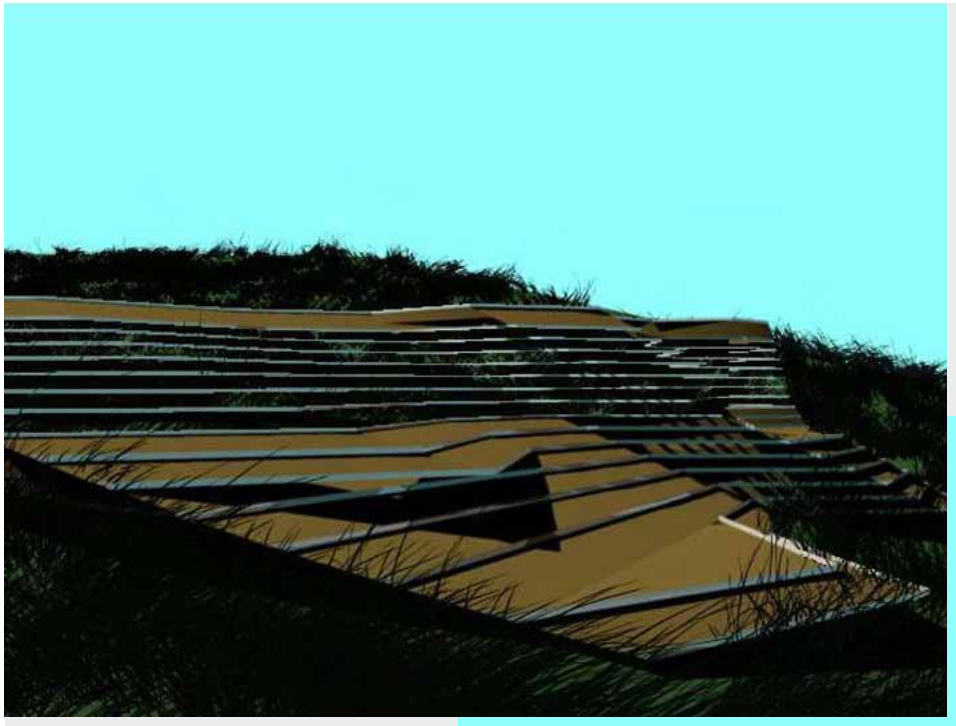


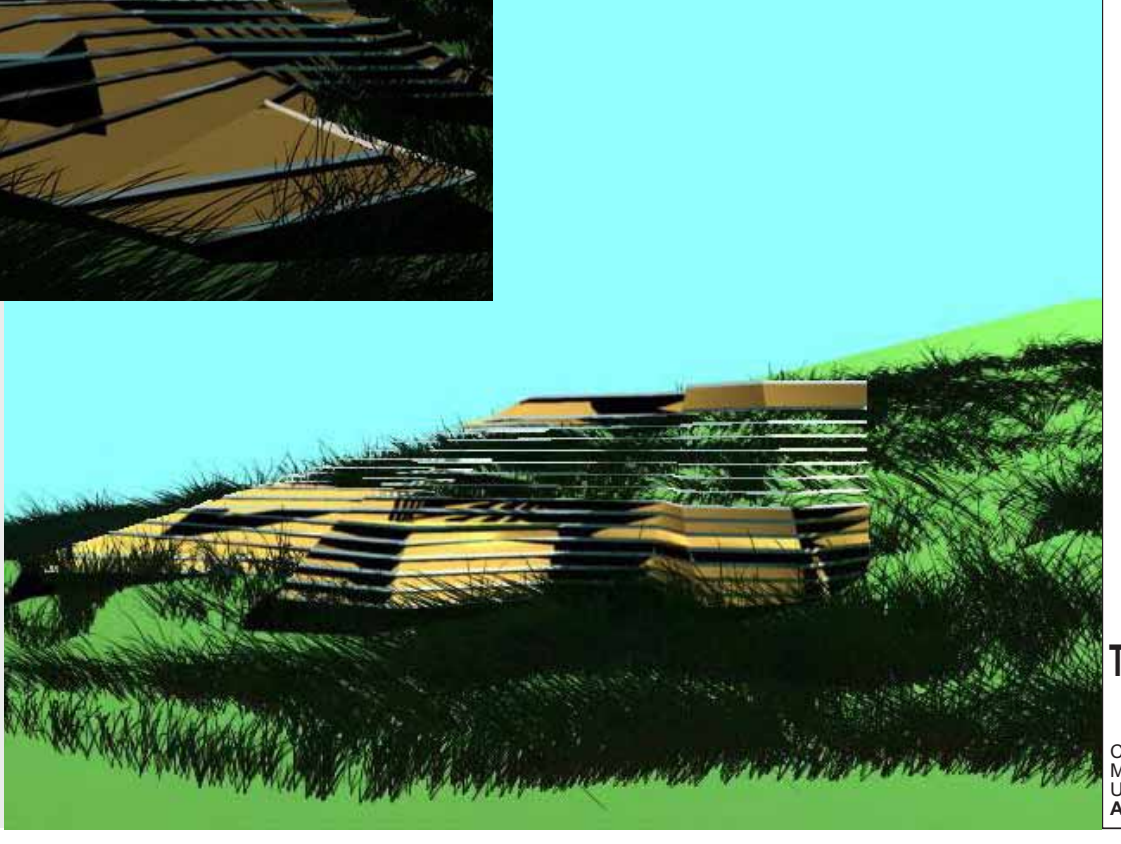
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.12





TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.13

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

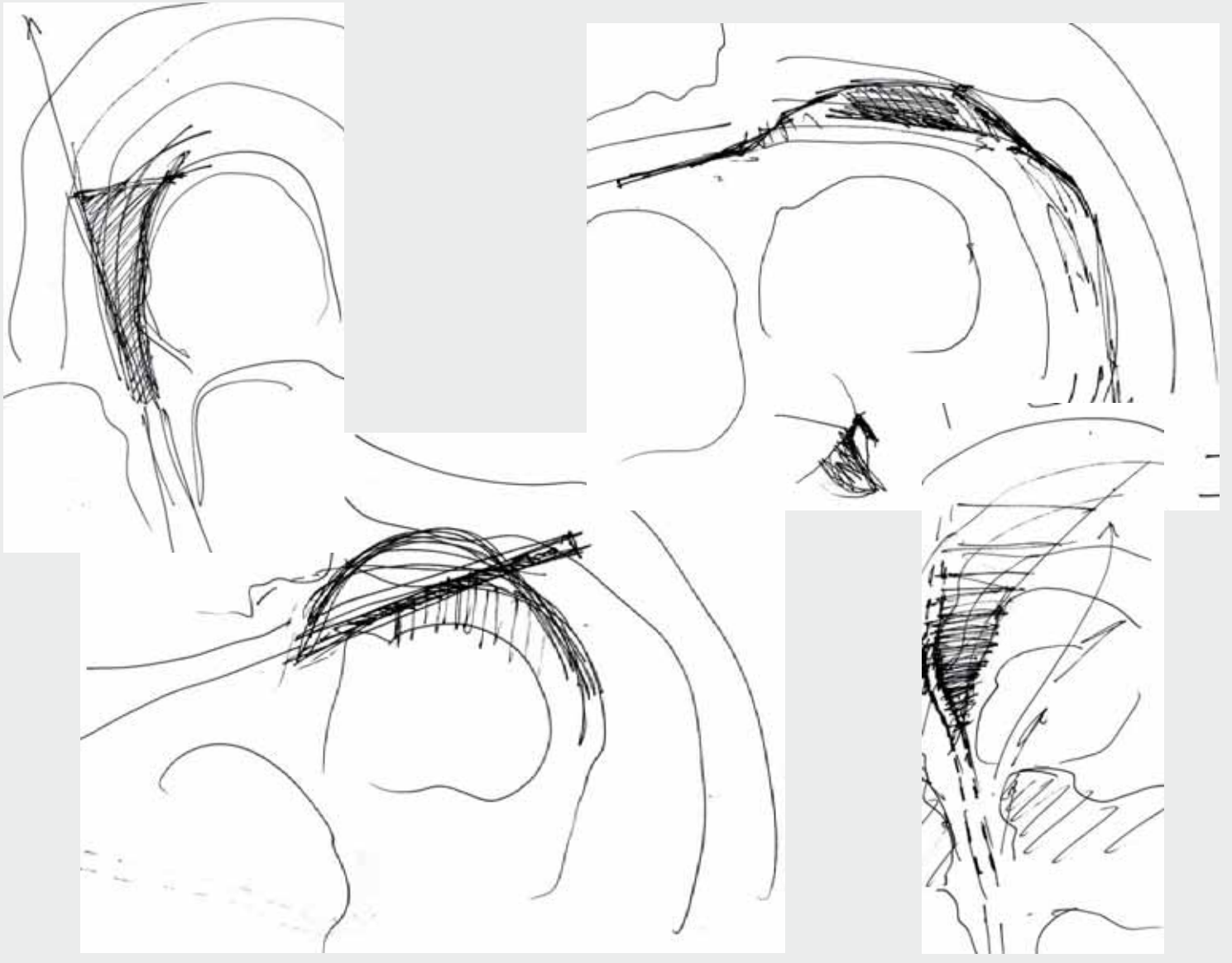
4.14

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.15

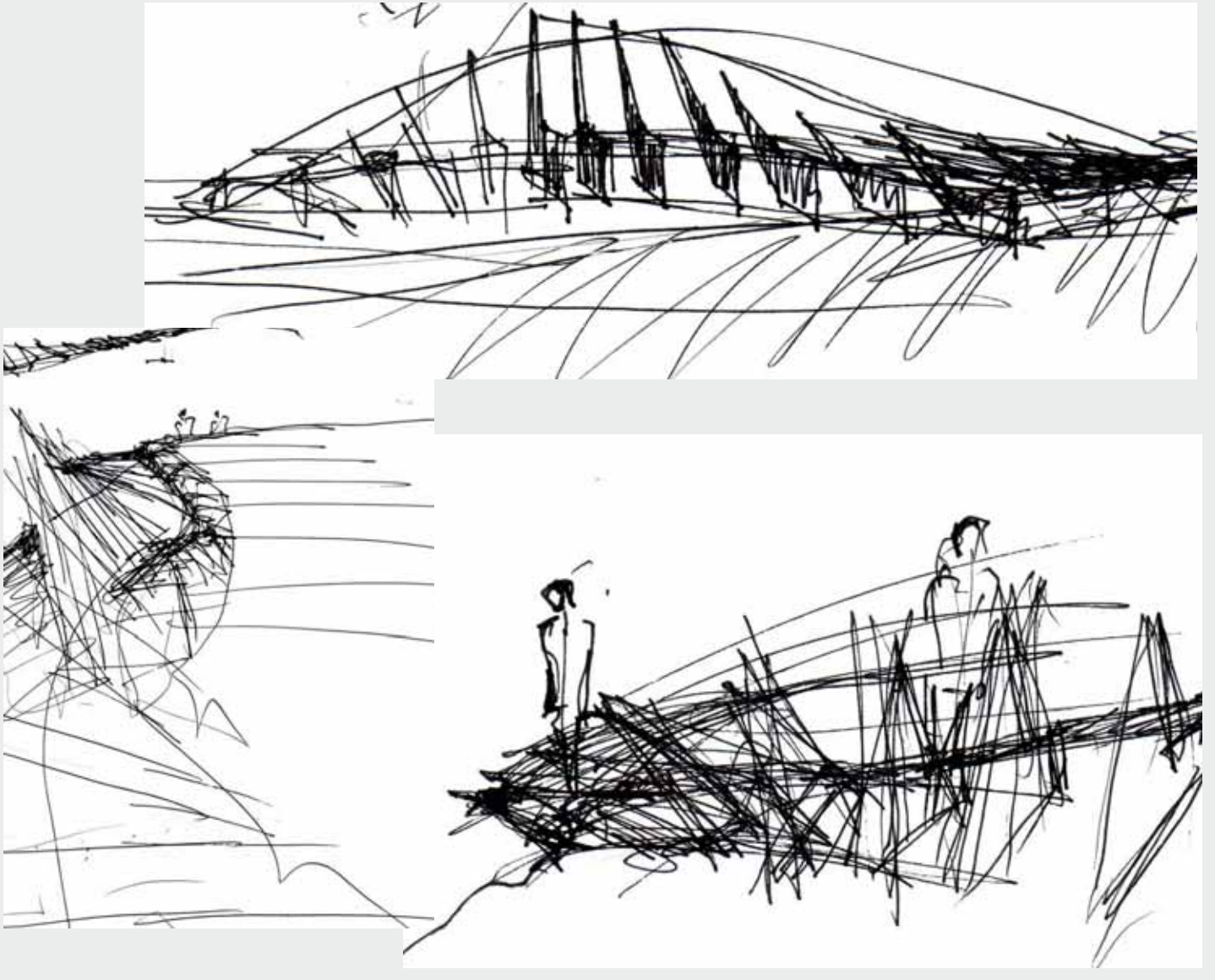


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.16



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.17

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.18

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

4.19

final design_the final seating area design derives its formal qualities from the manipulation of a hexagon__the motion of the object allows for one seating area in the grass, enclosed by loose horizontal wood slats, and one on a cantilevered platform, made of densely positioned vertical wood slats_the interplay of the horizontal and vertical slats is intended to give the object a dynamic quality, using the concept of point, line, and plane to give the seating area a beginning, middle, and end

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

4.20

horizontal slats would be made of a darker wood such as oak, emphasizing the heavy structural nature of the skeleton that they form for the seating area_vertical slats would be made of a lighter colored wood like pine, emphasizing their light, dynamic qualities as they condense along the length of the horizontal slats and eventually form solid sitting planes_each of the slats would need to be cut exactly to form for the structure to work as a larger unit, something made possible by using laser cutting technologies

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

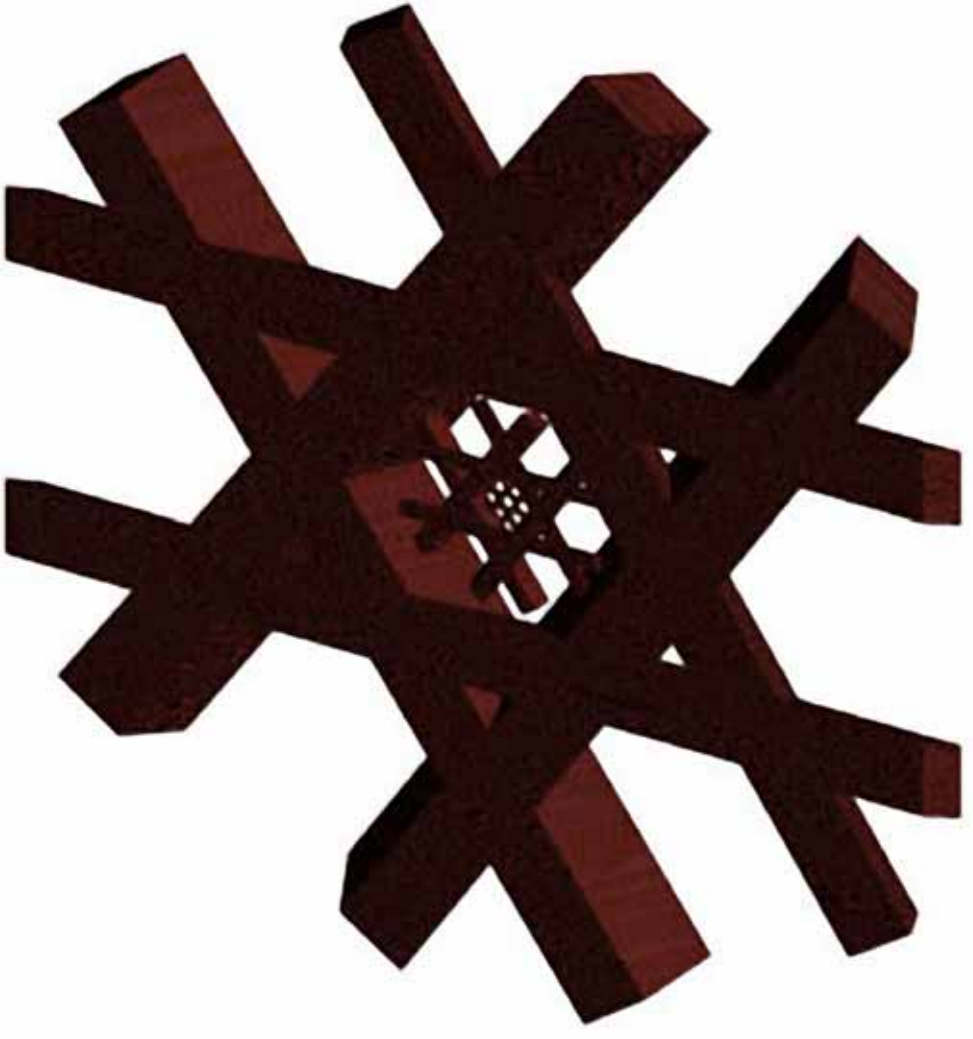
4.21

Elizabeth MacWillie
Fourth Year, Architecture

TRANSFORMATION
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie
Mellon
University
Architecture

