

# COMPUTER APPLICATIONS

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DESIGN JOURNAL  
12/2025

## ASSIGNMENT 01

## 01 SKETCHES

## SCHEME ONE

## SKETCHING PROTOCOL

## 10-MINUTE SKETCH:

A careful, detailed exploration of the system.



## 1-MINUTE SKETCH:

A rapid capture of essential rules, forms, or dynamics.



## 10-SECOND SKETCH:

An immediate gestural impression of the system.



## REFLECTION

HOW THE CHANGE IN TIME ALTERED YOUR PROCESS AND PERCEPTION OF THE PARAMETRIC SYSTEM.

The evolution over time revealed the parametric system. My initial intention was to use scale as the parametric system, that the detail would be the system. I realized I started my initial drawing without really identifying what it was. I observed how bundles of the grass would stem off the main stem of the grass. Never one on their own, I study this in plan view as well. I finished the drawing fast and had five minutes remaining so I looked closer and found an even smaller parametric system. The very tips where the grass ended contained tiny tear drop seeds of some sort that layered together to form the larger tear drop like end.

MOST RESILIENT ASPECTS ACROSS TIME CONSTRAINTS, WHAT DETAILS COLLAPSED UNDER SPEED.

The overall form and branching pattern held across all time frames. Even in the 10-second sketch, the bundles radiating from the main stem remained clear. What collapsed under speed were the finer details, the seeds, textures, and layered endings of the grass tips.

HOW THIS EXERCISE MIGHT INFORM PARAMETRIC THINKING IN ARCHITECTURAL DESIGN PRACTICE.

The system was revealed through the act of drawing, not predefined. Parametric design can emerge in the same way, discovered through process and iteration rather than fixed at the outset.

ELEMENT: Alpine Bluegrass/Sweetgrass

PARAMETERS/VARIABLES: Scale and repetition

CONNECTION: Bundle off of main connection point



## ASSIGNMENT 01

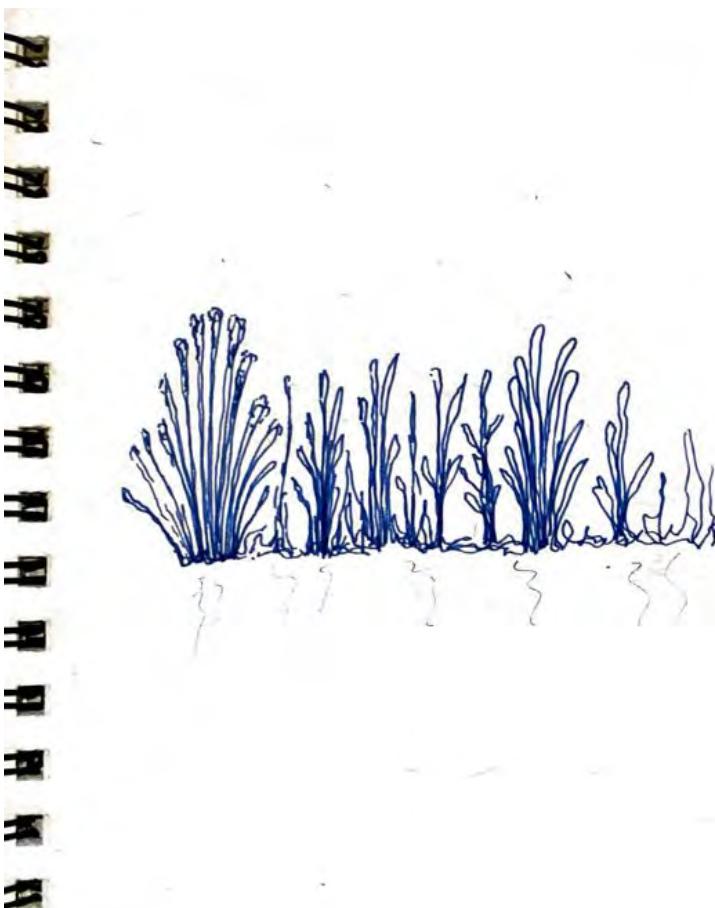
## 01 SKETCHES

## SCHEME TWO

## SKETCHING PROTOCOL

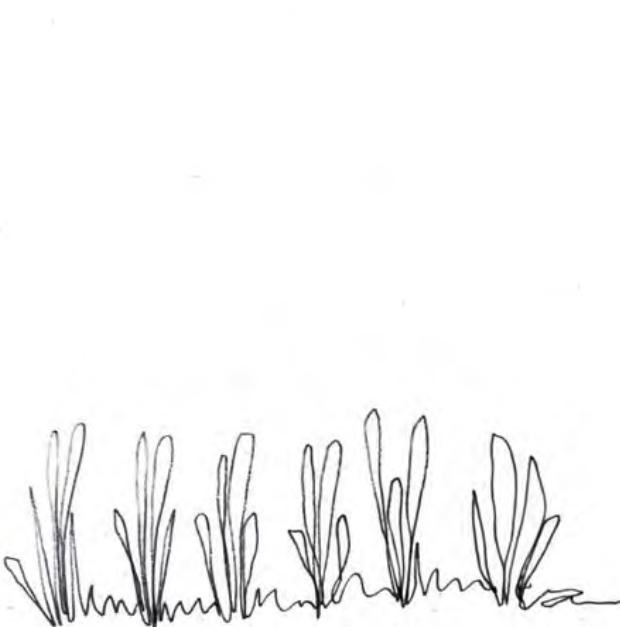
## 10-MINUTE SKETCH:

A careful, detailed exploration of the system.



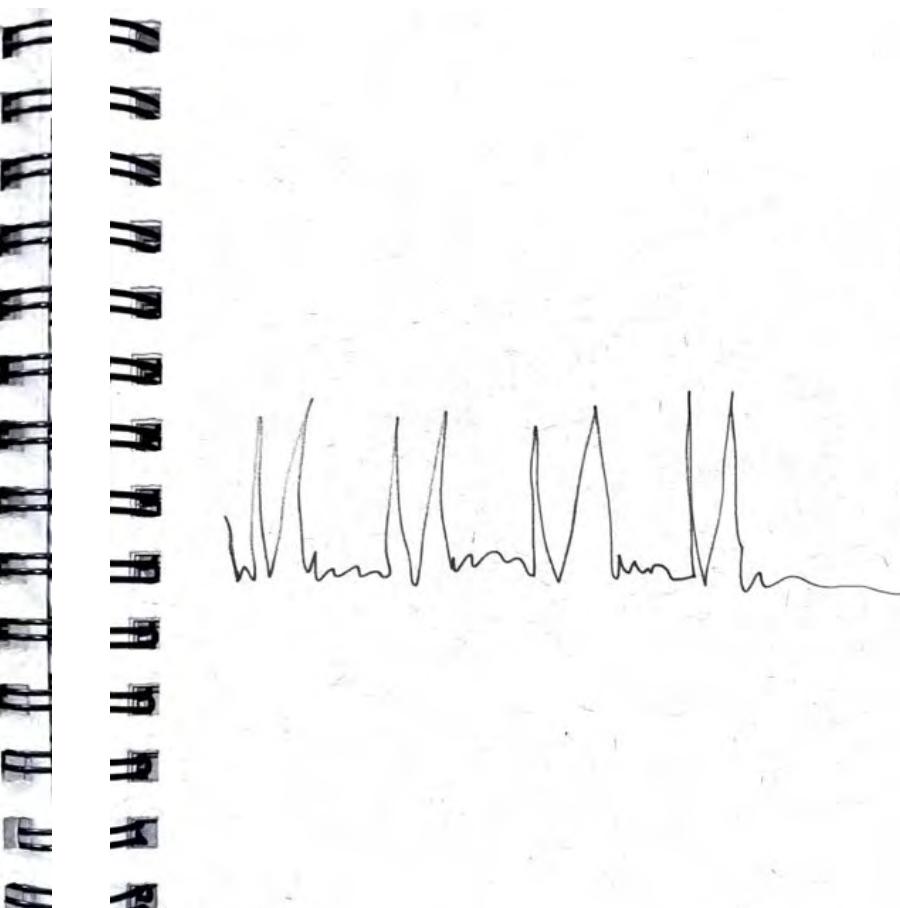
## 1-MINUTE SKETCH:

A rapid capture of essential rules, forms, or dynamics.



## 10-SECOND SKETCH:

An immediate gestural impression of the system.



## REFLECTION

HOW THE CHANGE IN TIME ALTERED YOUR PROCESS AND PERCEPTION OF THE PARAMETRIC SYSTEM.

