

METATOOL

IS A CRITICAL + TECHNOLOGICAL PROJECT
ABOUT CREATING EXPERIMENTAL DESIGN TOOLS
USING GRASSHOPPER AS A METATOOL:
A TOOL THAT ENABLES THE FORGING OF OTHER TOOLS.

DISCUSS THE PHILOSOPHY/THEORY OF PROSTHESES/BODIES/TOOLS.
DISCARD THE SPLIT BETWEEN ANALYSIS AND DESIGN.
ASSEMBLE YOUR OWN CRITICAL TOOLKIT.

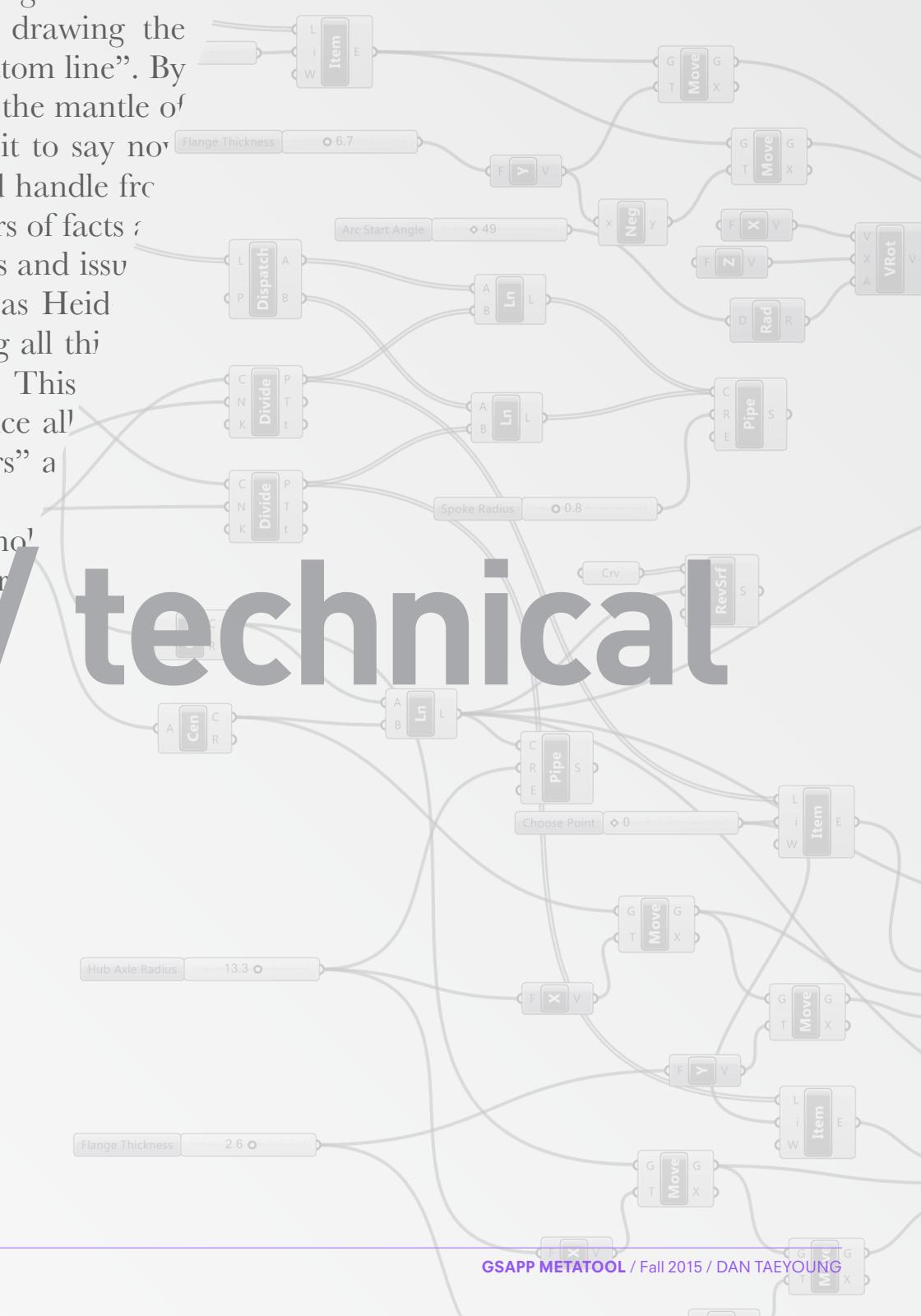
to hide behind the old protection of matters of fact. No designer will be
claim: "I am just stating what exists", or "I am simply drawing the
ences of the laws of nature", or "I am simply reading the bottom line". By
g design so that it is relevant everywhere, designers take up the mantle of
as well. I will come back to this in the conclusion: suffice it to say no
normative dimension that is intrinsic to design offers a good handle for
extend the question of design to politics. A politics of matters of facts
has always seemed far fetched; a politics of designed things and issues
more obvious. If things, or rather *Dinge*, are gatherings, as Heidegger
define them, then it is a short step from there to considering all the
of an activity called "collaborative design" in Scandinavia. This
the very definition of the politics of matters of concern since all
laborative" designs – even if in some cases the "collaborators" are
welcomed or willing.