5.0

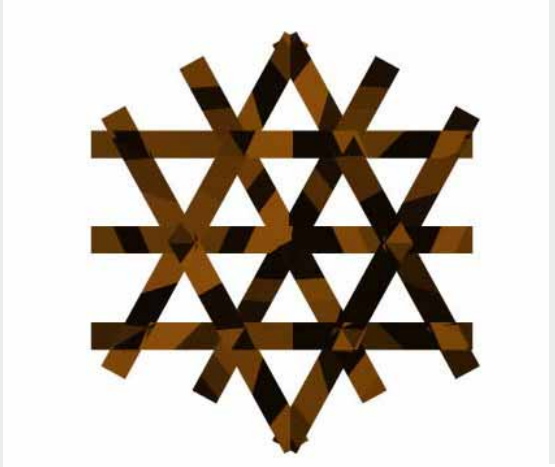


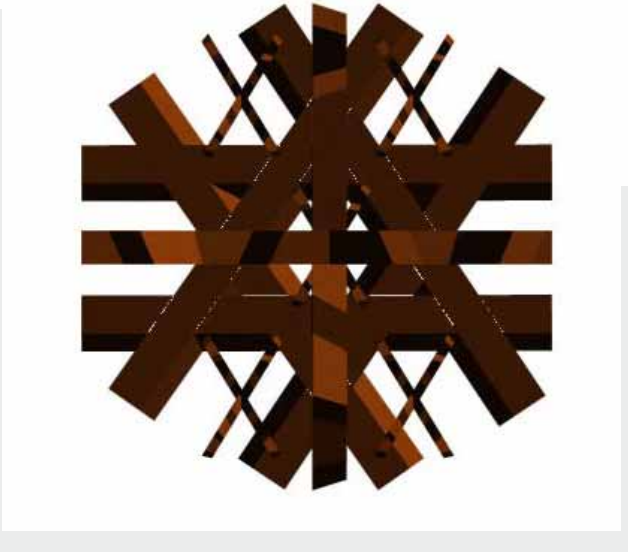
Concept Development

The beginning of the design process was spent a developing system on which to base the initial design for the piece going into the house. The concept was generated from the original analysis of the house that we had done. The hexagon plays an important part in the floor plan design, but was not used as much in section or to create three dimensional objects. I began to investigate the possibilities and limitations of using a hexagonal system to create three dimensional objects out of wood.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III





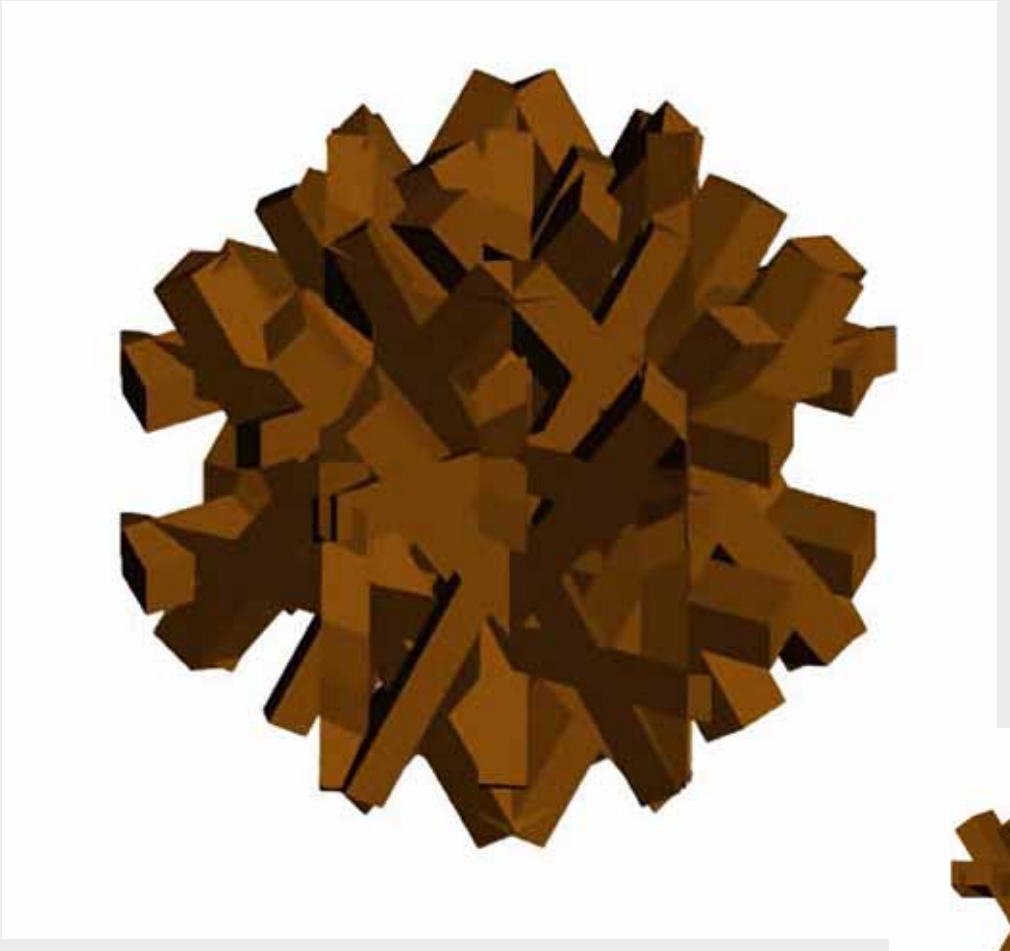
Concept Development

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

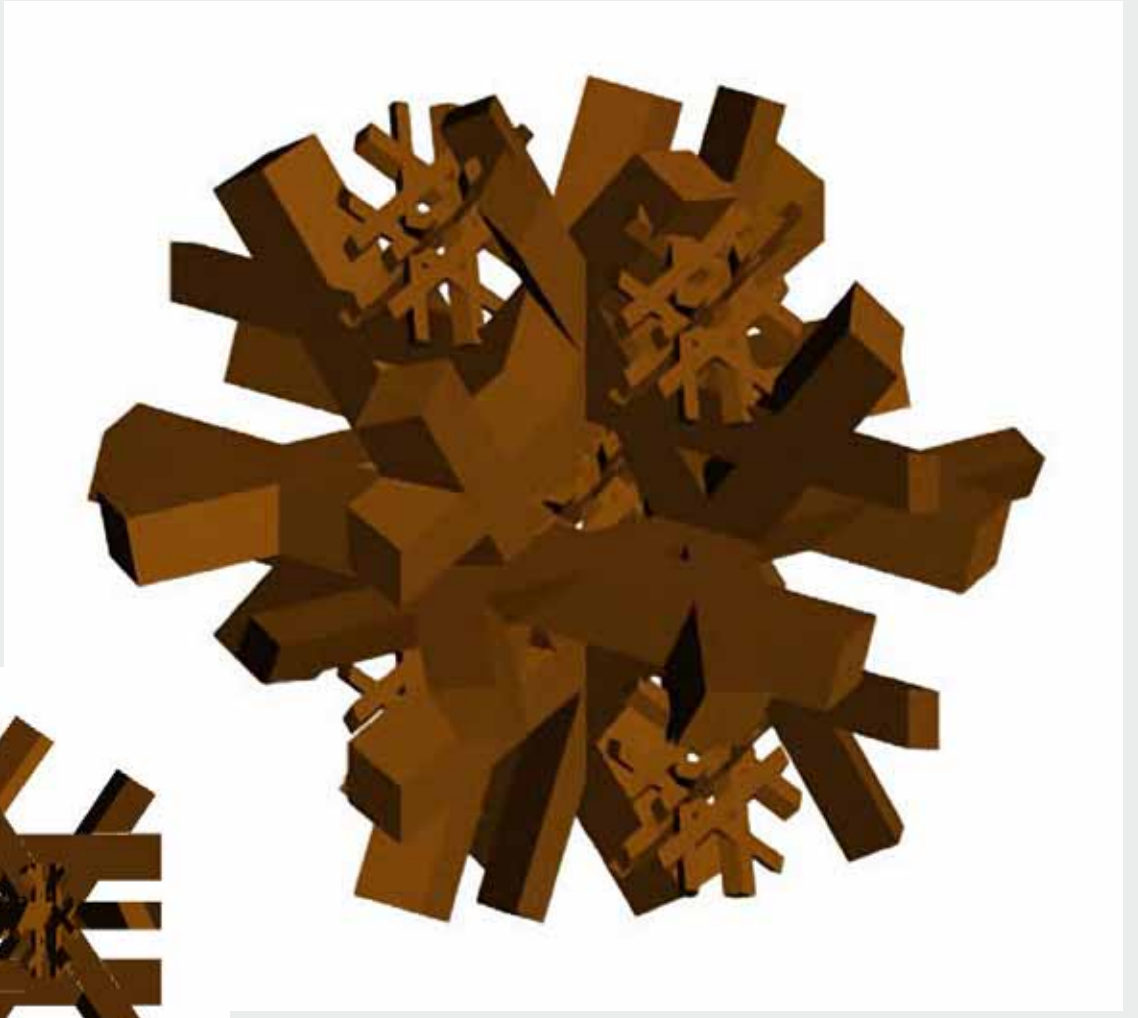
Carnegie Mellon University Architecture

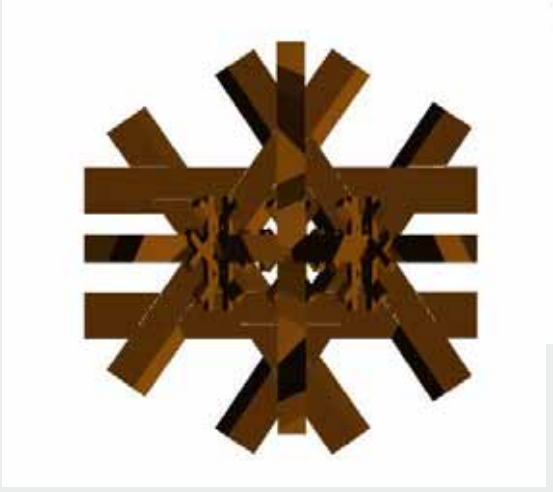
5.2



TRANSFORMATION

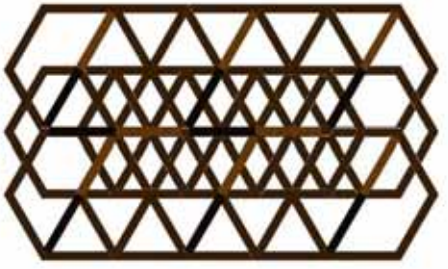
ENKEBOLL FOUNDATION
PROJECT PHASE III

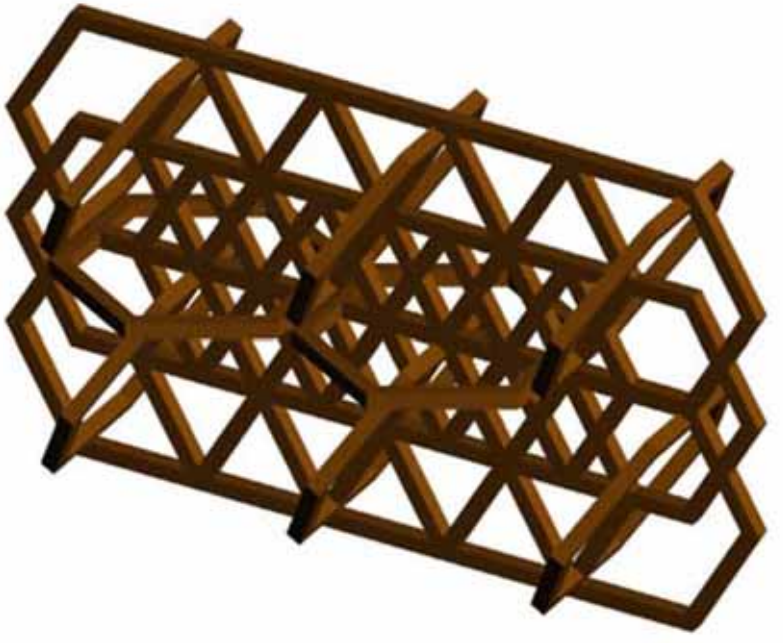


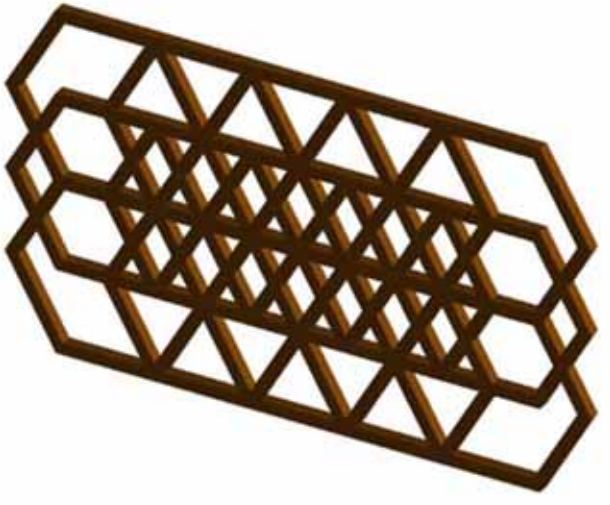


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III







Scheme Development

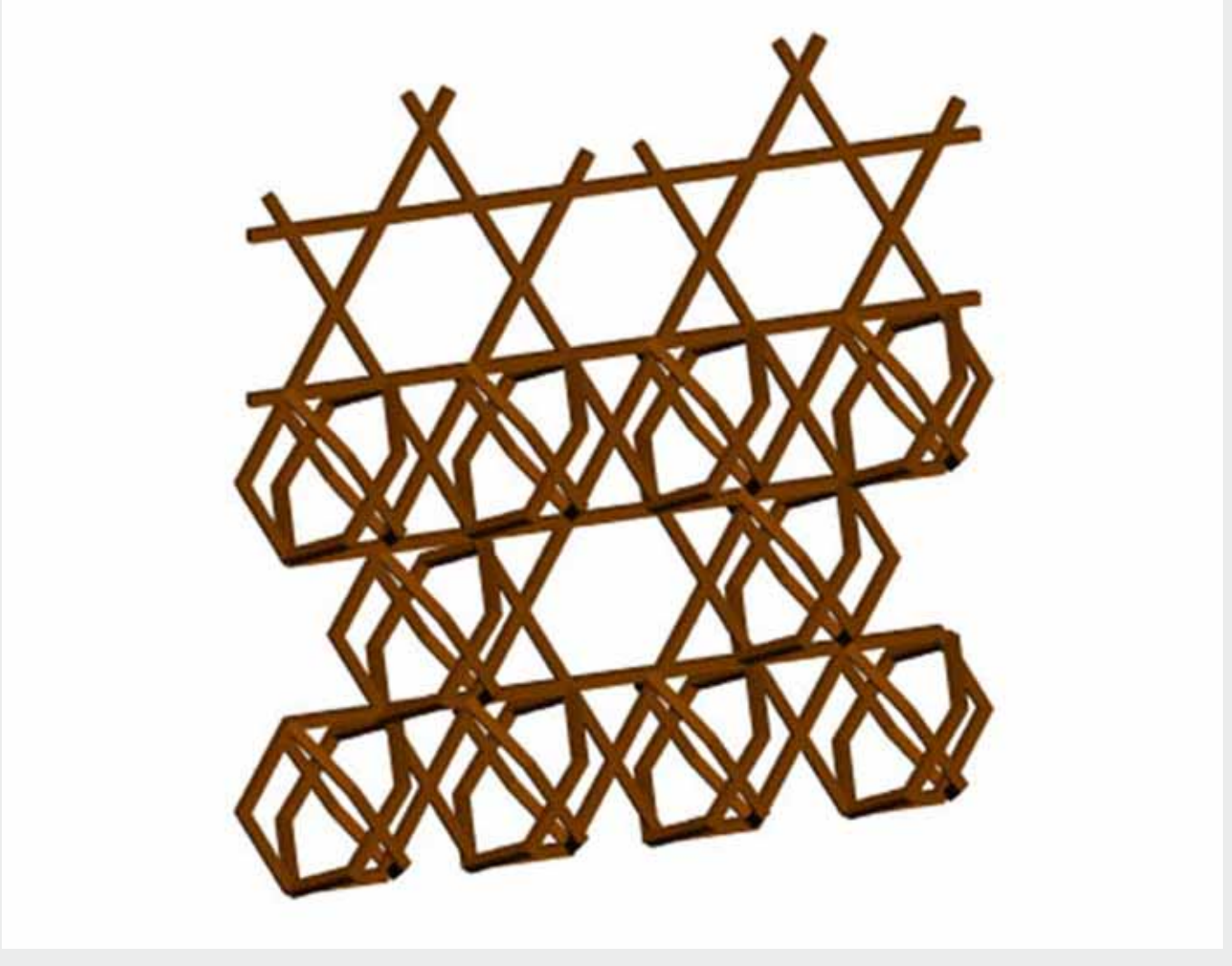
In the ne t p rt o the e i n proce l loo e t h t t pe o o ect oul e uit le or the hou e The v riou **layers of the house that filter** li ht throu h the hou e the in o the cutout pl n import nt role in the e perience o the i erent room l con i ere the implic tion o cre tin n o ect ithin the room **that would act as filter of** oth li ht n p ce hile ervin unction ell One unction th t l con i ere in m n o the cheme to cre te pl ce to tore or pl ce thin p rti ll in re ction Fr n lo ri ht i li e o clutter n u e uent minim l inclu ion o tor e p ce