In this study I focused on the grass in profile, showing its shifts in height and density. Over time, what emerged was not the individual blades but a continuous line of connection. In a field, the closest plants are easy to distinguish, yet the density of the background blurs them into a singular entity. The study revealed this interconnection, the system existing less in the single strands and more in their layered relationship.

MOST RESILIENT ASPECTS ACROSS TIME CONSTRAINTS, WHAT DETAILS COLLAPSED UNDER SPEED.

The finer detail of the grass collapsed. Individual strands disappeared, replaced by sharper, more abstract marks. The drawings held the overall rhythm but lost their organic nature.

HOW THIS EXERCISE MIGHT INFORM PARAMETRIC THINKING IN ARCHITECTURAL DESIGN PRACTICE.

This study underscored how parametric thinking can capture connection and geometry, revealing systems not in isolated parts, but in the relationships that emerge through time and repetition.

ELEMENT: Alpine Bluegrass/Sweetgrass

PARAMETERS/VARIABLES: Layering, time, Connection

CONNECTION: Continuous line



## ASSIGNMENT 01

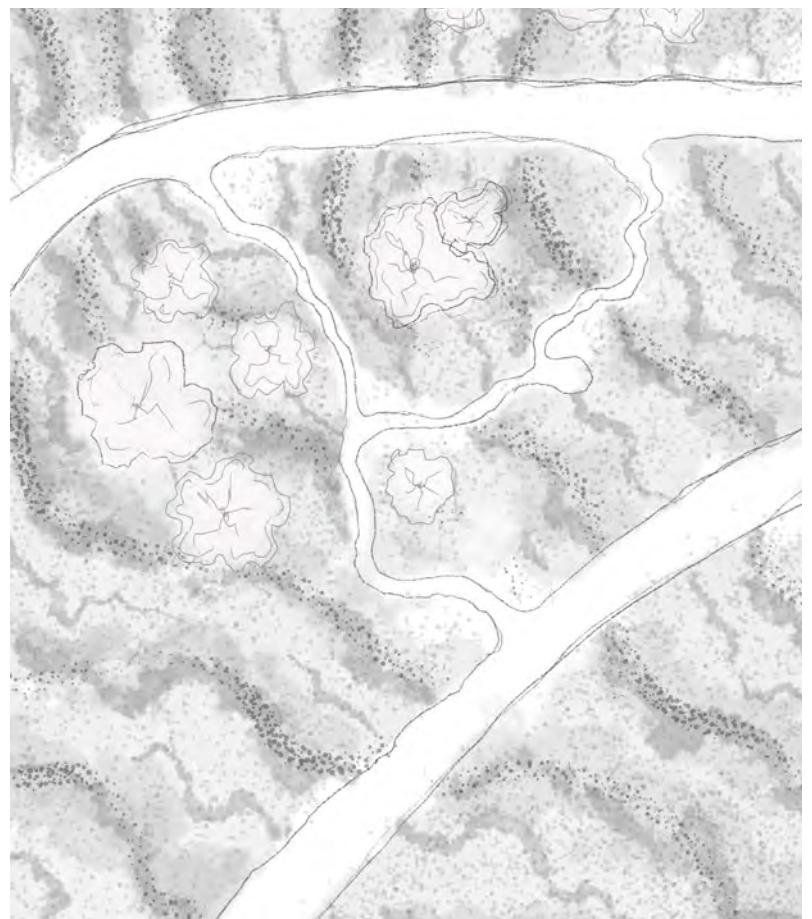
## 01 SKETCHES

## SCHEME THREE

## SKETCHING PROTOCOL

## 10-MINUTE SKETCH:

A careful, detailed exploration of the system.



## 1-MINUTE SKETCH:

A rapid capture of essential rules, forms, or dynamics.



## 10-SECOND SKETCH:

An immediate gestural impression of the system.



## REFLECTION

HOW THE CHANGE IN TIME ALTERED YOUR PROCESS AND PERCEPTION OF THE PARAMETRIC SYSTEM.

In this scheme I wanted to showcase how to wind informed the grass. Looking out into the field The grass would dance. It had a movement with itself that I wanted to capture in a parametric way. My articulation of this changed in each study. It was difficult to capture as I tried to imagine it from a birds eye view flowing in-between the trail systems.

MOST RESILIENT ASPECTS ACROSS TIME CONSTRAINTS, WHAT DETAILS COLLAPSED UNDER SPEED.

By the final drawing I let go of the trails completely I returned to the wave like shapes the grass made collectively and let that define it through large strokes. At the end scale was lost and motion remained

HOW THIS EXERCISE MIGHT INFORM PARAMETRIC THINKING IN ARCHITECTURAL DESIGN PRACTICE.

This study revealed how a huge system (where I started with trees and trails and stippling to define the grass) can be widdled down into one large movement.

ELEMENT: Alpine Bluegrass/Sweetgrass

PARAMETERS/VARIABLES: Layering, Movement

CONNECTION: Motion



## ASSIGNMENT 1 REFLECTION

At the time we had this assignment, it was during the first 6 weeks of our courses, it was busy and hectic and the escape was needed. It bled into my studio class and reengaged some of the excitement for the content.

I was able to just sit with nature for a minute, really be in it, silently, instead of designing for it. My biggest takeaway from this assignment was just that: we need to be with something to design for it, to attempt to feel it and understand it.

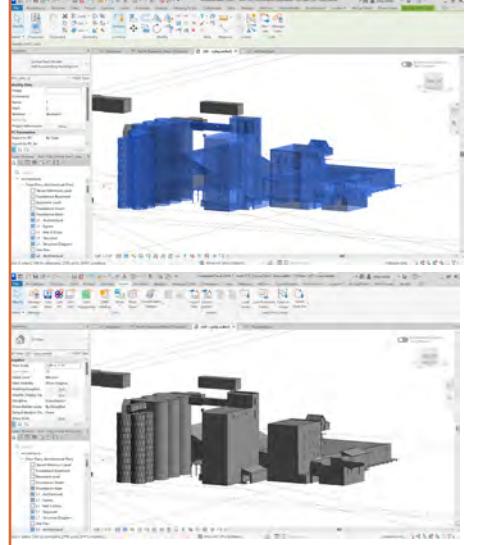
Then the systems start to reveal themselves. I noticed how there were patterns in everything: in the ripples in the water, the bark on the trees, the blades of grass as they came together. It was all intrinsically interwoven. And in a way that is parametricism. The revealing of patterns and how they can repeat themselves to reveal something new or whole.

## ASSIGNMENT 02

## 02 LINKING SOFTWARE

## RHINO INSIDE

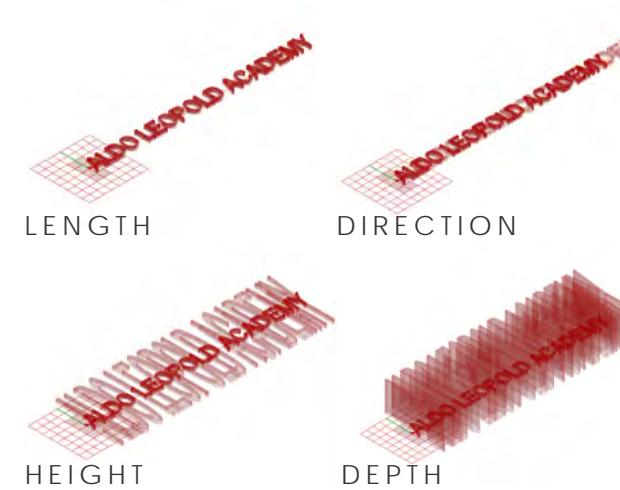
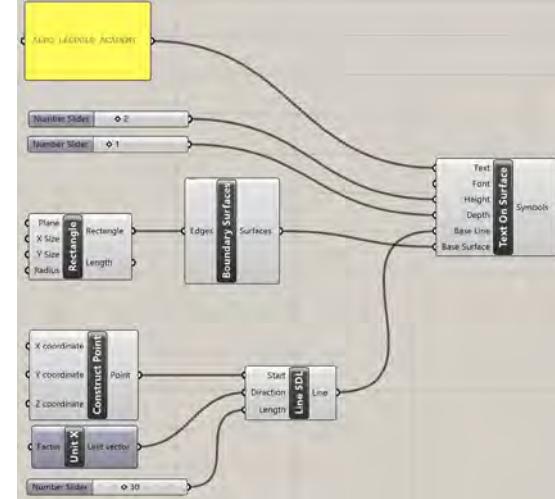
## IMPORT 3DM