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

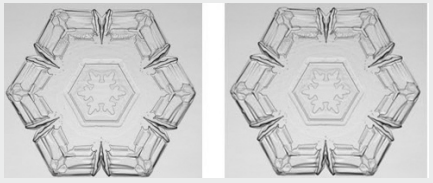
Carnegie Mellon University Architecture

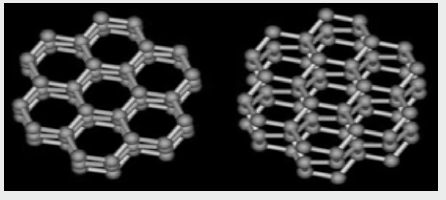
5.5

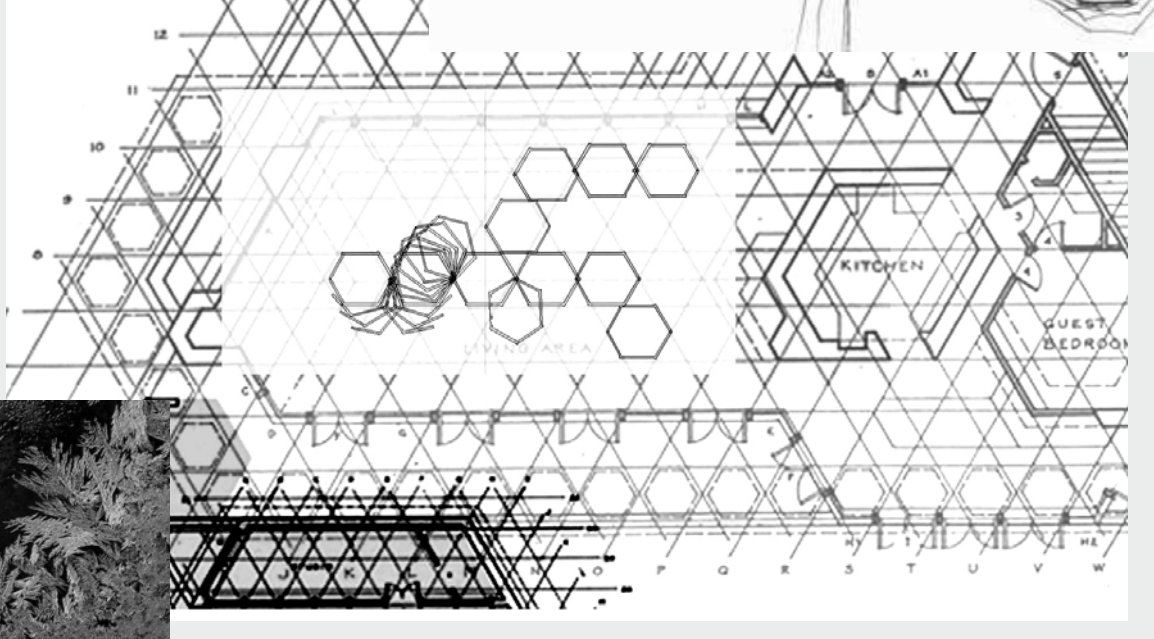


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III







Screen Stu

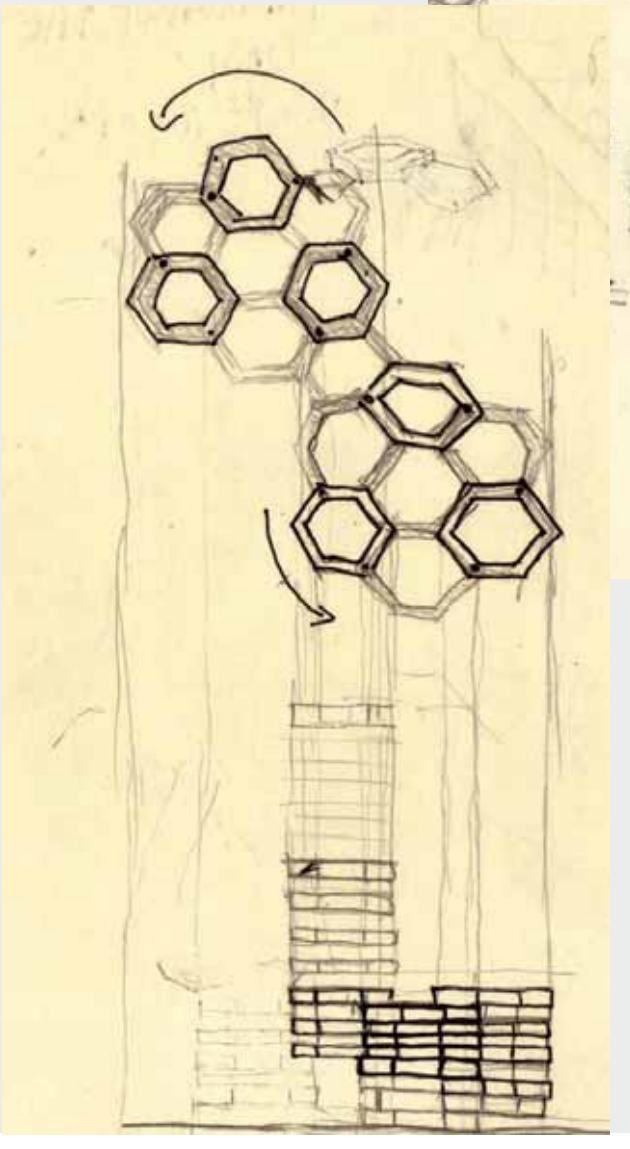
I continue ith the i e o creen e on he on l tem l loo e to e mple o tem in n ture th t re e on the he on The the molecule o **the snowflake bond to one another and enable infinite** ro th i intri uin l e n to loo t tem th t m e o t c e he o **nal pieces fixed together at** cert in corner The t c coul hrin n ro th throu h the hou e touch **and leave the floor at cer** t in point even rot te n ivel t the point the he on ere oine to ether Cert in portion coul rot te out r to cre te noo to tore or pl ce thin Al o in m min urin thi proce implic tion o cert in e i n eci ion on the con truction o the o ect The u e o oo or e ell ith cheme th t u e m n repe te lice n oul e m e po i le ith the u e o l er cutter

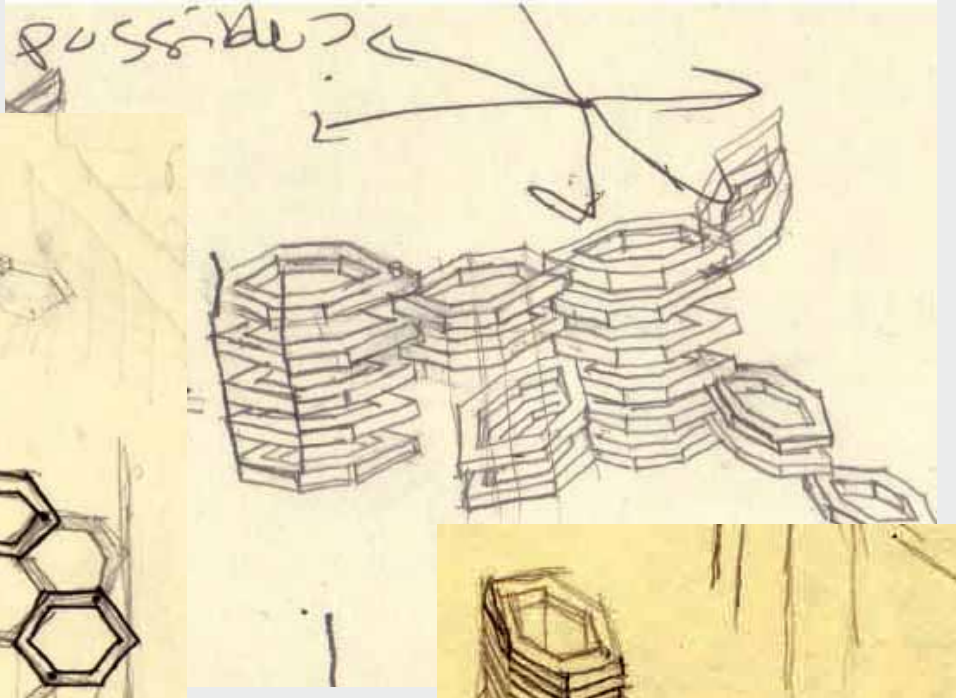
TRANSFORMATION

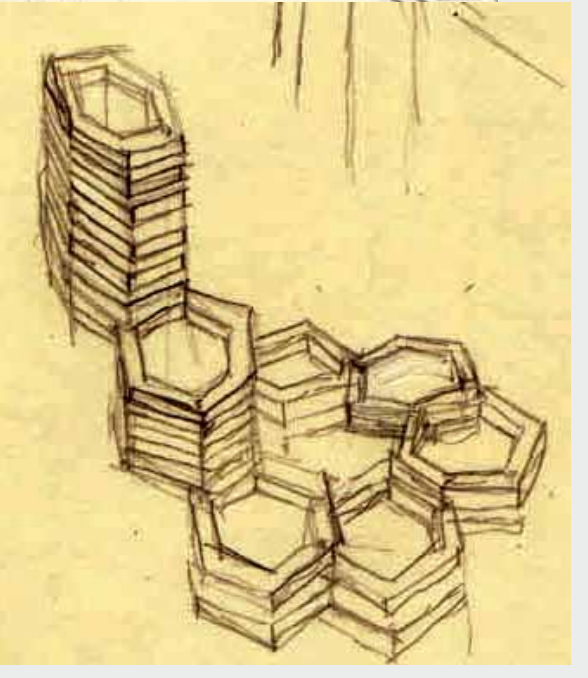
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

5.7







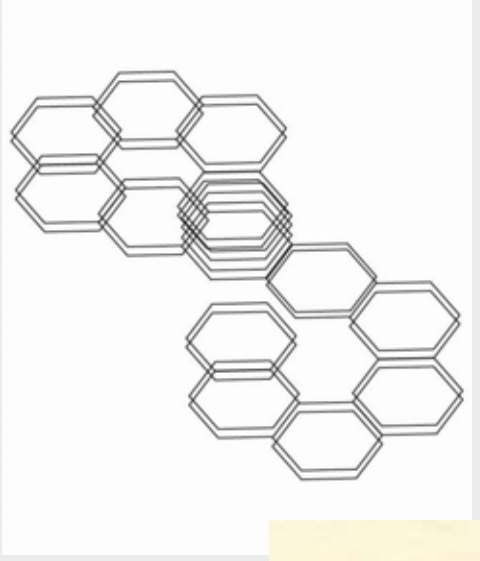
Screen Stu

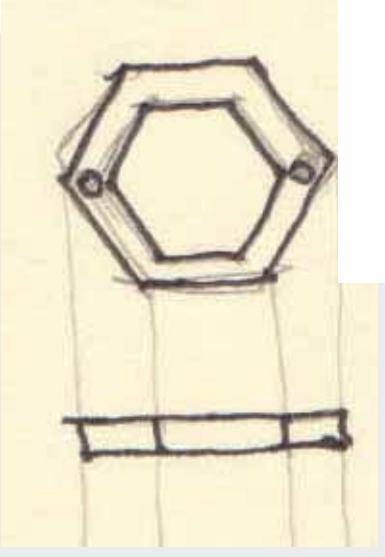
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

5.8





Screen Stu

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

5.9

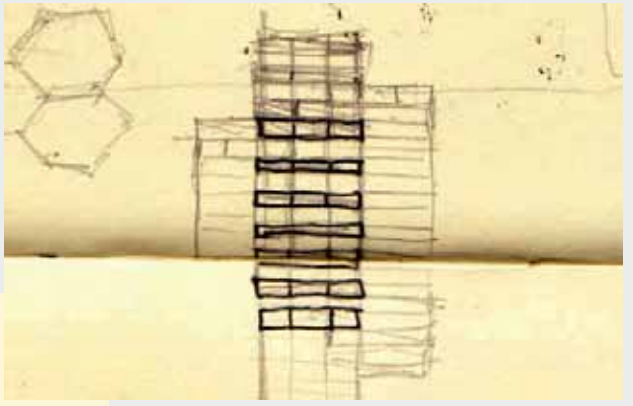
Screen Stu

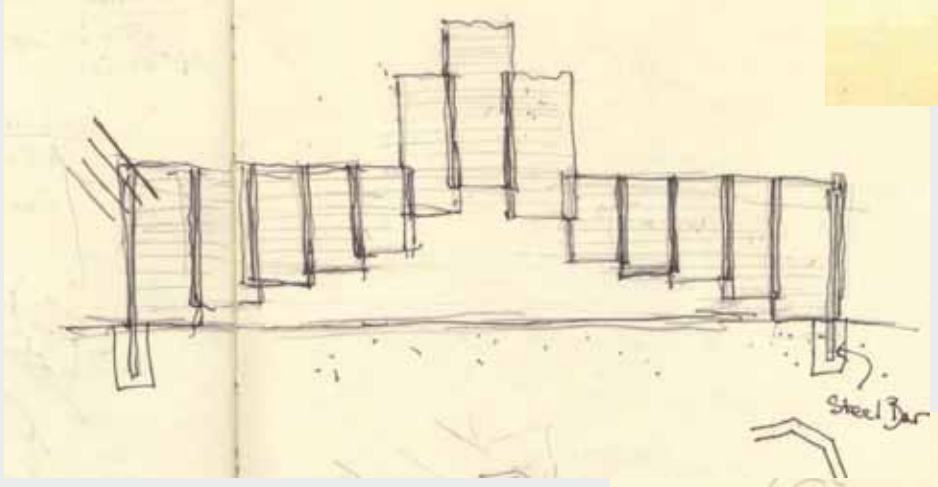
TRANSFORMATION

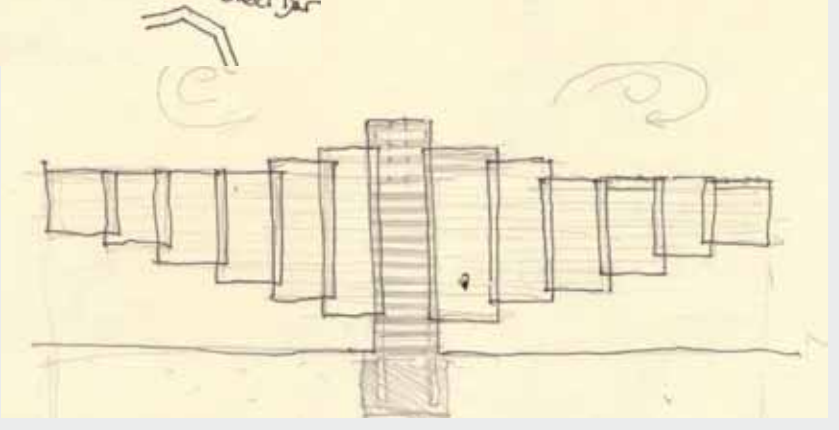
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

5.10







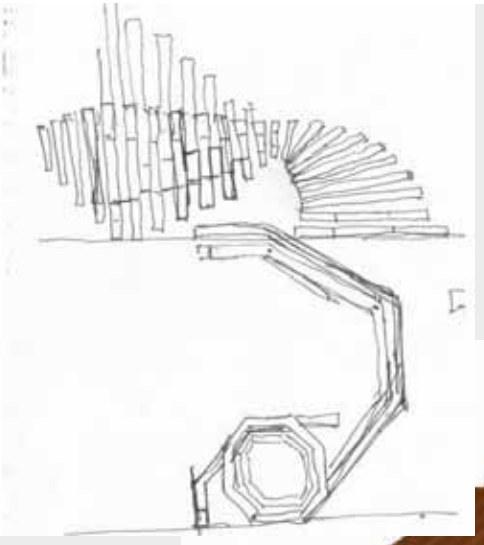
ench Stu

e n rro e o n the t pe
o o ect th t e oul e
e i nin to n o ect on
hich one coul it l
e n ith tem imil r
to the one I h een loo in
t ith the creen Cert in
corner o the he on ere
connecte ith o el or
ro th t llo e them to
rot te out th t point A the
oo en he on pir le
to ether the e n to orm
ur ce hich oul erve
the pl ce to it on top o

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **5.11**



ench Stu

For the ne t ph e l e n to loo more t the three imen ion l u litie cre te the com in tion o multiple he on n the t pe o p ce n ur ce th t coul e cre te ith the u t po ition o piece th t h i erent c le n i erent rot tion

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **5.12**

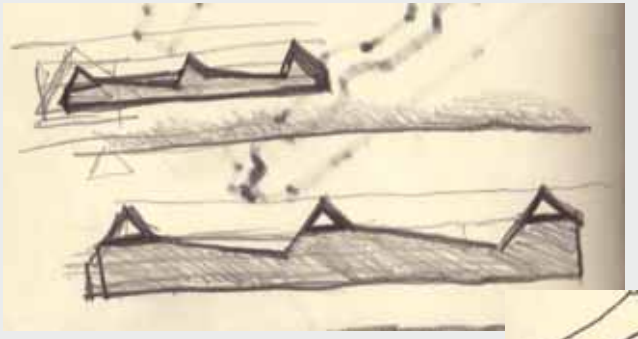
ench Stu

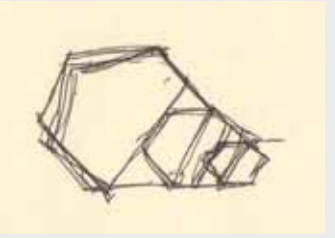
TRANSFORMATION

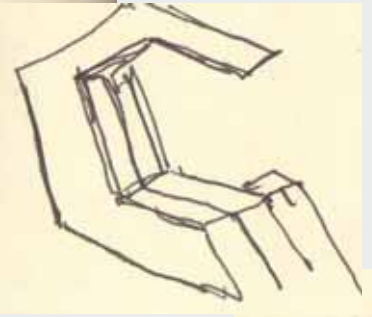
ENKEBOLL FOUNDATION
PROJECT PHASE III

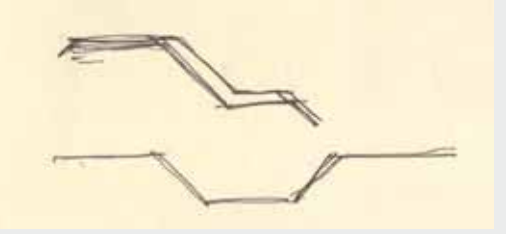
Carnegie Mellon University Architecture

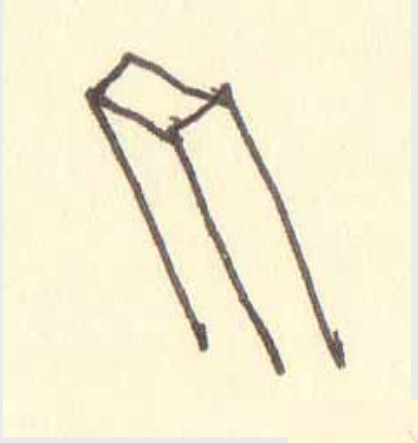
5.13

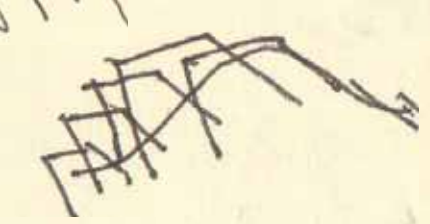


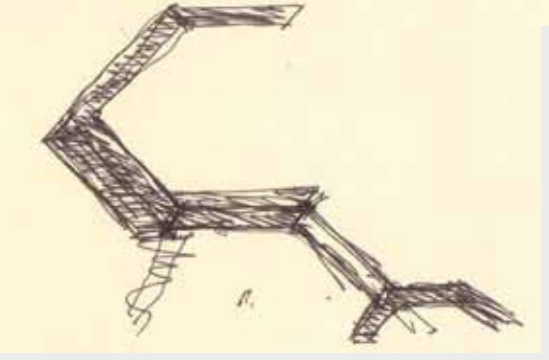


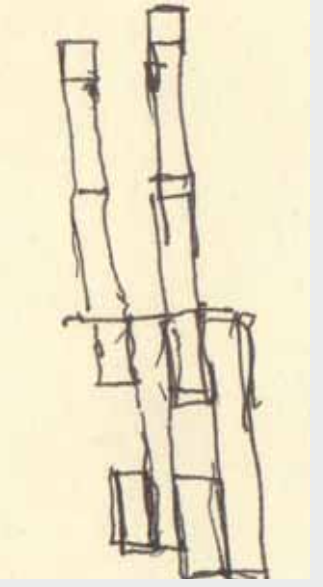












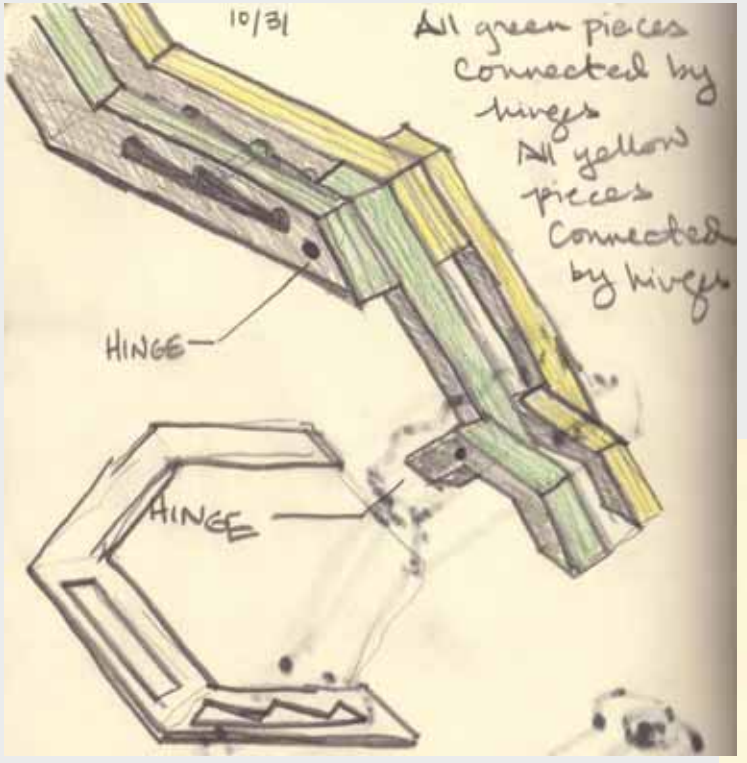
Fin l De i n

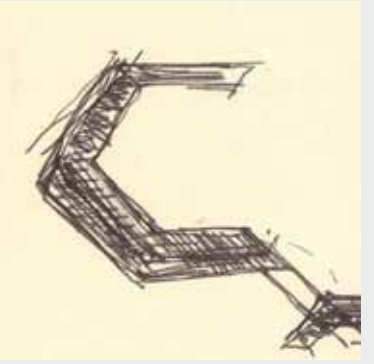
In the l te t p rt o the e i n proce l con i ere ho to cre te piece th t oul uit our cho en loc tion the hill ne r the hou e The e i n l evelope l lo e or movement o the i erent piece o the ench o th t it oul e le it to ettle into the hill i e no m tter hich p rt o the hill it h een pl ce on Thi i en le the hin e th t connect the oot piece n the le piece to the e t piece llo in them to move in epen entl o the piece ne t to them ch e t piece i connecte to the cent e t piece ith r tchetin evice hich llo them to li e c n orth to c commo te the ump n ip o the hill Thi e i n l o llo or i erent t pe o occup nc It c n e l in cro t in or on or le ne in t

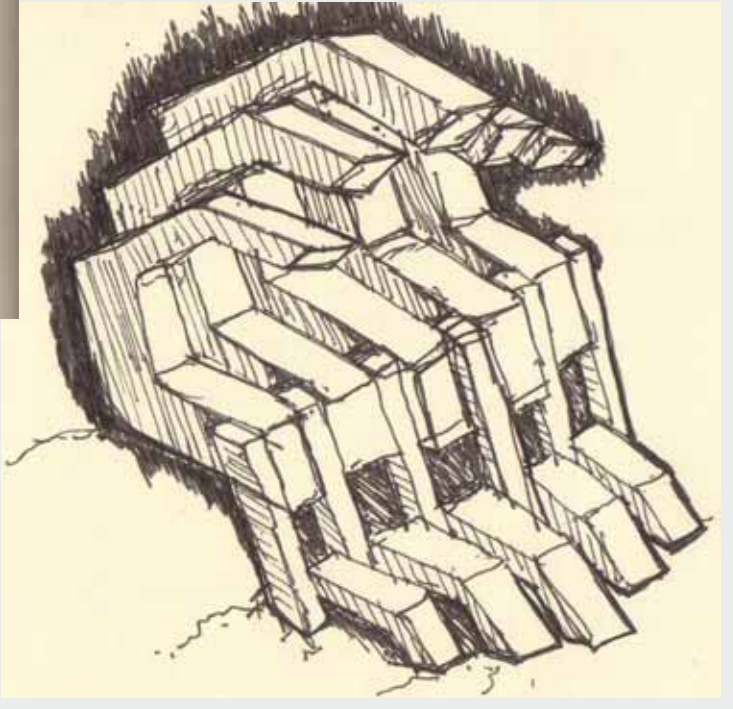
TRANSFORMATION

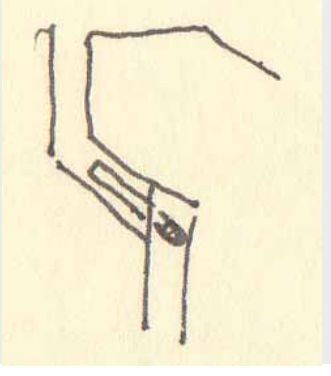
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **5.14**



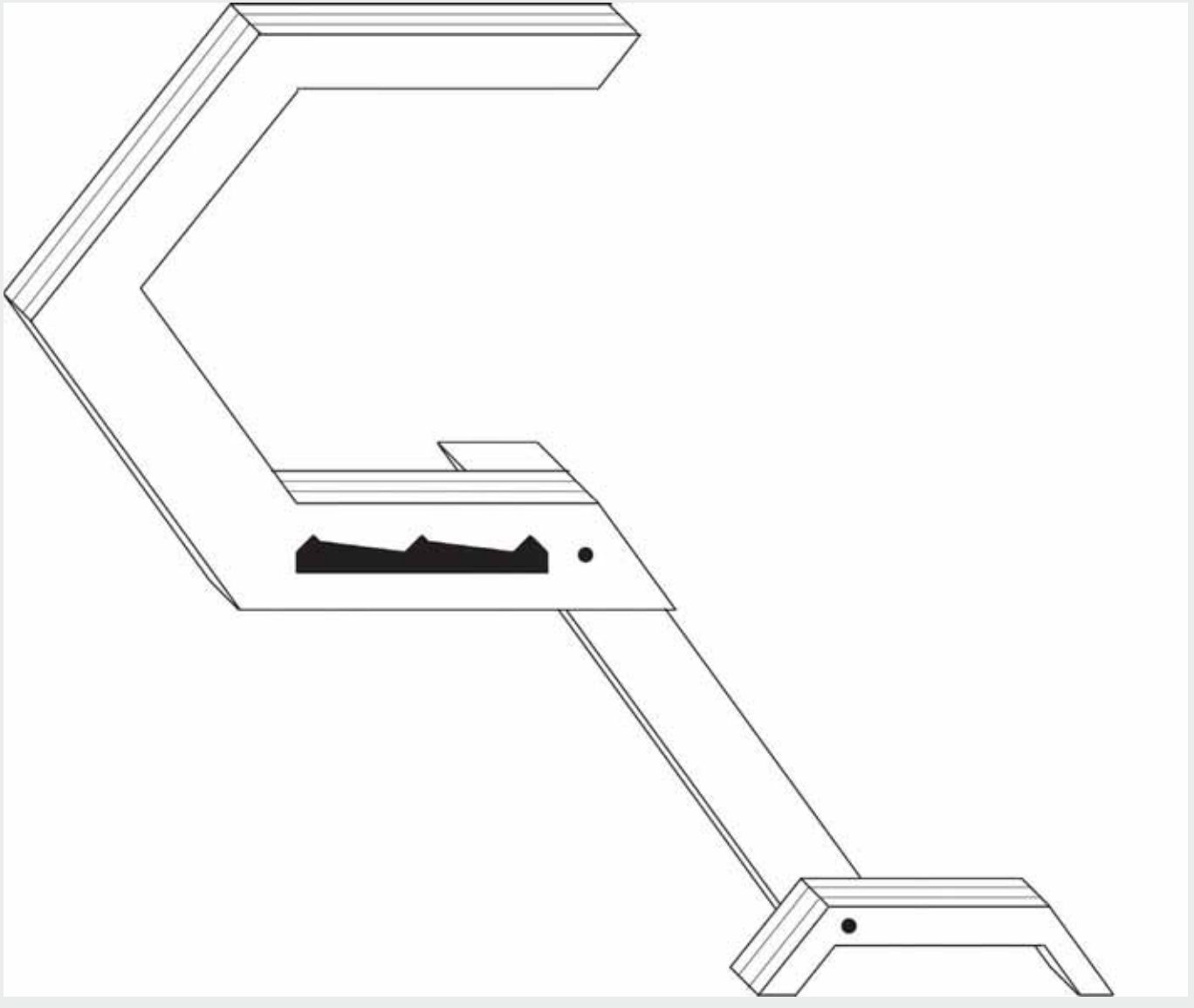






TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III



Fin l De i n

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

5.16

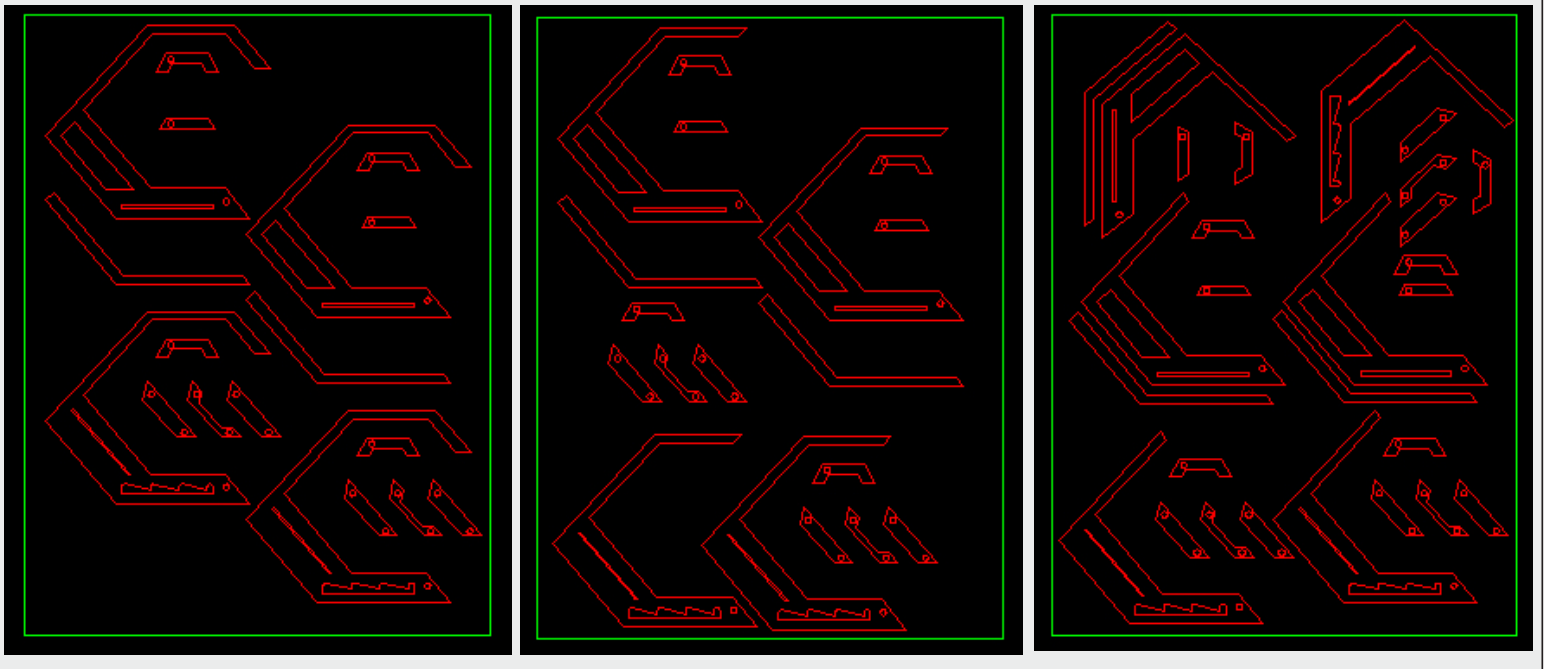
Computer Mo el

The ne t p rt o the proce
to mo el m e i n
u in Form l u e thi
tool to figure out the proper
c le n n le or the
in ivi u l piece n to or
out the mech ni m hich
connect them