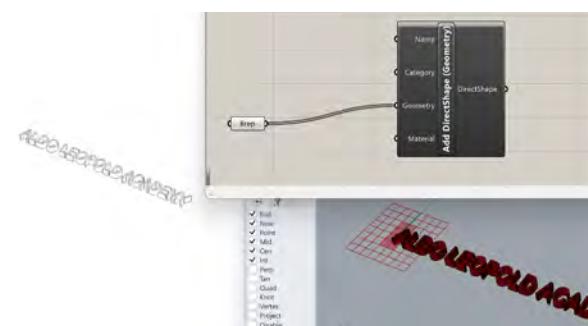
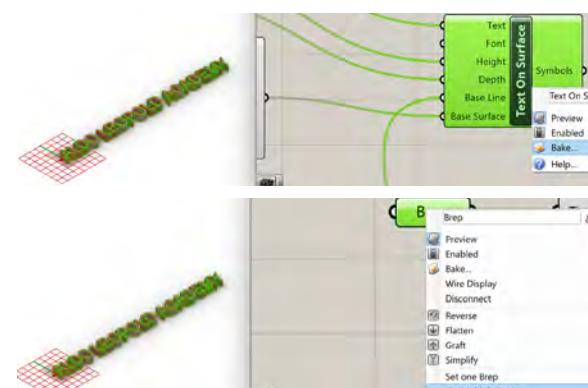
The import 3DM is the first way I experimented with inserting a rhino project into revit. This is a great process for pre-existing designs. I used this process to put my adjacent buildings into my central revit project. The buildings were already existing I just needed a way to get them in.

The rhino Inside allows for flexibility and back and forth control. Push and pull, there is more possibility through this process. More room for parametric designs or iterations. I see lots of possibility in this process. Even in something as simple as exploring iteration of the Sign I want to put on the facade, it was much easier to write this simple script with addition, then to trace out each shape in revit.

## PARAMETRIC WORDS



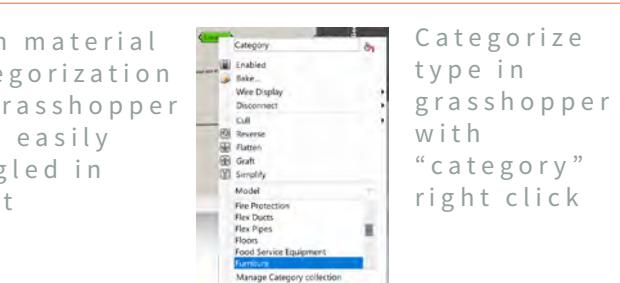
Bake the Final choosing of the parametric words script from grasshopper. Use this baked extrusion to be the input for a new script that will send it to revit.



Move into Revit



With material categorization in grasshopper it is easily toggled in revit



Categorize type in grasshopper with "category" right click

## MODEL CREATION IN GRASSHOPPER/ REVIT

**Text Input and Sliders:** Text panel provides the text string, while two number sliders control the text height and depth (extrusion thickness). These make the text size adjustable.

**Base Surface Setup:** A Rectangle component defines the area where the text will sit, and the Boundary Surfaces component converts that rectangle into a surface. Changing the X and Y size values updates the text base.

**Baseline Creation:** A Construct Point and Line SLD component generate a start point and line for text placement. The Unit X vector defines the direction, and a length slider controls how far the text spreads along that line.

**Text on Surface:** The Text on Surface component takes all these inputs, text string, font, height, depth, baseline, and surface, and projects or extrudes the text parametrically onto the surface.

In essence, this setup is parametric because changing any of the number sliders (for text size, surface dimensions, or line length) instantly updates the text geometry.

## DATA EXCHANGE WITH REVIT

This script sends the baked 3D sign geometry from Rhino to Revit using Rhino.Inside. The Brep input brings in the geometry, which is then grafted so each piece/letter is treated separately. The Add Material component creates a "Sign" material, while the Category defines its Revit family type (like Generic Models). Finally, Add DirectShape imports the geometry into Revit with the assigned material and category. It stays parametric because any updates to the original Grasshopper model can be re-baked and instantly pushed to Revit.

My first script creates and parametrically controls the sign geometry; the second one transfers that geometry into Revit, complete with category and material definitions, through the Add DirectShape workflow.

## ASSIGNMENT 2 REFLECTION

My first experimentation with linking software was through placing the surrounding buildings on our site into our model for studio. As simple as it was, this was a total game changer. The methods I would have used previously would have taken ages, so this was a big time saver.

The second experimentation I wanted to create a sign for our project. I was able to learn a lot through the process, although being very (almost completely) new to Grasshopper this semester, I did not succeed entirely in completing my vision. I originally wanted to create something that couldn't be done in Revit (which, what I got to work could be done in Revit). Although through some struggle, it gave me a bit of confidence to try again on something more challenging for the next assignment.

The linking software/Rhino.Inside has always been a workflow I have wanted to implement, as I enjoy doing schematic design in Rhino. Previously I would rebuild geometry after my Rhino phase, so this again proved to be a big time saver.

DESIGN INTENT

## 03 INSPIRATION

SOMETHING FUN

## DYNAMIC LANDSCAPES: HARDSCAPE VS SOFTSCAPE

QUICK SKETCH



These images capture my design intentions/inspirations for the boardwalk: to choreograph movement, pause, and transition within the landscape. The images explore how built form can flow with terrain, integrating, exploring and blurring the lines of architecture and landscape.