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **5.17**



AutoCAD Dr in

in AutoCAD l l i out ll the in ivi u l piece The e r in ere u e to pl n n cut out the piece or the ph ic l mo el hich ere cut u in the l er cutter

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **5.18**

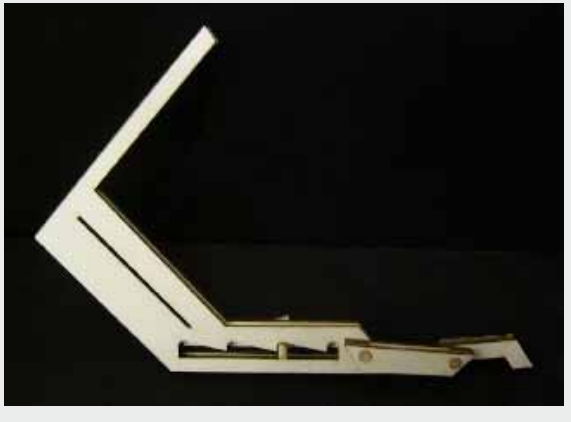
Fin l Mo el

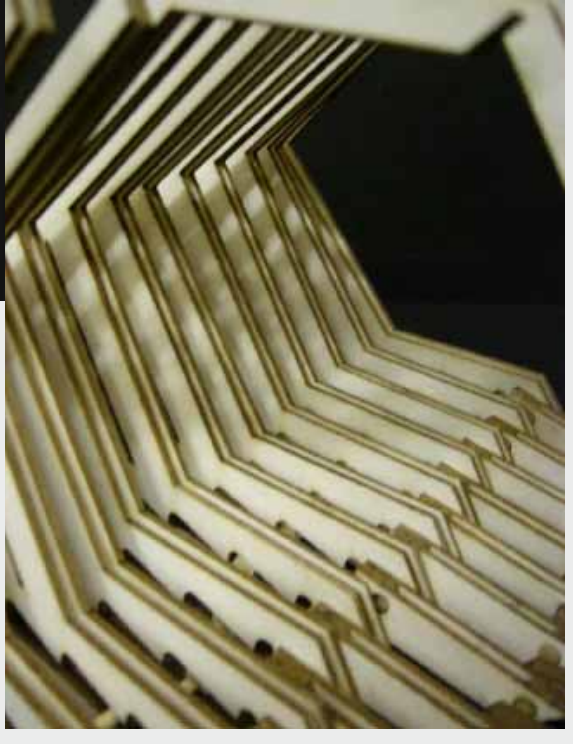
Thi mo el i m e out o
l min te piece o
mu eum o r cut u in the
l er cutter The hin e re
m e rom oo en o el l
l ere to t e
thi pro ect urther l oul
loo more in epth to i er
ent mech ni m to u e to
cre te the hi tin u lit o
the e i n n l oul ur
ther evelop the v ri tion
et een the i erent e
ment to cre te more uni ue
e perience epen in on
here ou t on the ench

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **5.19**





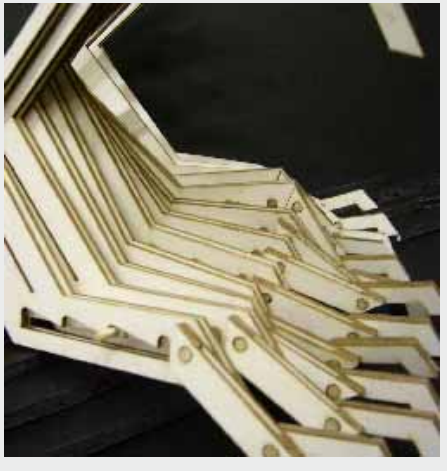
Fin l Mo el

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

5.20



Fin l Mo el

Settlin into the hill

TRANSFORMATION

ENKEBOLL FOUNDATION

PROJECT PHASE III

Carnegie Mellon University Architecture

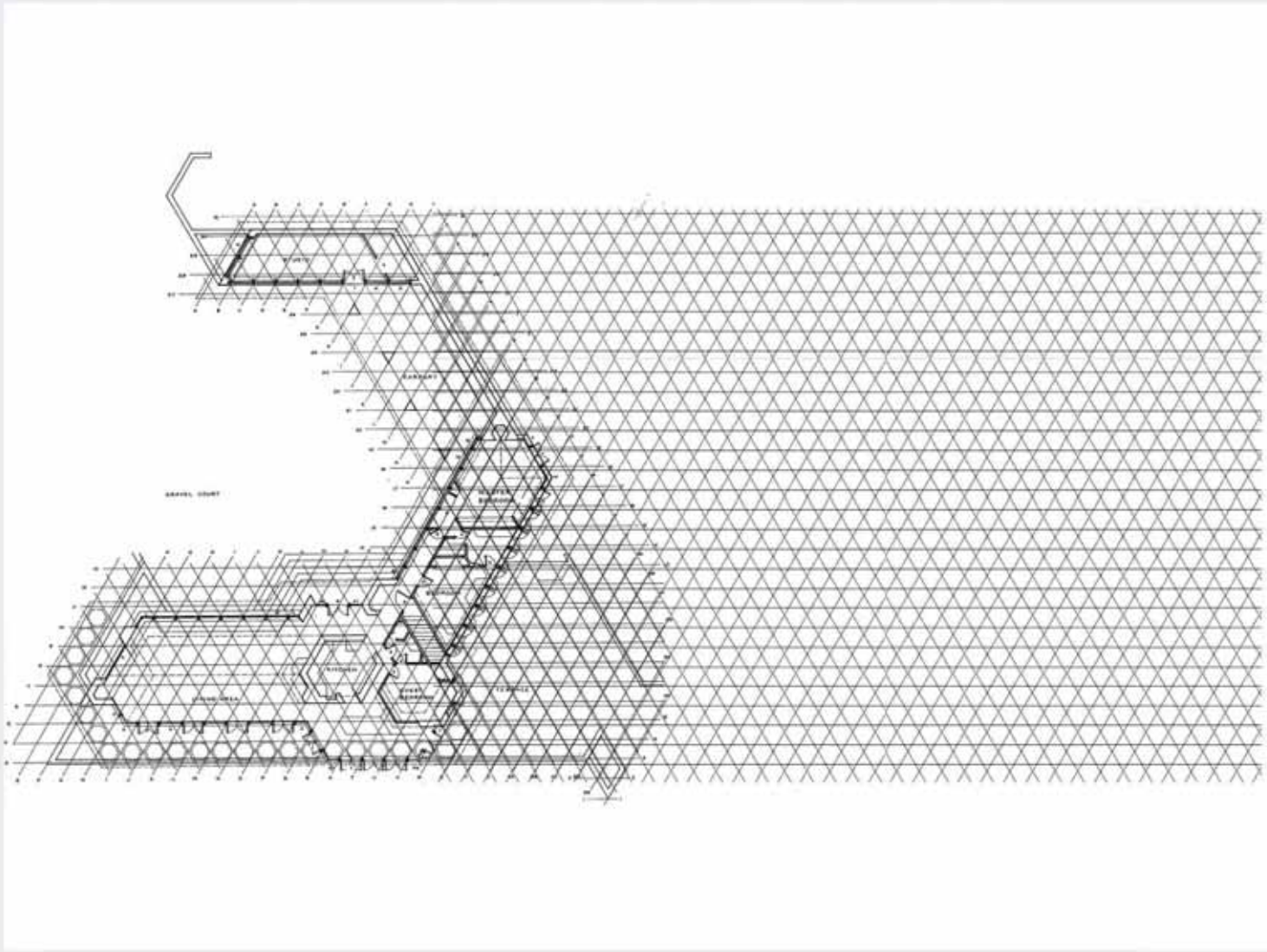
5.21

Chang Zhang
Third Year, Architecture

TRANSFORMATION
ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie
Mellon
University
Architecture

6.0



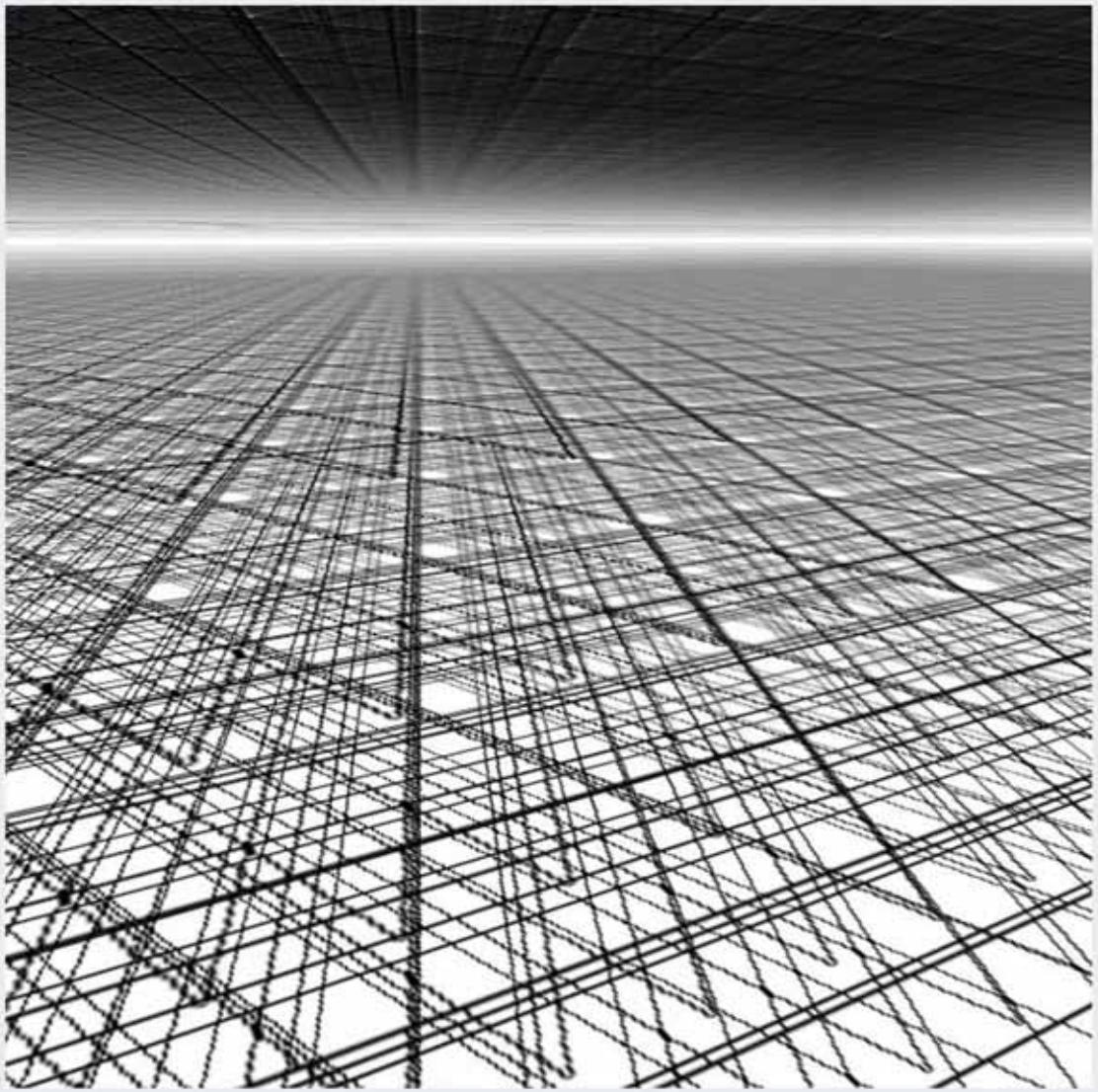
The Hexagonal grid is by far the strongest geometric characteristec of the Hagan house. However, despite its dominance, the hexagonal grid system seems only to be consistent in plan, in other words this dominant formal rigor only works on parallel 2D planes.The following series of exercises seeks to create organic form from this highly ordered and geometric system that does not refer directly to a 2D hexagonal grid.

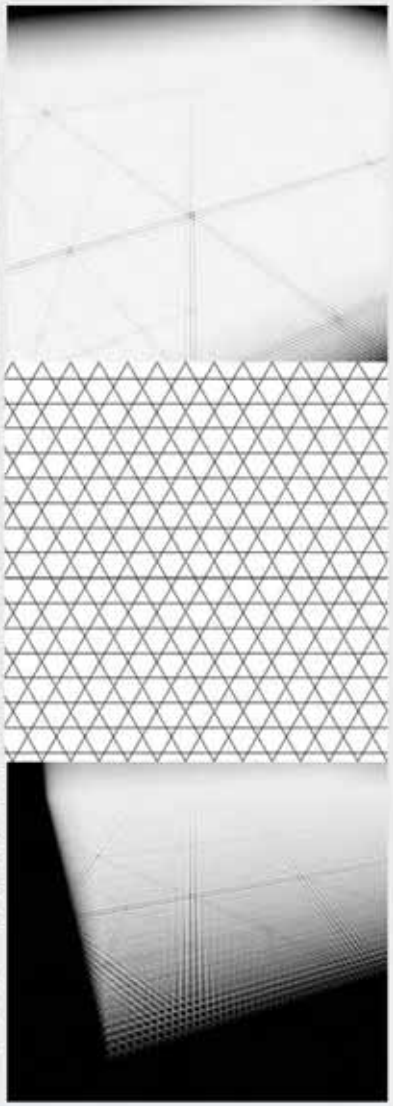
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.1





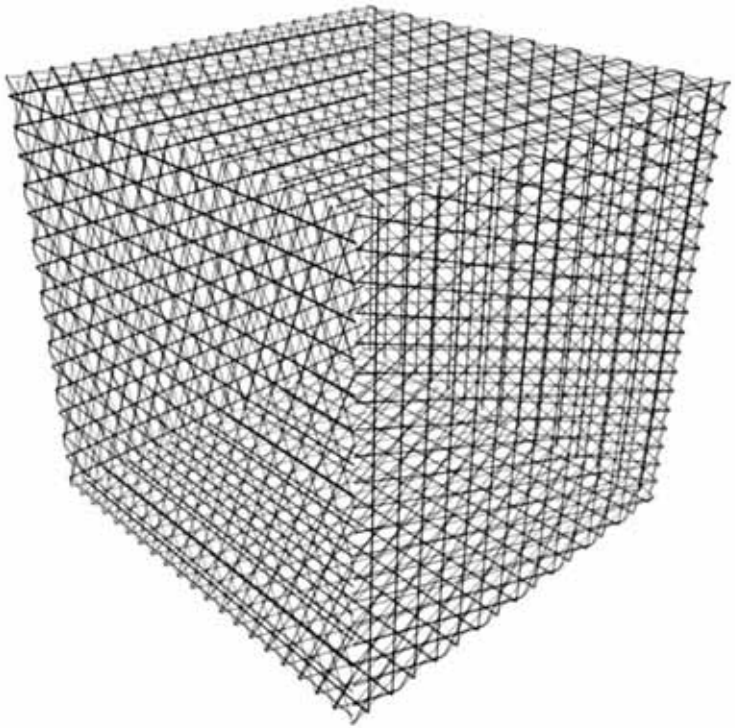
A simple process of overlaying multiple copies of a typical hexagonal grid (right middle) gives the perceived visual sense of a three dimensional 120 degree array. This exercise raises the possibility or deriving three dimensional form from the 2D grid.

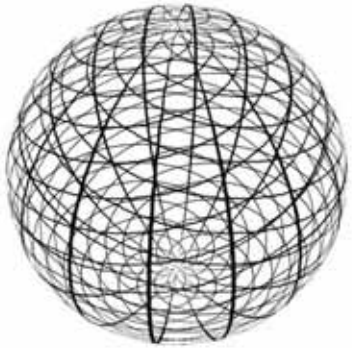
TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.2





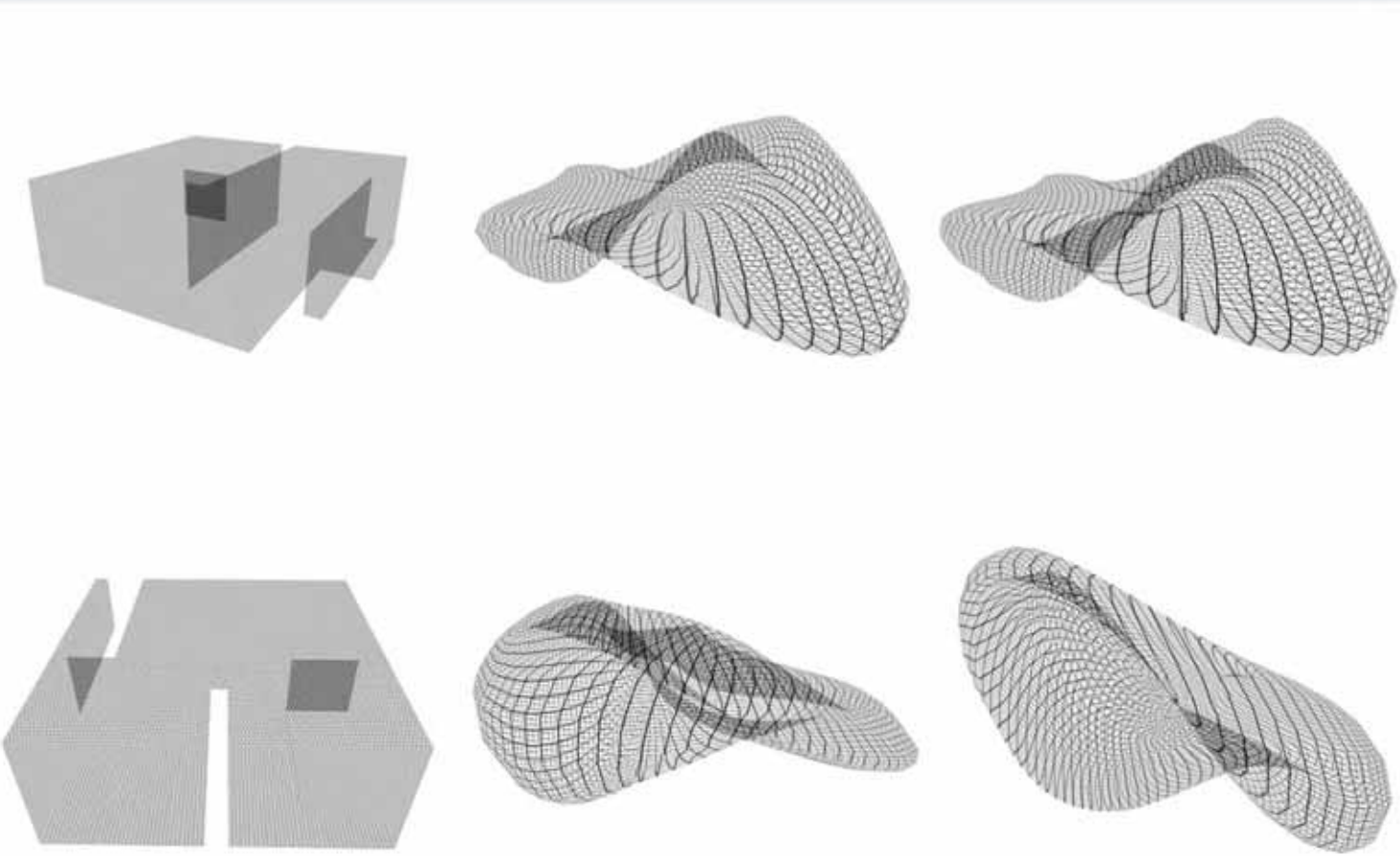
Further studies of overlaying 2D hexagonal grid upon three dimensional objects yields alternate interpretations on how 3D forms may be derived from the manipulation of an originallly planar surface.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.3

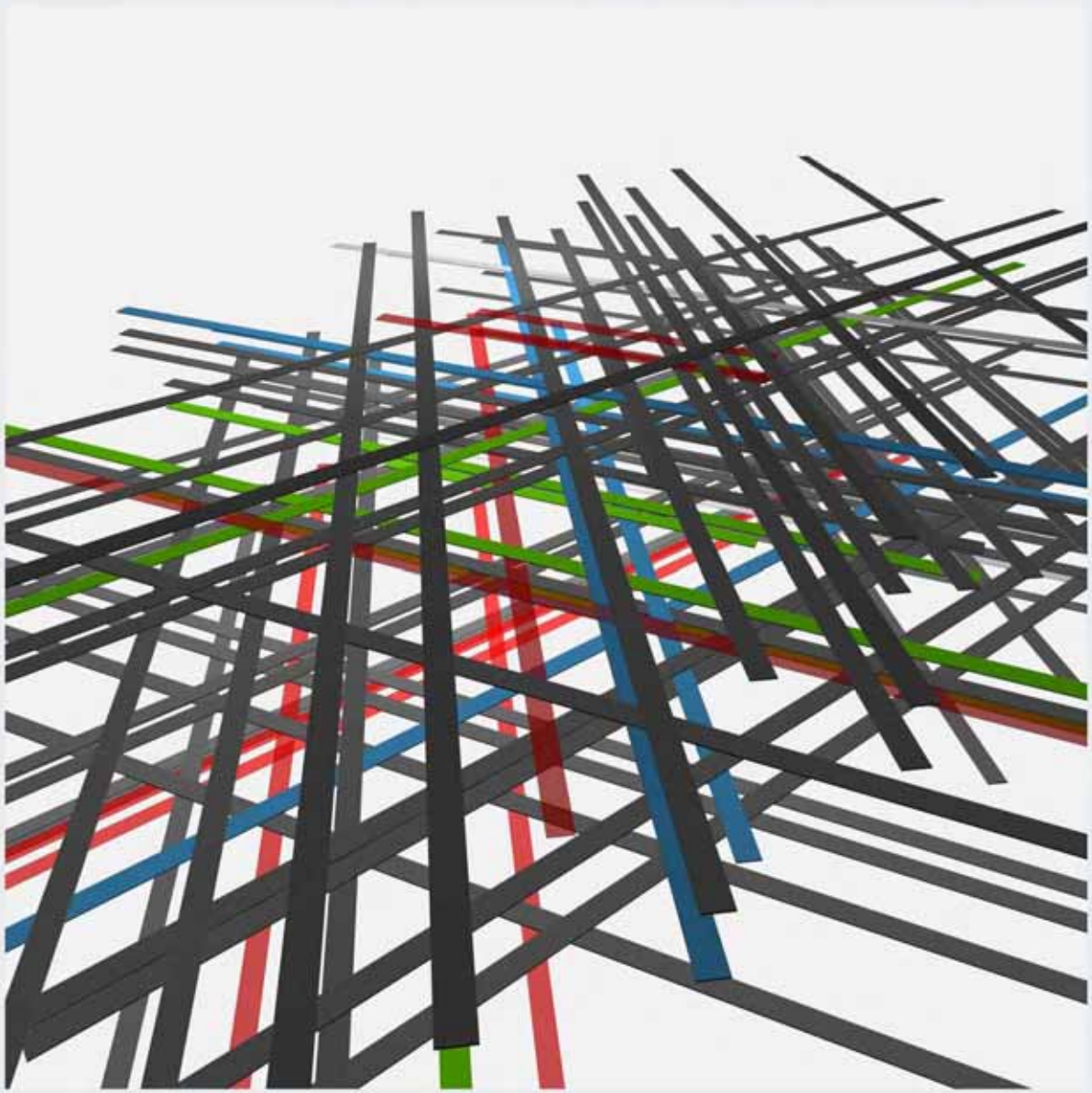


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.4



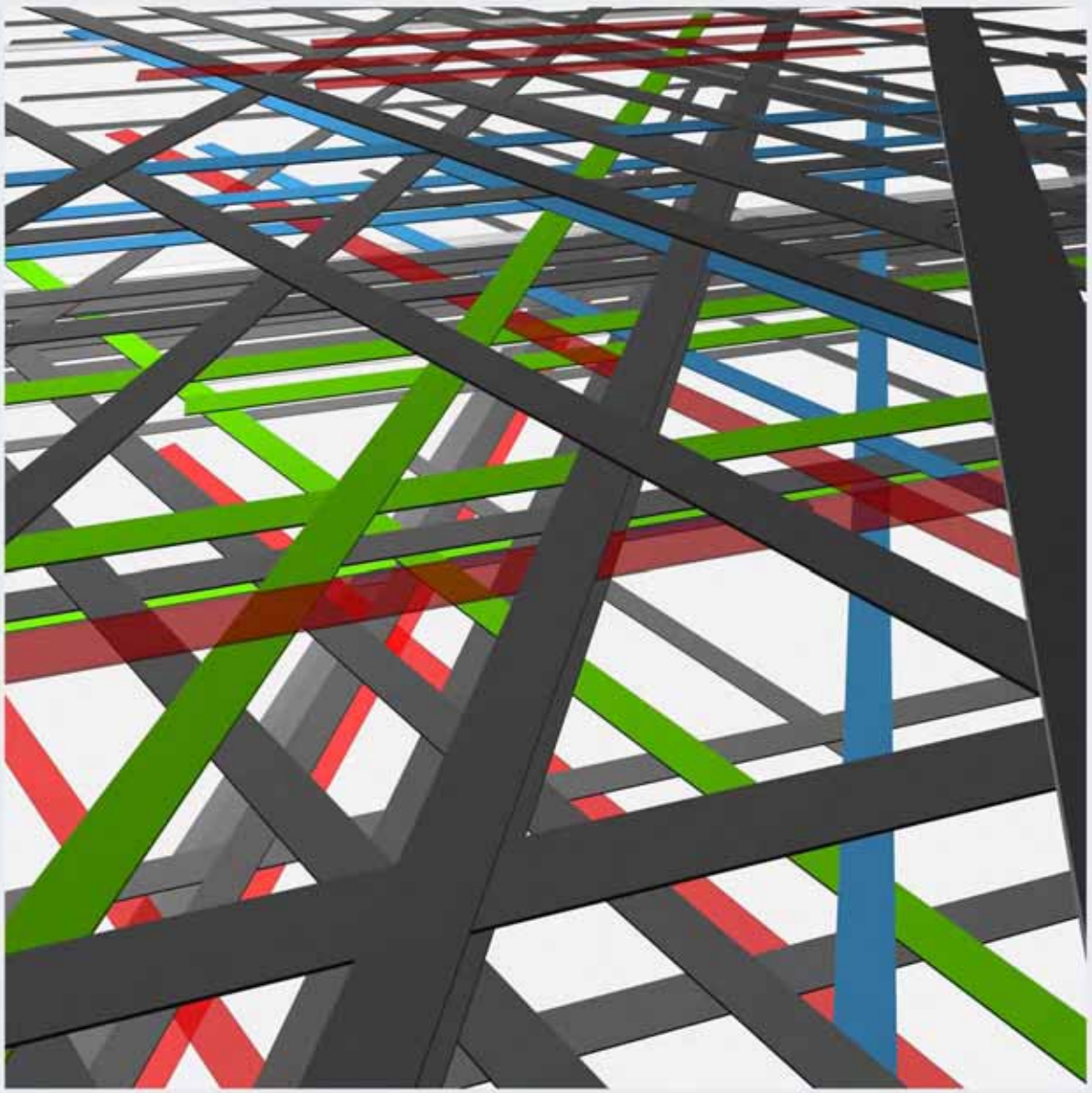
In this study, semi planar rectangular prisms are arrayed on offset parrallel planes upon the Z axis. On the X and Y, the prisms are seen as vectors arranged as the original 2D grid. In this arrangement, the grid once again begins to dissolve and give insight on how 3D form may be derived.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.5