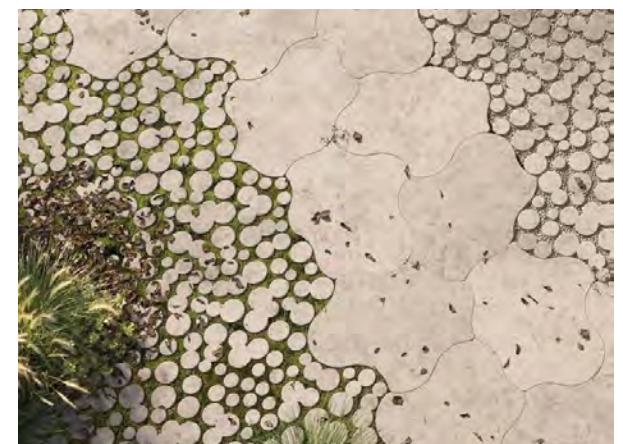
MOVEMENT: BOARDWALKS



PAUSE: SEATING

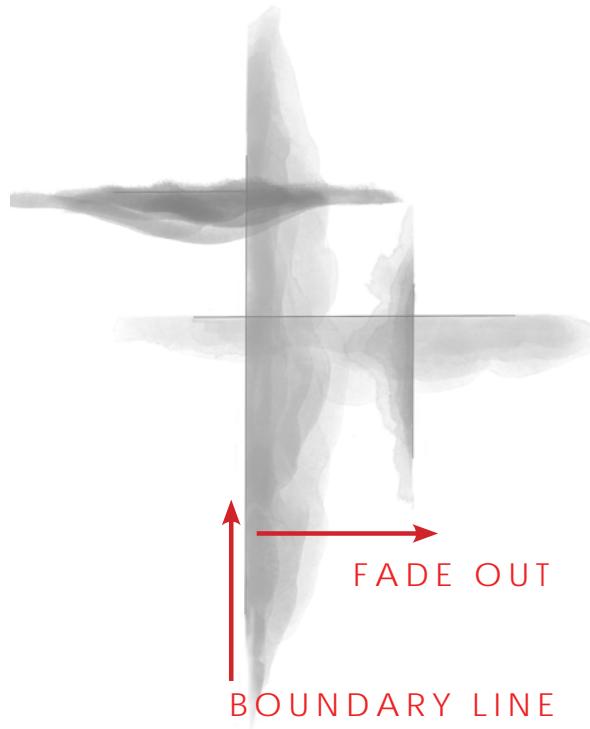


BLURRING LINES: FADE

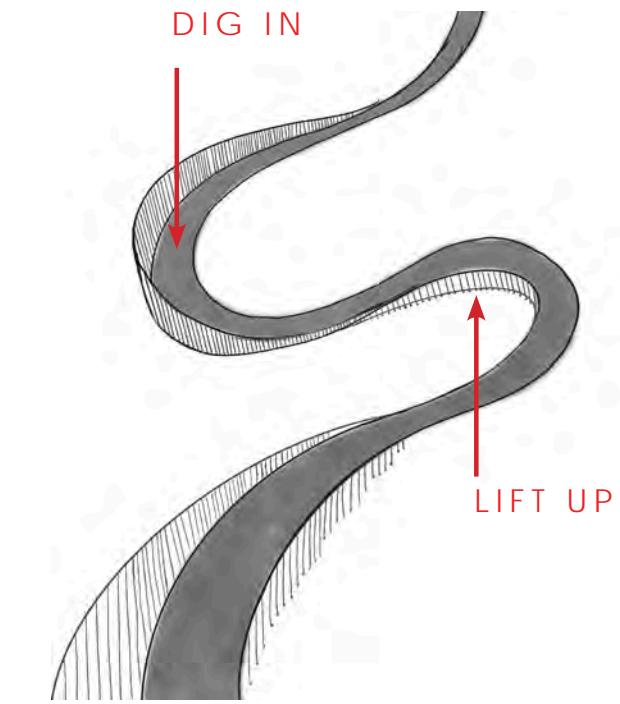
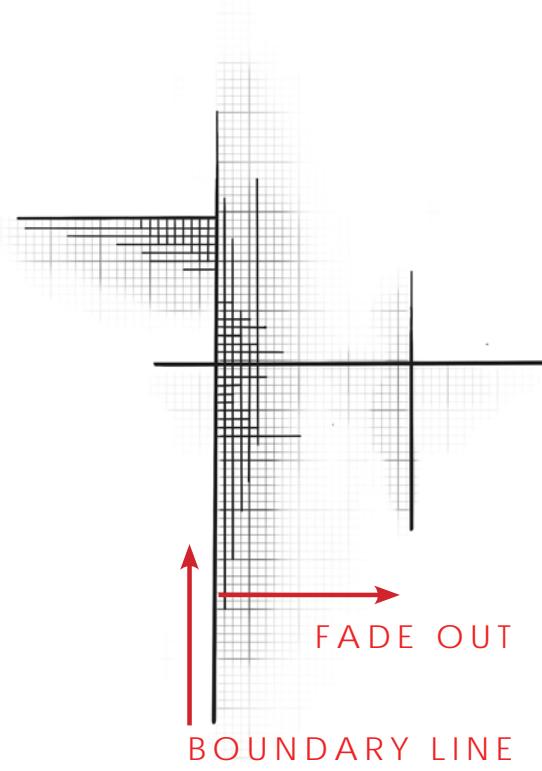


## DESIGN INTENT

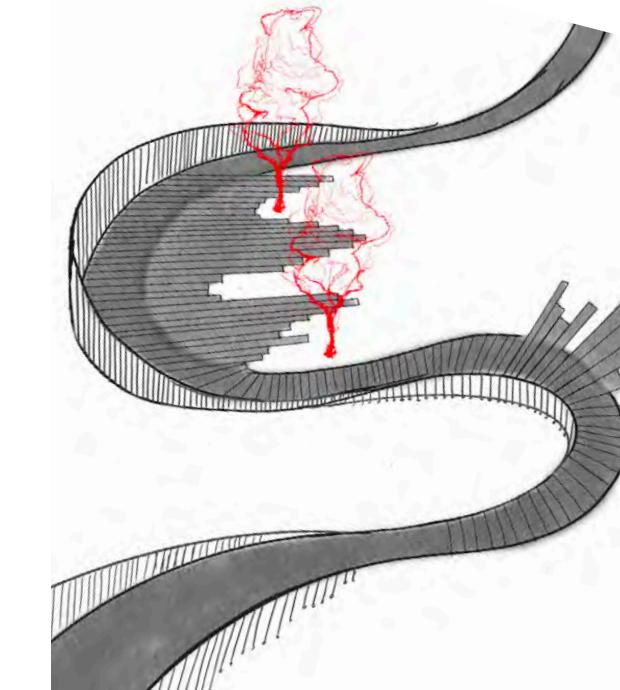
## 03 LANDSCAPE IN MOTION | IDEA GENERATION



These sketches showcase the desire to have the boardwalk 'fadeout' into the landscape. Maintaining lines that define it in the X and Y direction.



These sketches showcase movement in a different direction: digging in or lifting up at turning points or special moments. creating an experience where you are literally inside the landscape or above it, changing perspective and view points.

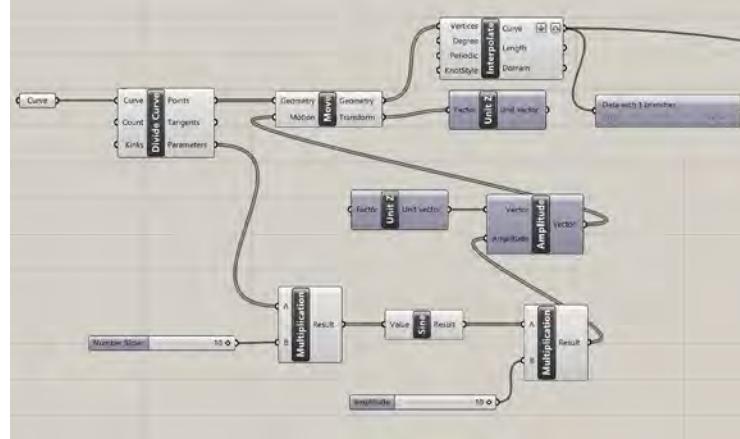


Here the desires are combined where the boardwalk both undulates and responds to existing features of the landscape, pushing out towards views and curving in towards existing features like trees, rocks, water.

## PARAMETRIC DEFINITION

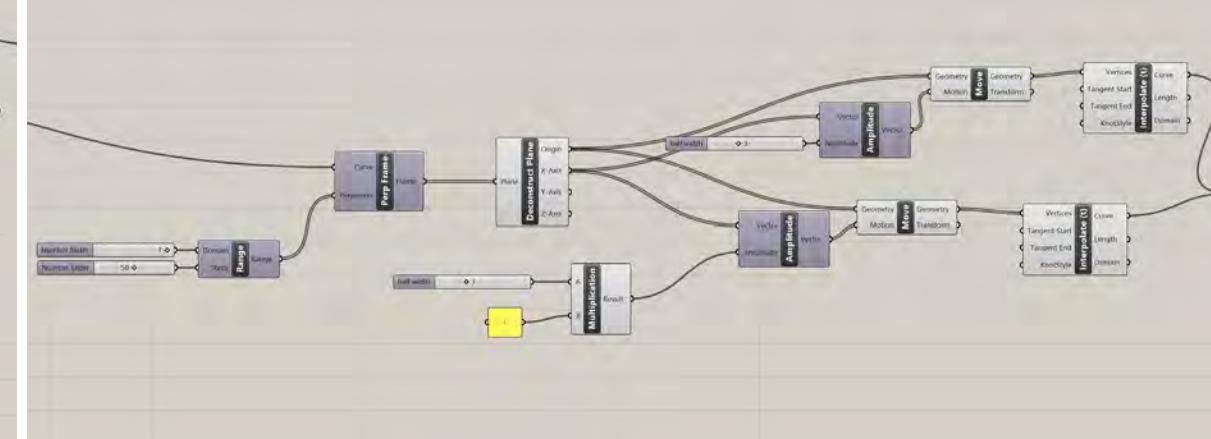
## 03 SCRIPT BUILDING | WAVES

## WAVE GENERATOR



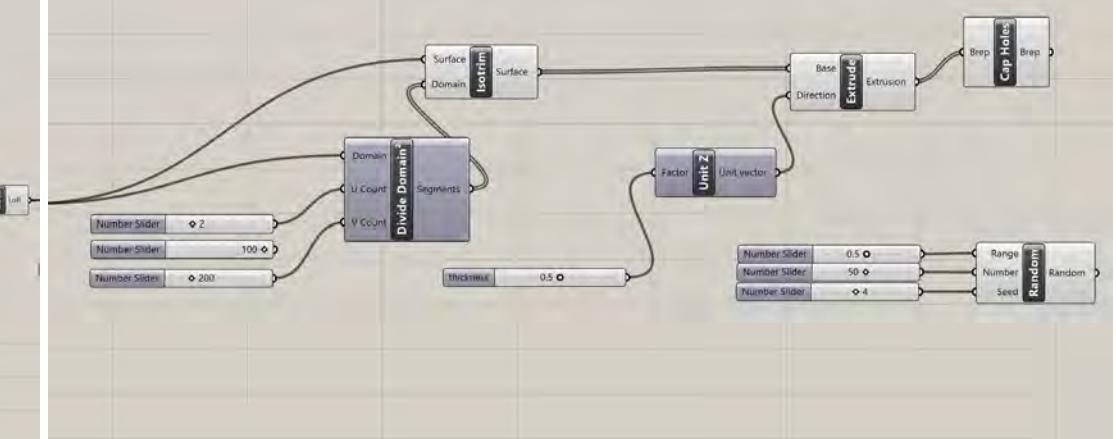
Generating an undulating line based on sketch curve. The frequency slider controls how many waves appear, and the amplitude slider controls how tall or deep those waves are. Interp creates the line