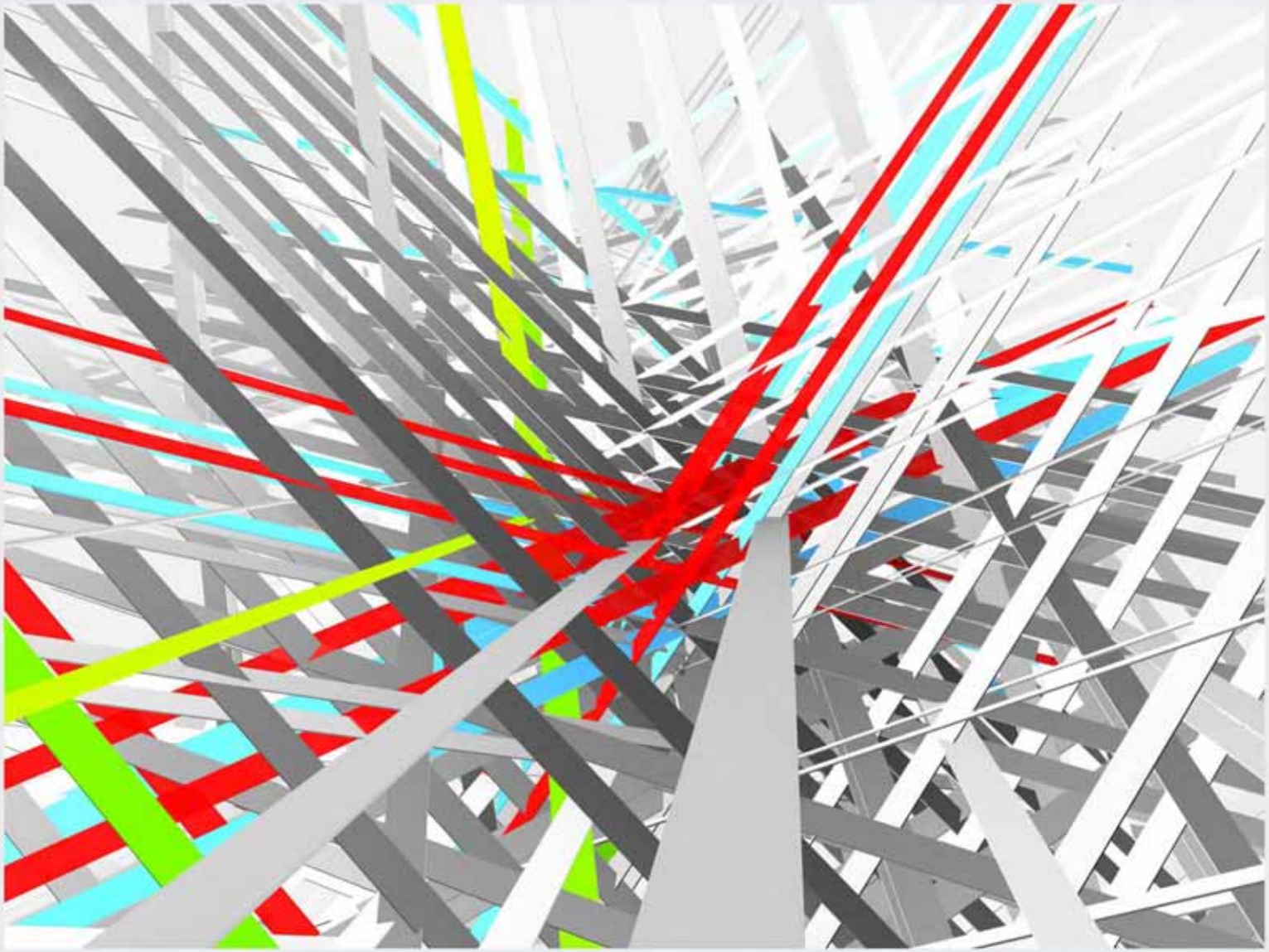


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.6



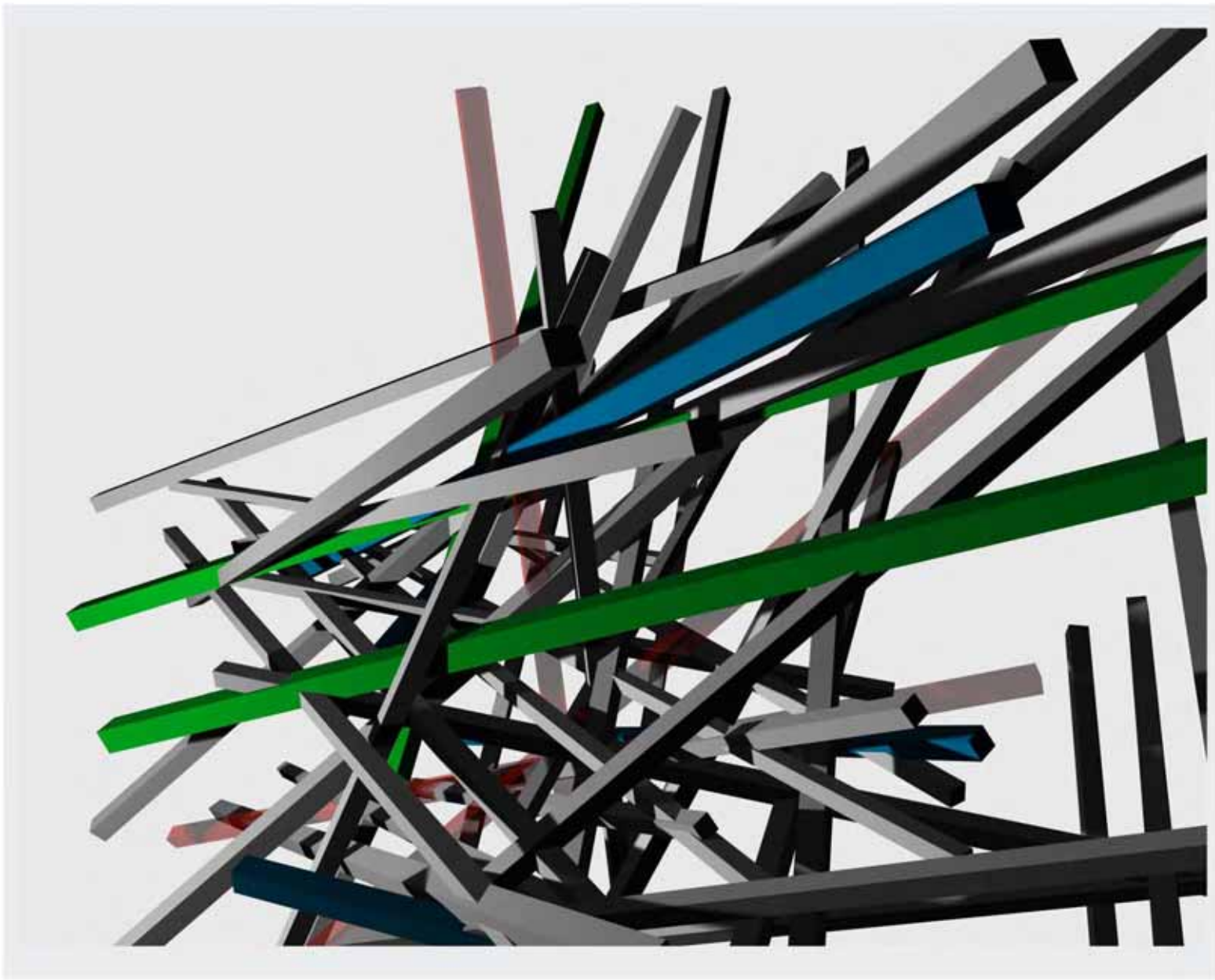
This is no longer a study of perceived three dimensional connections. In the next four studies, the 2D planar arrays from the previous studies are converted into multiple arrays on multiple coordinate orientations. The resultant forms are system of how the initial 2D hexagonal grid may be manipulated to create three dimensionality.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture**