## WIDTH AND SURFACE

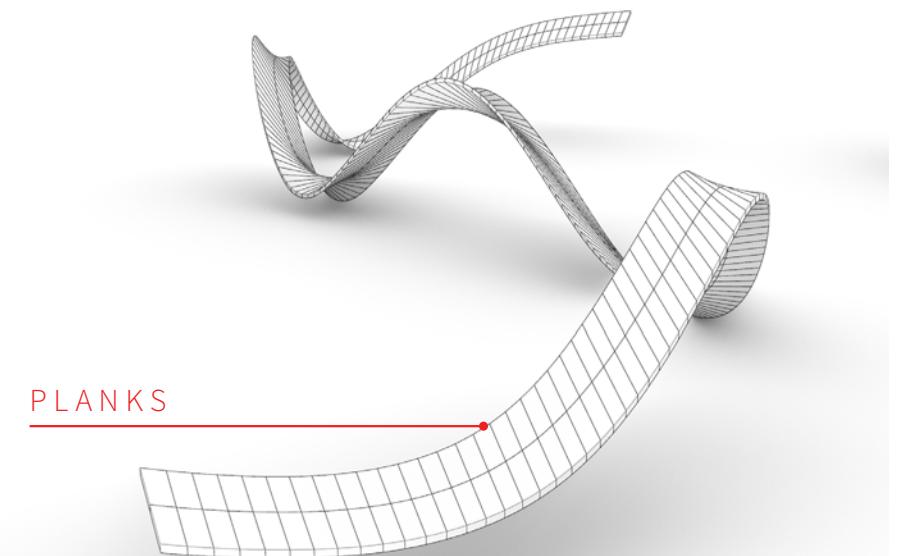
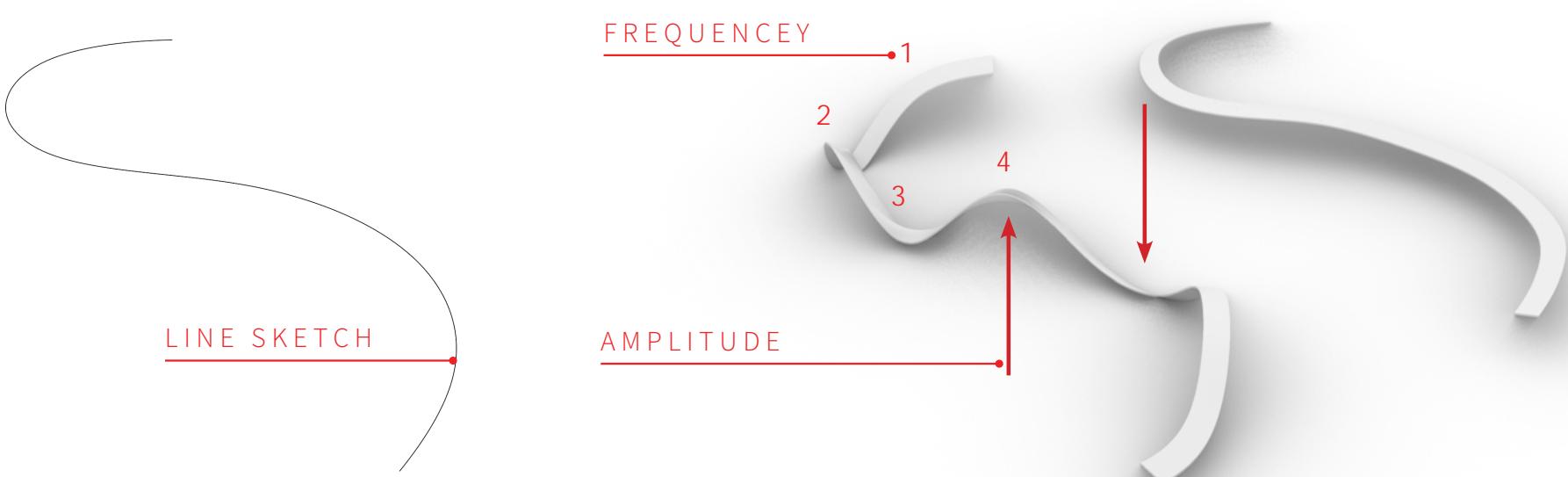


Perpendicular frames are generated along the curve and points are moved outward by a controllable half width number slider. Two interpolated curves are lofted together to form a continuous surface (boardwalk)

## PLANKS + THICKNESS



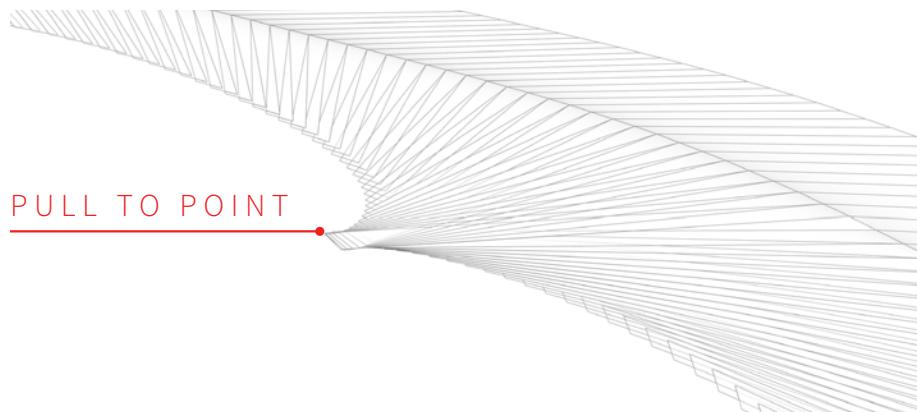
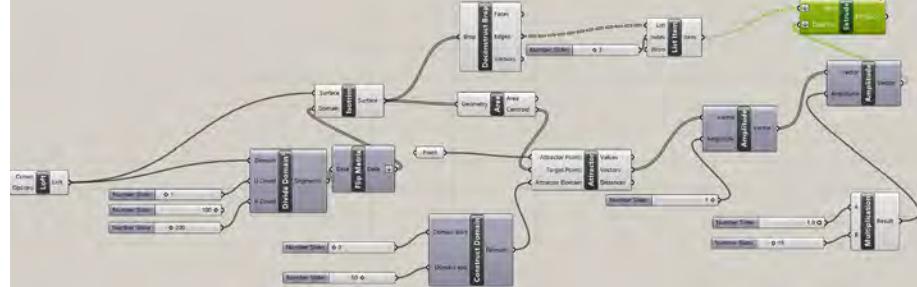
Here the surface is divided into planks/structural elements that make up the boardwalk. Then each plan is given physical thickness by extruding up on the Z-axis. The Random component introduces variation in the planks



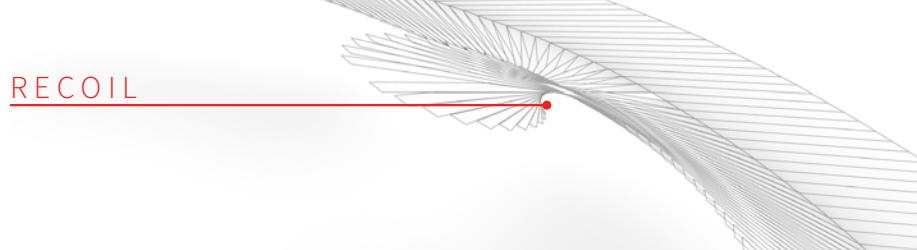
## PARAMETRIC DEFINITION

## 03 SCRIPT BUILDING | REACHING

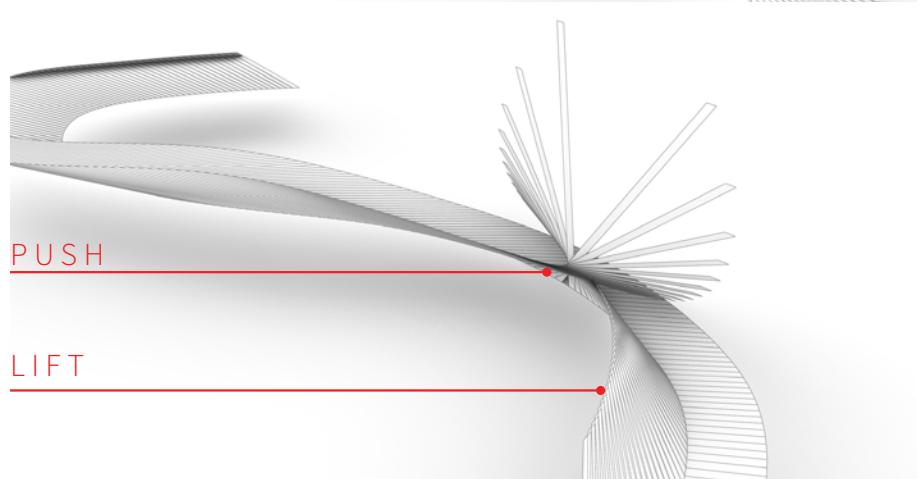
## ATTRACTION POINT



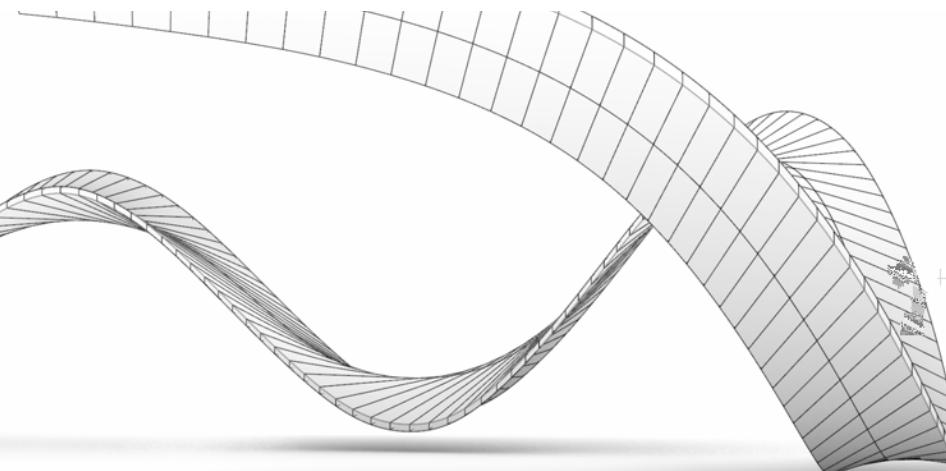
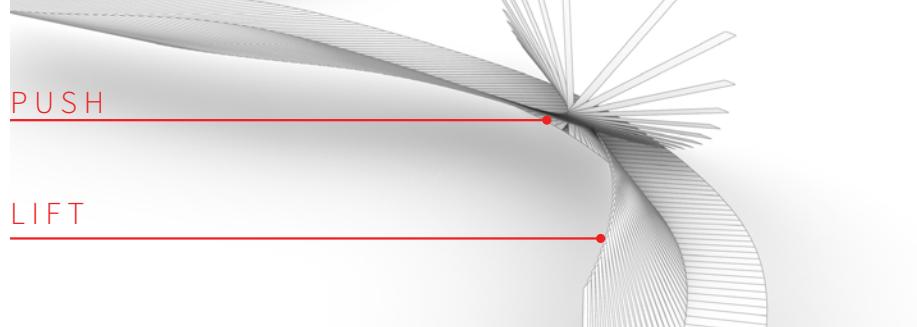
## RECOIL



## PUSH



## LIFT



## CONCLUDING THOUGHTS

The parametric method made me rethink my approach to the boardwalks. How they could respond to the environment by moving up and down, carving into the ground and lifting above it or undulating with the earth's flow. How they could reach out or recoil to features on the land like rocks, trees or water. It made me think about every element, how the guiding line, creates a response to the width and variability, what the limits are before the chain breaks.

The parametric capabilities are so variable in Grasshopper, there are so many unique ways to approach an idea or script (I'm almost positive the way I did it was not the most efficient) but I learned an incredible amount about how and why geometry will react, and in the end I was able to create something that moves and breathes! More to learn.

## REFERENCES

"4.3 How to Model Curves Parametrically – Intro to Parametric..." YouTube, uploaded by EpikKai, <https://www.youtube.com/watch?v=Pbro9Dzx8Vs>. Accessed 4 Nov. 2025. YouTube

"Grasshopper: Mastering Curve Offset Direction" YouTube, uploaded by EpikKai, <https://www.youtube.com/watch?v=ePciKeAKPl0>. Accessed 4 Nov. 2025. YouTube

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"Grasshopper Surface Extrude: Simple code for beginners" YouTube, <https://www.youtube.com/watch?v=hAYwSNqLc>. Accessed 4 Nov. 2025.

"Grasshopper Attractor Points (Easy)" YouTube, uploaded by EpikKai, <https://www.youtube.com/watch?v=tPGSdsZoib4&t=1s>. Accessed 4 Nov. 2025.

"Grasshopper Tutorial: Extrude and Offset Surface" YouTube, [https://www.youtube.com/watch?v=nCndlln3s2k&embeds\\_referring\\_euri=https%3A%2F%2Fchatgpt.com%2F&source\\_ve\\_path=MjM4NTE](https://www.youtube.com/watch?v=nCndlln3s2k&embeds_referring_euri=https%3A%2F%2Fchatgpt.com%2F&source_ve_path=MjM4NTE). Accessed 4 Nov. 2025.

"125 - Grasshopper - Fundamentals of Attractor Points 4 - Extrusions with Attractor Points" YouTube, <https://www.youtube.com/watch?v=HqXlcOmAxpw>. Accessed 4 Nov. 2025.

"Dividing Surface into Planks for a Timber Boardwalk." Rhino/Grasshopper Forum, McNeel Forum, <https://discourse.mcneel.com/t/dividing-surface-into-planks-for-a-timber-boardwalk/125204>. Accessed 4 Nov. 2025.

## ASSIGNMENT 3 REFLECTION

The inspiration for this assignment excited me. I wanted to intertwine natural elements and built. In the future I would have liked to attempt to incorporate topography into the sequence and how the boardwalk could affect the landscape and vice versa in a parametric manner.

In this assignment I hit many points of frustration and spent lots of time with YouTube (as evidenced by my resources). I did not find that Grasshopper came intuitively to me, and it was very rare I could place a node by myself and connect it successfully to produce an outcome. Like anything, I will get better with time if I keep working at it, but I really did struggle, which reflecting back I am glad I did. Because I pushed myself to try something outside of my comfort zone and got a product from it, although again not exactly what I was hoping for, it felt like a win.

Something I really enjoyed from this assignment was the sketch-to-digital workflow. It made me think through how I wanted it to move and what the parameters really were. (It was also fun.)

# 04 — RENDERING

## PROJECT OVERVIEW

I really enjoyed exploring the world of twinmotion. This was a strong learning curve from lumion and other softwares I have used in the past: the various settings, environmental, lighting and rendering controls felt challenging to navigate at first but as I found the balance I came to really enjoy this software.

I was able to discover things about light qualities I had never noticed before and felt challenged in creating photorealistic renders. There were key things I found would help the render to become more and more realistic and they varied heavily for interior vs exterior. Composition and foreground, middleground and background details were key. Shadows and color changed per each view and influenced them heavily.

Some things I really enjoyed about twinmotion were the capabilities of the weather tools/night time & day time and material details from 3D substance. Super fun and excited to try again with a little more experience.



## AERIAL VIEW



## EXTERIOR VIEW



## INTERIOR VIEW



## ASSIGNMENT 4 REFLECTION

Assignment 4 was by far my favorite assignment. I have always enjoyed the rendering process most for presentations, and Twinmotion was like an entirely new world.

There was definitely frustration in the beginning trying to understand how all the settings worked with one another and how to achieve photorealism (or something close to it), but I believe I came a long way from the beginning to the end. The results were vastly different from my typical style of rendering in the past, which pushed me to explore new avenues.

This assignment, and the rendering process in general, opened up conversations I didn't expect, revealing how many disciplines intersect with architecture. Friends/family in lighting, IT, tech, photography, graphic design, and fine art all offered input, helping me refine settings through their own expertise. It was exciting to share the work in this way, to feel renderings become a place where so many perspectives/skills could meet. (possibly helped by the fact that I was working over Thanksgiving, with plenty of eyes around).