6.7

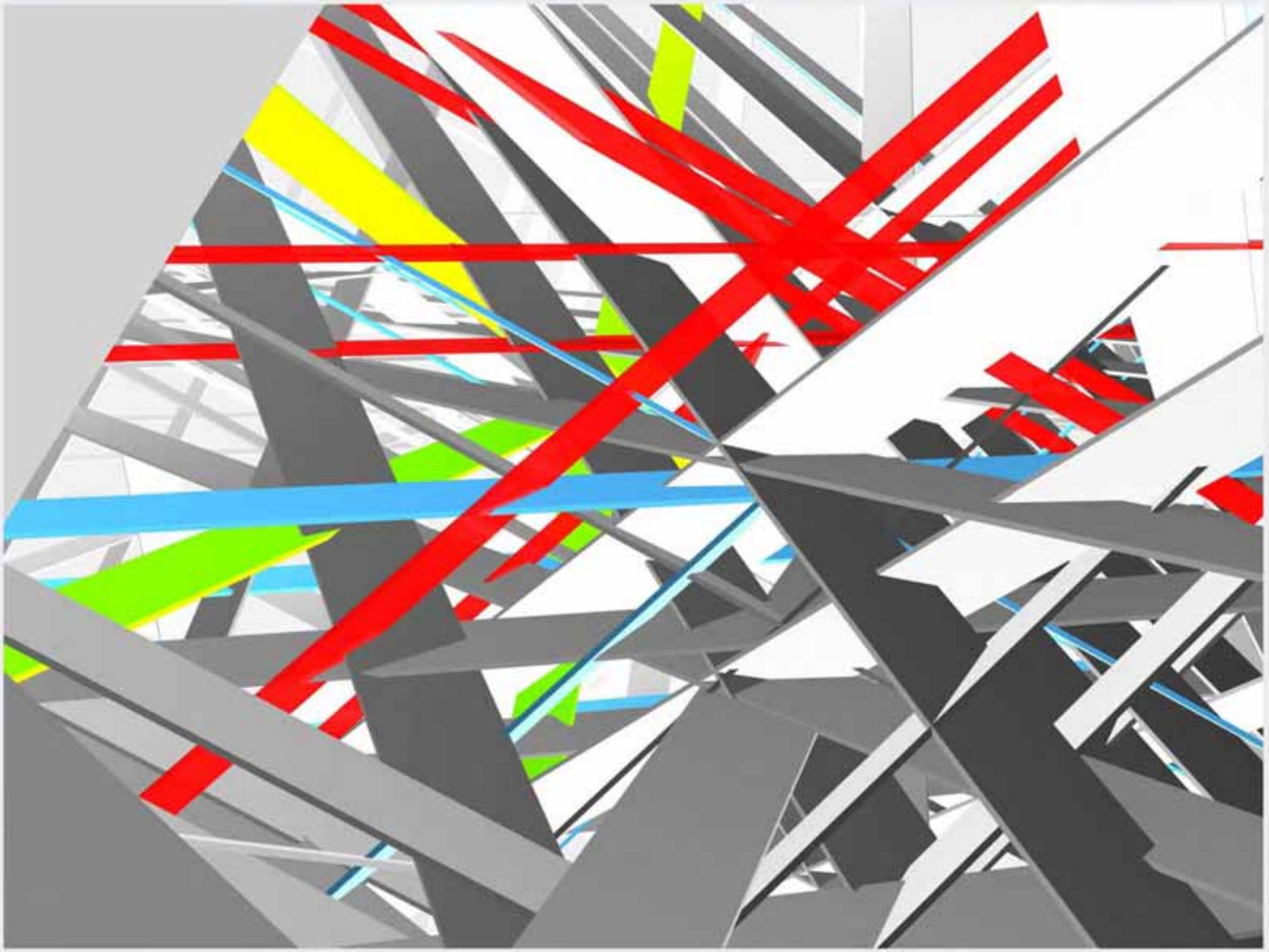


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.8

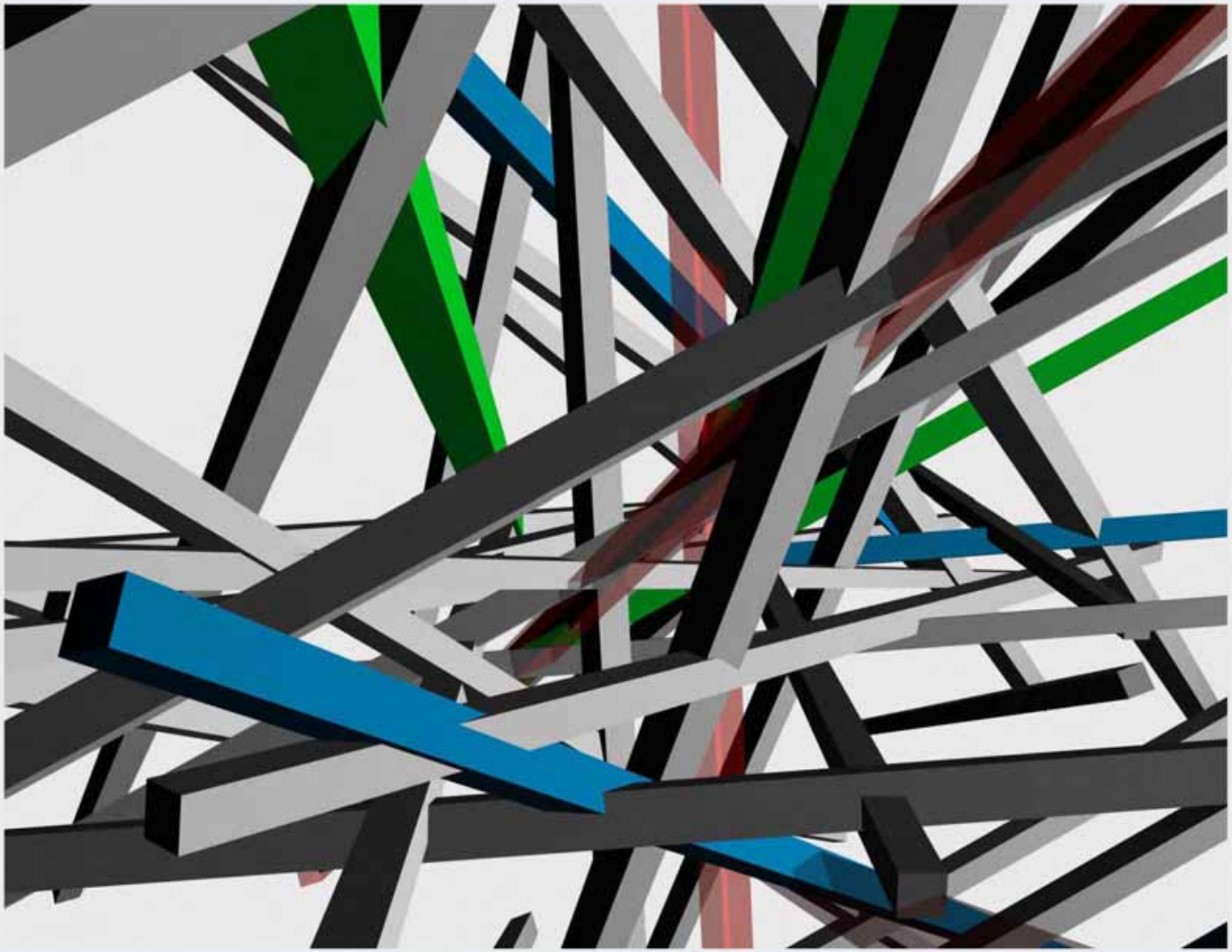


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University
Architecture

6.9

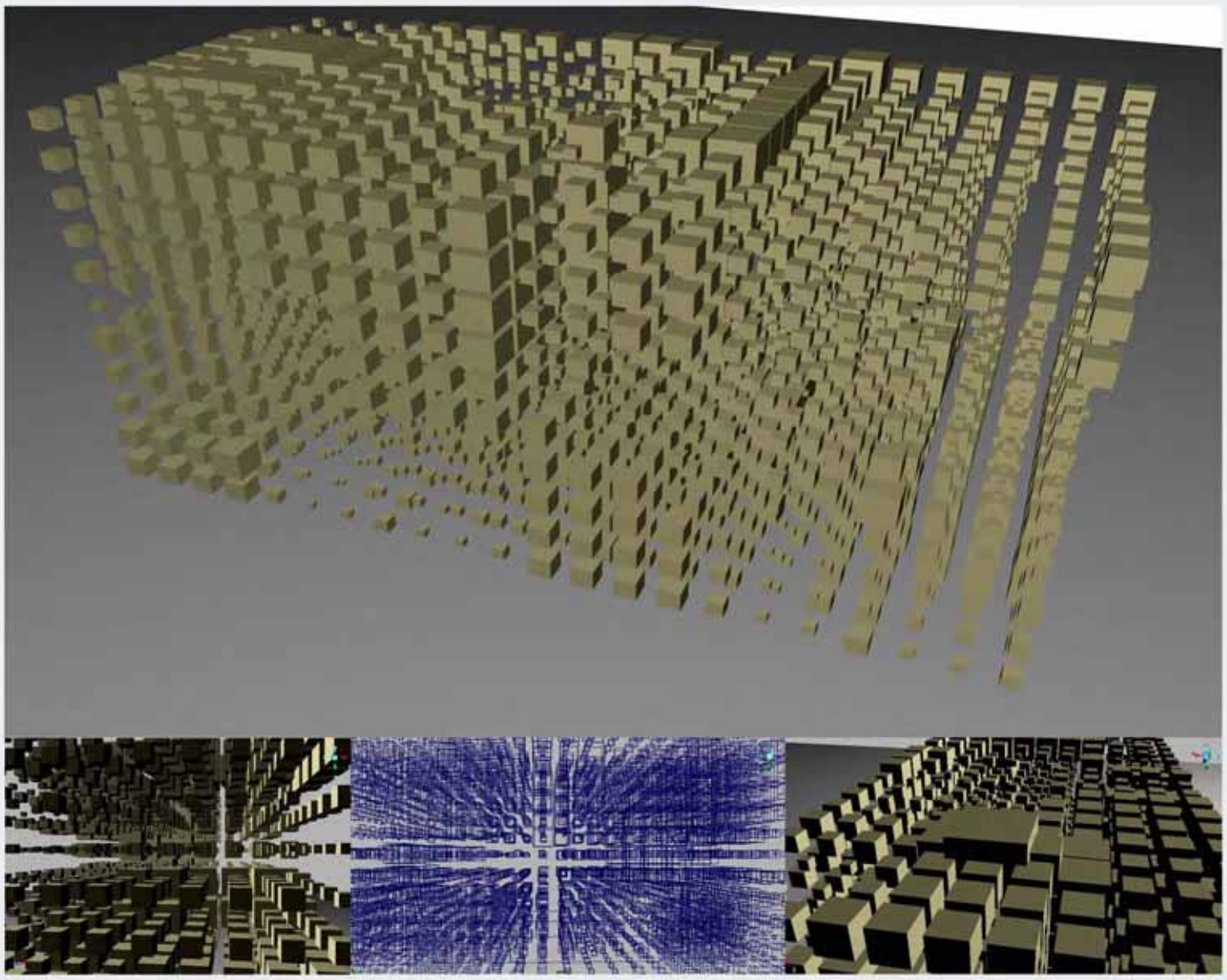


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

6.10

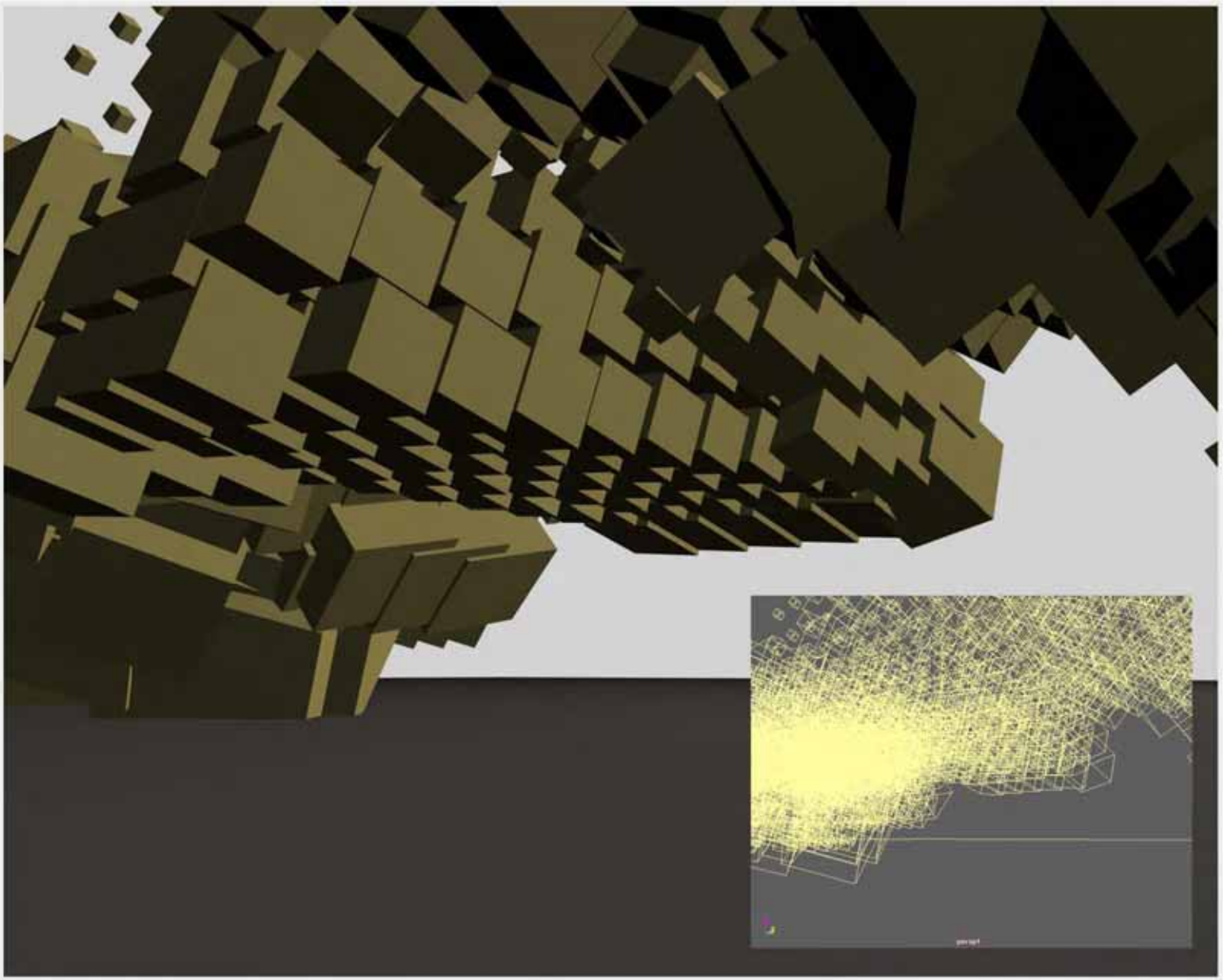


Taking a break from exploring the relationship of 3D axes derived from the original hexagonal grid, this study begins to ask what happens at the intersections of the three dimensional axes. Here, a simple orthagonal grid system defines points in space. Points are individually represented by cubes - the only regular six sided polygon. As the previous studies of overlaying 2D hexagonal grids began to imply hierarchies of node intersections, scaling of cubes within the orthagonal array also begins to hint at node priorities.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **6.11**

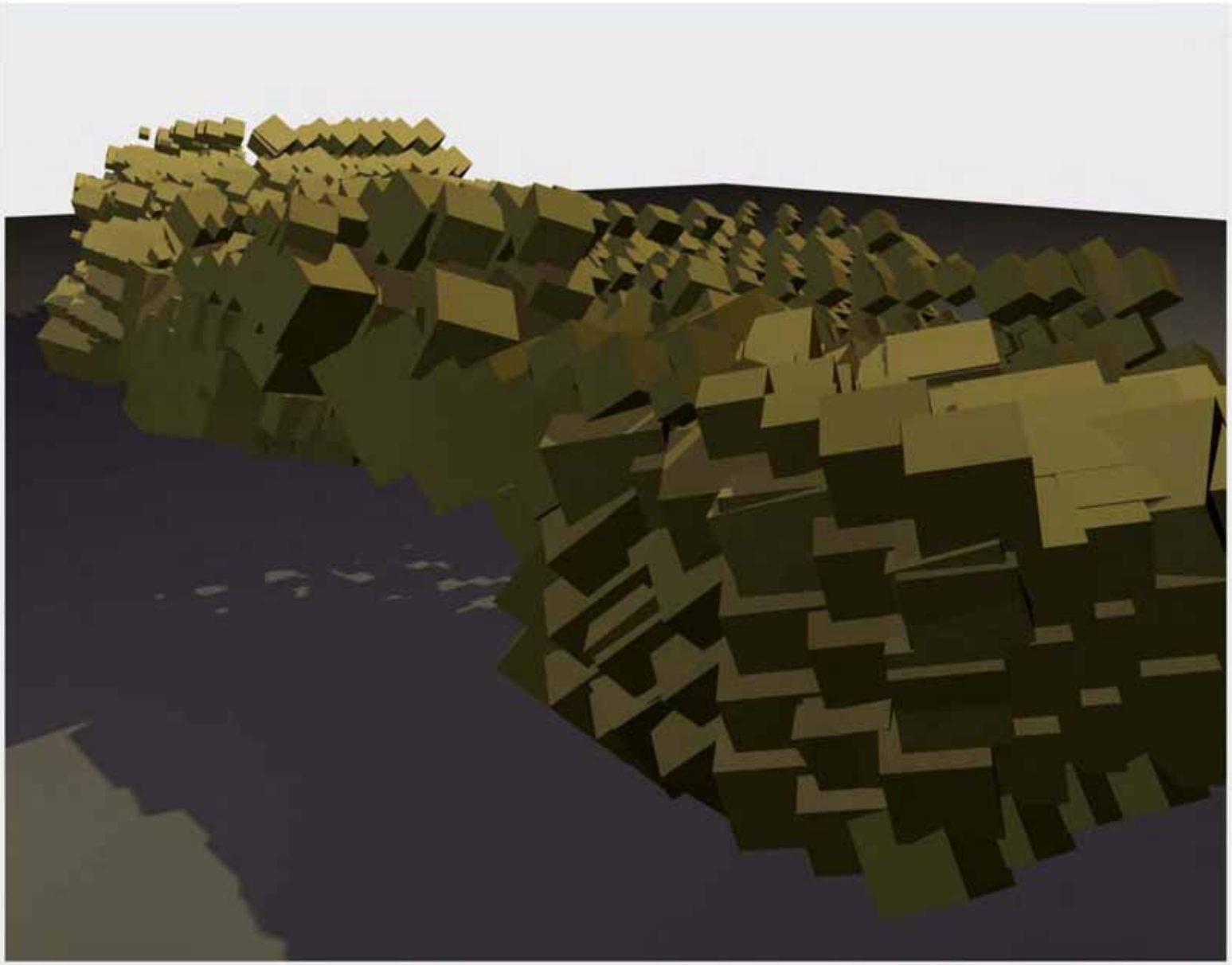


Solid form is derived from the 3D vector array studies and 3D nodal studies. The derived form is an organic structure built of modules of cubic elements twisted and contorted from the tensions of invisible 3D vectors.
Individual cubic nodes differ in characteristic of scale and orientation. While the relationship of individual nodal points relate rigorously to nodes in its proximity, the arrangement possibilities of the final solid form are infinite. Thus a truly 3D system of solid formgiving is grown from a simple 2D grid.

TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University **Architecture** **6.12**

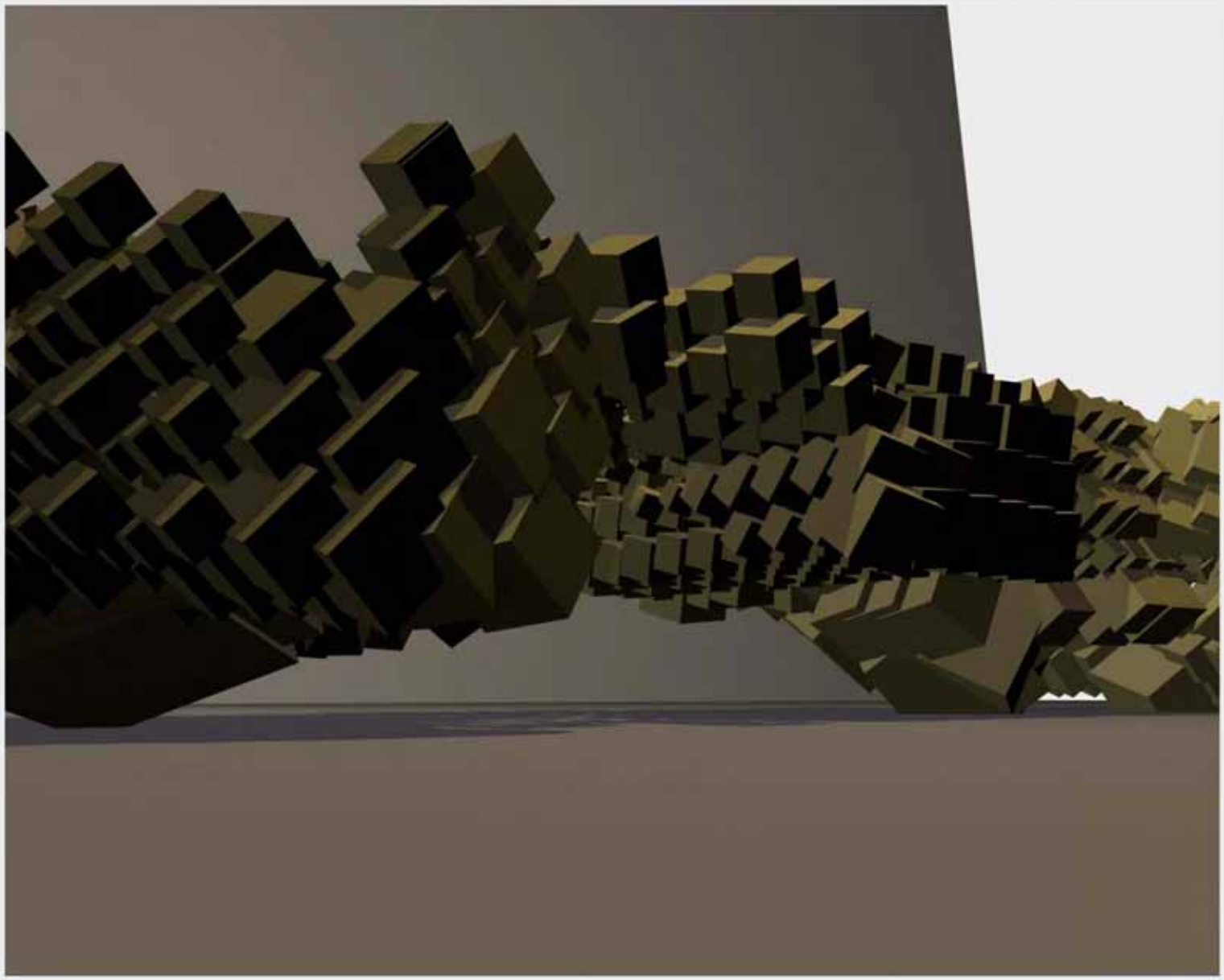


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

6.13

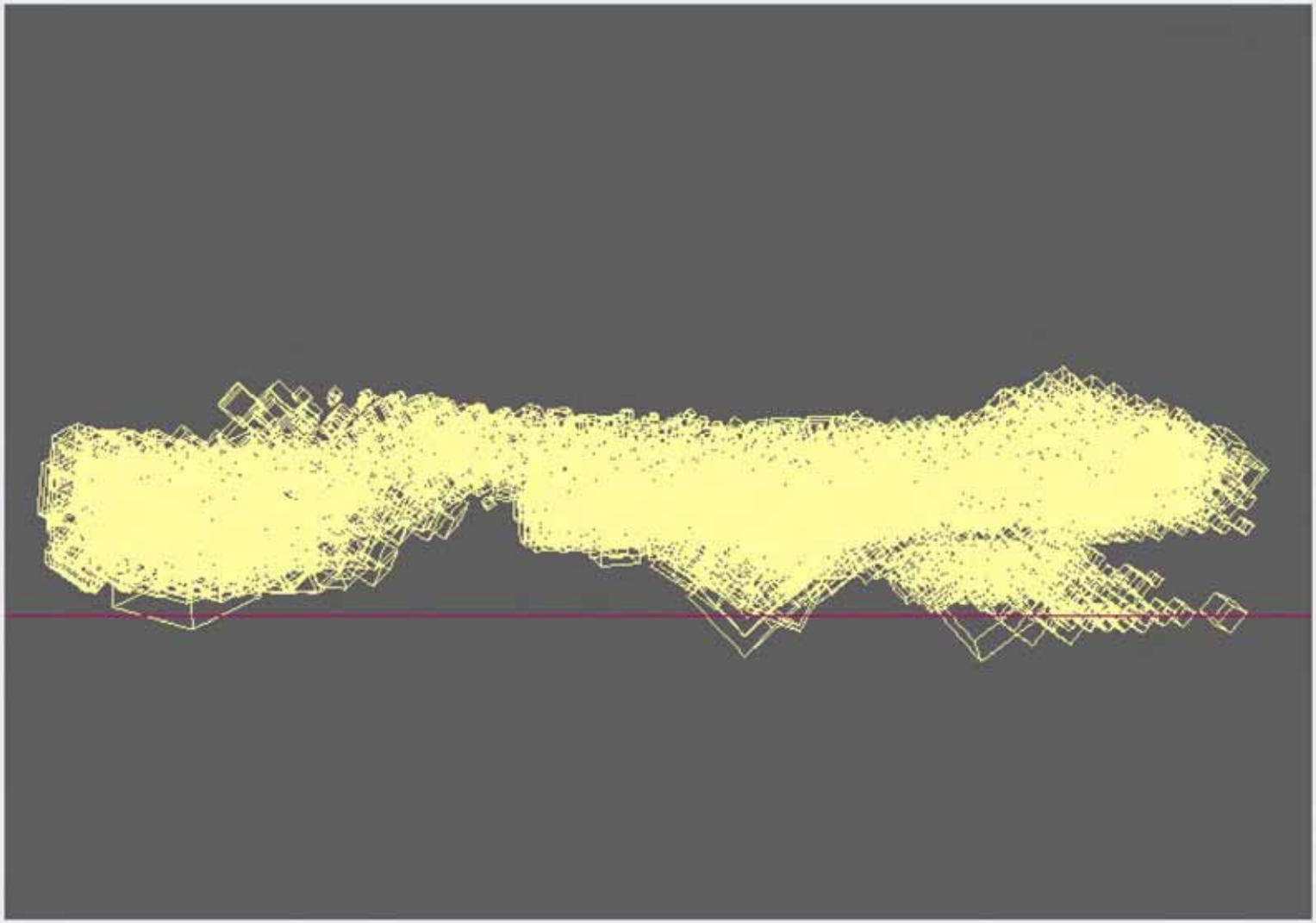


TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture

6.14



TRANSFORMATION

ENKEBOLL FOUNDATION
PROJECT PHASE III

Carnegie Mellon University Architecture **6.15**