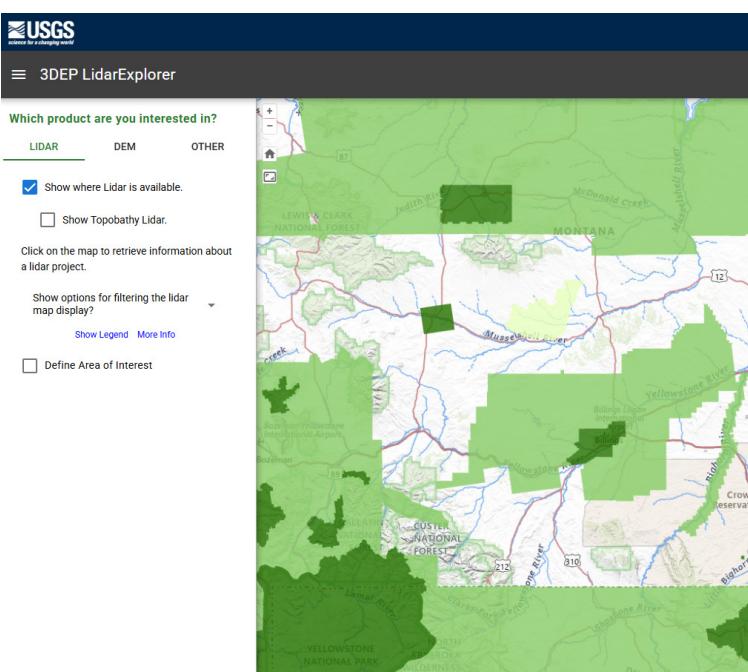
## ADDITIONAL EXPLORATIONS

## POINT CLOUD

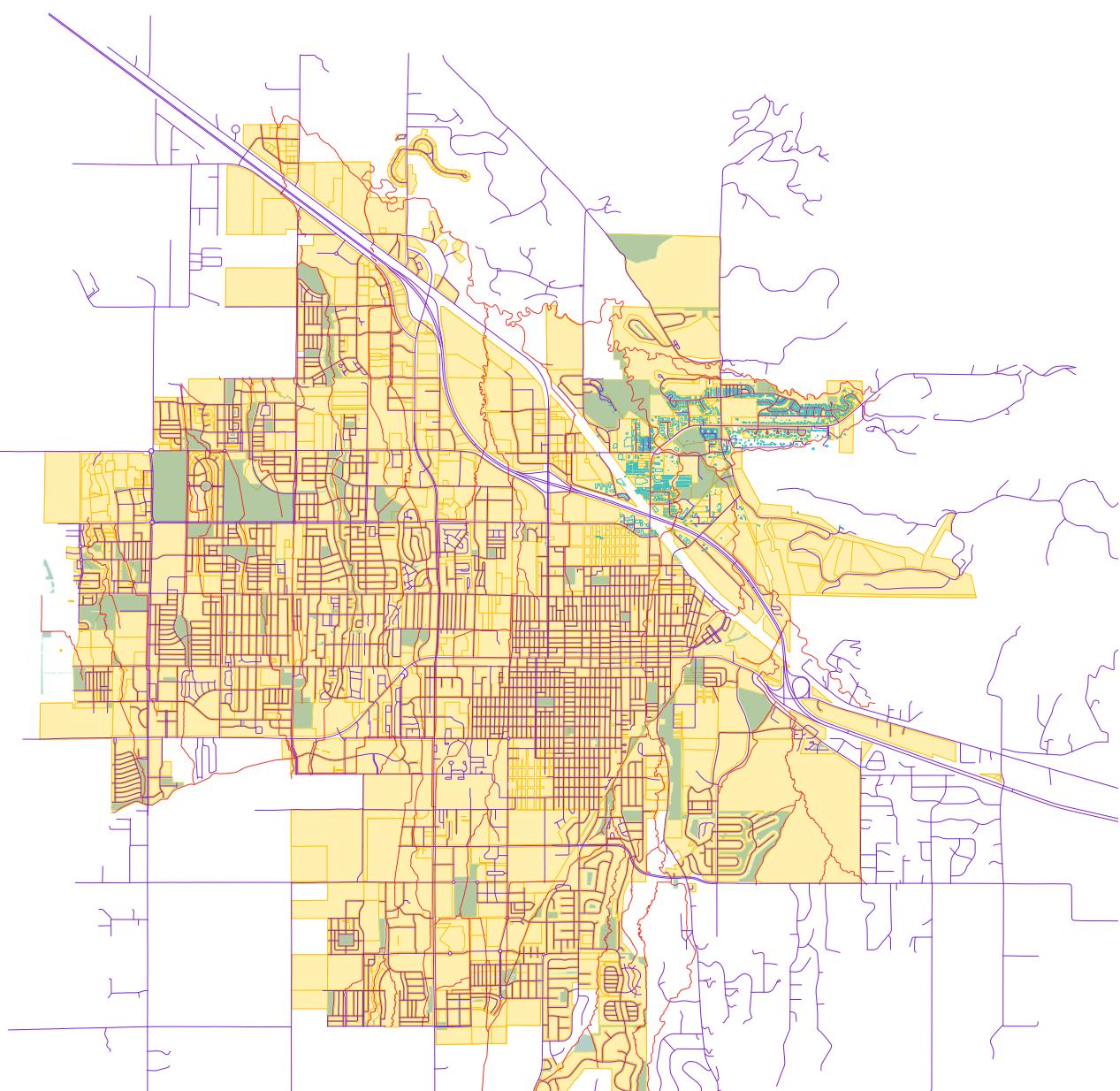
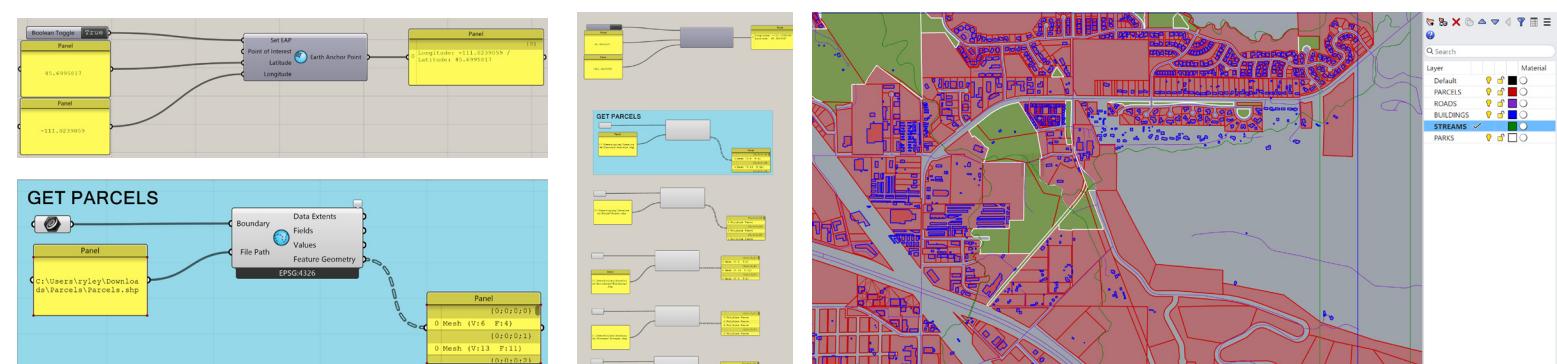
## OPEN DATA DOWNLOAD



## LIDAR DATA DOWNLOAD



## GRASSHOPPER SCRIPT IN RHINO



LiDAR topography To Rhino- mōtus

<https://www.youtube.com/watch?v=hanJXK1HKK8&t=34s>

## ADDITIONAL EXPLORATIONS

## KANGAROO

## DANIEL PIKER: DESIGN EXPLORATION THROUGH MINIMISATION

Daniel Piker: Part one

- Paper things- experimentation by hand into larger systems
- Replication in 3D in computer
- flexibility by hand, geometry can be surprising- computer revealed discoveries
- Origami-
- form finding through physical models
- kangaroo- combining speed, exactness and flexibility with some of the physical form finding
- Kagaroo is about geometry and physics
- Beginning= pavillions/hanging structures. Catalyst Hexshell
- bubble gum structure- minimal surface installation
- Tentile? textile?
- how the fabric stretches informs the structure
- Fabrication =like a puzzle
- combine factors, satisfy constraints
- A way of finding aesthetic forms

How Does the physical inform the computer? Go back to concept models:

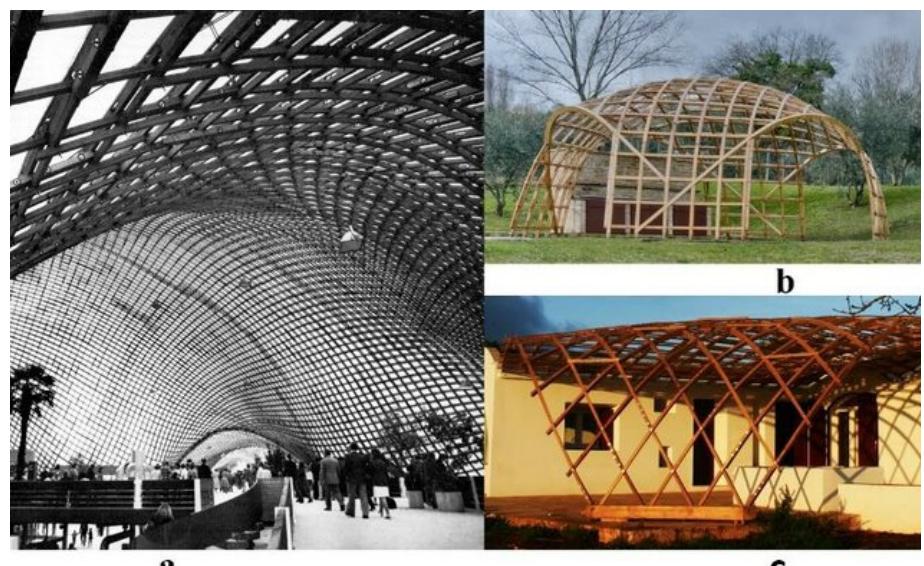
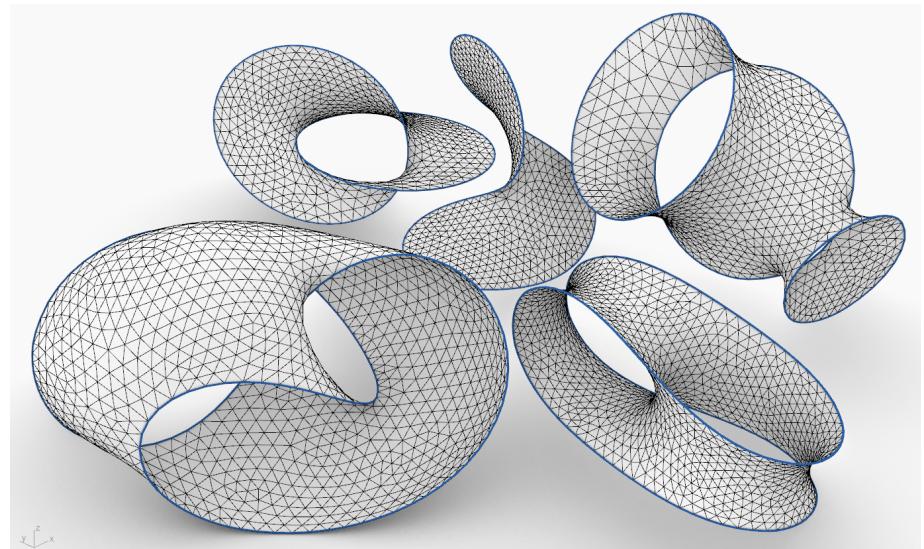
Patterns in kangaroo can become repetitive- they feel almost iconic like you've seen them before. Very specific to certain projects. How do you make something feel more original?

Daniel Piker: Part two

- Physics engine
- Proportions in 1d 2D 3D etc
- minimizing the total potential energy for a system
- constraint satisfaction by projection
- alternating projections vs averaged projections
- viscous vs kinetic
- retaining sqft while moving shapes-super cool
- interactive- working w time and space
- movement- motion (similar to water)
- similar to myra?
- kids toys, jewelry ... goes beyond design in the built realm and into everything, very imaginative
- Scalelessness makes to possibilities feel endless
- 

Movement of objects, how does movement become something fixed? how does it inform design?- moving like water

If this was somehow a game i wouldve had a heyday as a kid



## ADDITIONAL EXPLORATIONS

## RESOURCES

## BIM OBJECTS FOR REVIT

Herman Miller  
Revit family.biz  
Steelcase  
Knoll

offices  
residential  
Office  
Fancy Furniture

## RENDERING

Dimensiva  
Adobe Substance assets

High quality 3D models  
Materials/Models/Decals

## LIGHTING

FluxWurx  
Vibia

Commercial  
Pretty

## ENVIRONMENT

Lighttanza  
WUFI  
Climate Studio

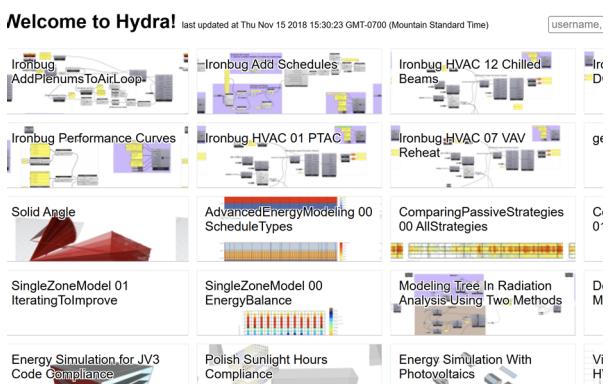
Electric/daylight  
Envelope  
Lotss of stuff

## PLUGINS

environment  
rhino inside

Topography manipulator  
rhino to revit

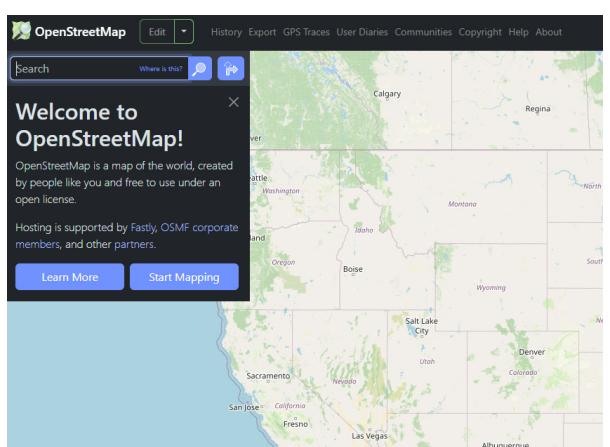
## GRASSHOPPER



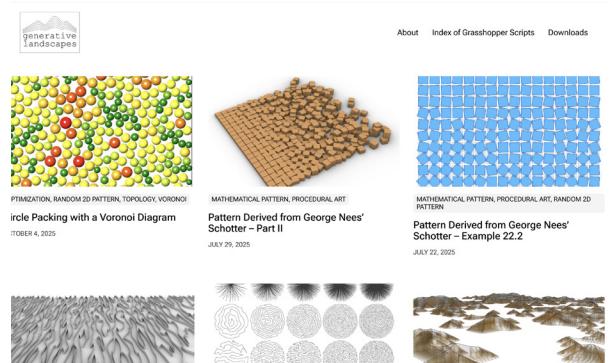
## TOPOGRAPHY



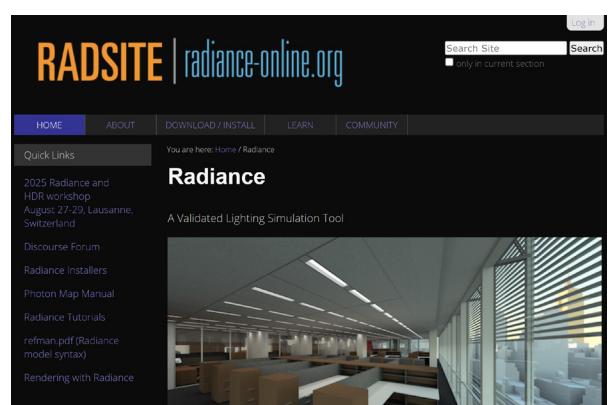
## OPEN STREET MAP



## TERRAIN/LANDSCAPES



## DAYLIGHTING



<https://www.radiance-online.org/>

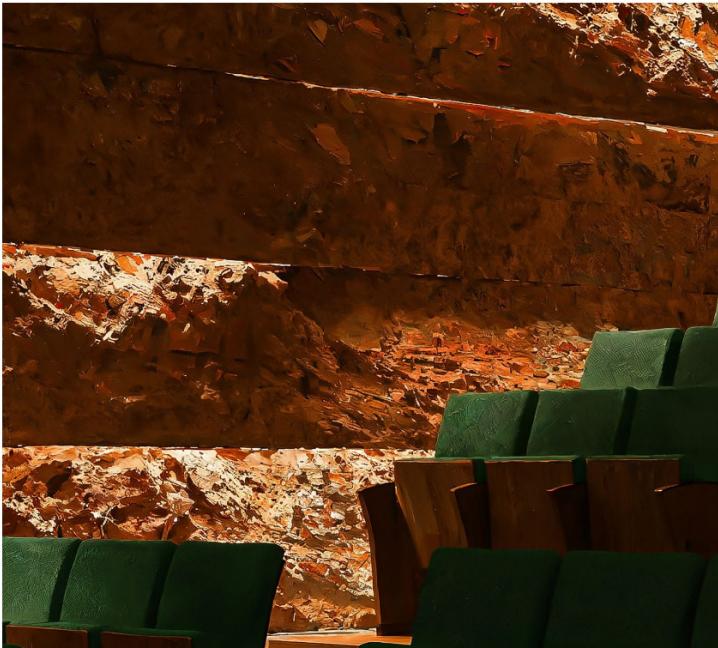
ADDITIONAL EXPLORATIONS

INSPIRATION

AMAZING RENDERS



**Mir means peace.  
We make renders of architecture and landscapes.**



THE 3RD AND THE 7TH