l parenthesis on our two disciplines: when science and scholars began to revisit the old materialist traditions some would deeply transform objects into projects. They took into what was defined as mere “material constituents”; the form versus function argument; transformed matter and contradictory assemblies of conflicting humans and demonstrated that “artefacts have politics” and that could be assembled. But because of the word “co” in the infamous expression “social construction”), the modernist opposition between what was social, symbolic was material, real, objective and factual. No matter to escape the trap that the modernist constitutive inquiries, science and technology studies has things have looked better had we talked of “construction”? I doubt it). The trap has been nearly that is, so long as we remained officially g to me in that in the spread of design, this crazing transformations as my own field. STS a small subfield of social (alas, alas, so sociable support of a much larger movem



to hide behind the old protection of matters of fact. No designer will be claim: “I am just stating what exists”, or “I am simply drawing the consequences of the laws of nature”, or “I am simply reading the bottom line”. By making design so that it is relevant everywhere, designers take up the mantle of responsibility as well. I will come back to this in the conclusion: suffice it to say now that the normative dimension that is intrinsic to design offers a good handle from which to extend the question of design to politics. A politics of matters of facts has always seemed far fetched; a politics of designed things and issues is more obvious. If things, or rather *Dinge*, are gatherings, as Heidegger defines them, then it is a short step from there to considering all the things of an activity called “collaborative design” in Scandinavia. This is the very definition of the politics of matters of concern since all “collaborative” designs – even if in some cases the “collaborators” are not welcomed or willing.

In parenthesis on our two disciplines: when science and technology scholars began to revisit the old materialist traditions some forty years ago, they would deeply transform the object into projects. They took into account what was described as more “material components”; they transformed the form versus function argument; transformed matter and meaning; and contradictory assemblies of conflicting humans and objects. They had demonstrated that “artefacts have politics” and that what could be assembled. But because of the word “construction” (as in the infamous expression “social construction”), they maintained the modernist opposition between what was social, symbolic and what was material, real, objective and factual. No matter how hard one tries to escape the trap that the modernist constitutive model of social inquiries, science and technology studies has been, things have looked better had we talked of “social construction”? I doubt it). The trap has been never so tight that is, so long as we remained officially committed to me in that in the spread of design, this is the most dazzling transformations as my own field. STS is a small subfield of social (alas, alas, so sociable) support of a much larger movement.



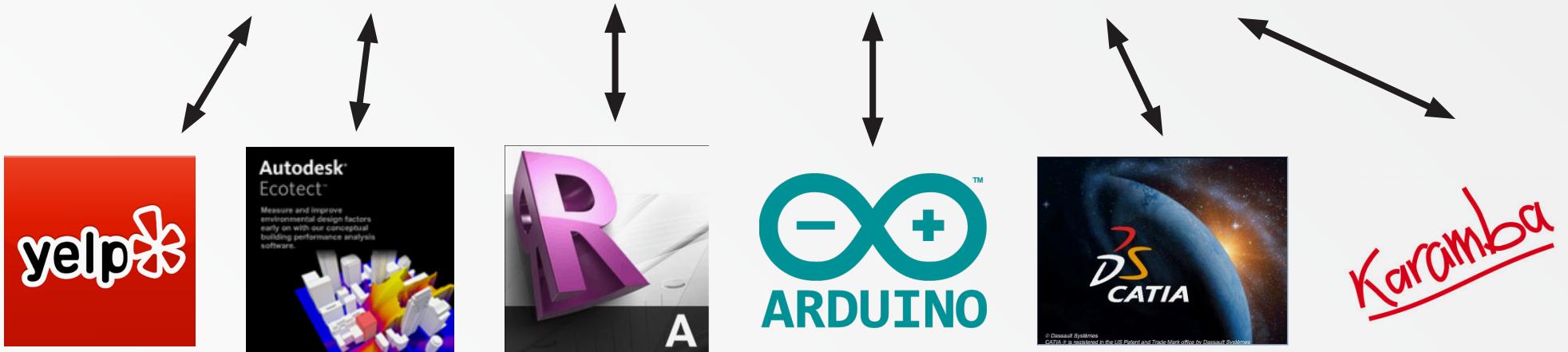
Bruno Latour, “Visualisation and Cognition: Drawing Things Together”
Mark Hansen, Bodies in Code: Interfaces with Digital Media
Graham Harman, Tool-Being: Heidegger and the Metaphysics of Objects
Deleuze and Guattari, Introduction to A Thousand Plateaus
Christopher Alexander, ‘Systems Generating Systems’
Marshall McLuhan, The Medium is the Message

to hide behind the old protection of matters of fact. No designer will be
 claim: "I am just stating what exists", or "I am simply drawing the
 consequences of the laws of nature", or "I am simply reading the bottom line". By
 doing design so that it is relevant everywhere, designers take up the mantle of
 politics as well. I will come back to this in the conclusion: suffice it to say now
 that the normative dimension that is intrinsic to design offers a good handle from
 which to extend the question of design to politics. A politics of matters of facts?
 This has always seemed far fetched; a politics of designed things and issues?
 This is more obvious. If things, or rather *Dinge*, are gatherings, as Heidegger
 defines them, then it is a short step from there to considering all the
 consequences of an activity called "collaborative design" in Scandinavia. This
 is also the very definition of the politics of matters of concern since all
 "collaborative" designs – even if in some cases the "collaborators" are
 welcomed or willing.

In parenthesis on our two disciplines: when science and technology scholars began to revisit the old materialist traditions some forty years ago, they would deeply transform the object into projects. They took into account what was described as more "material components": the form versus function argument; transformed matter into contradictory assemblies of conflicting humans and objects. It had demonstrated that "artefacts have politics" and that they could be assembled. But because of the word "construction" (as in the infamous expression "social construction"), the modernist opposition between what was social, symbolic and what was material, real, objective and factual. No matter how hard one tries to escape the trap that the modernist constitutive model of social inquiries, science and technology studies has been, things have looked better had we talked of "social construction"? I doubt it). The trap has been necessary, that is, so long as we remained officially committed to me in that in the spread of design, this is the most interesting transformations as my own field. STS is a small subfield of social (alas, alas, so sociable) support of a much larger movement.





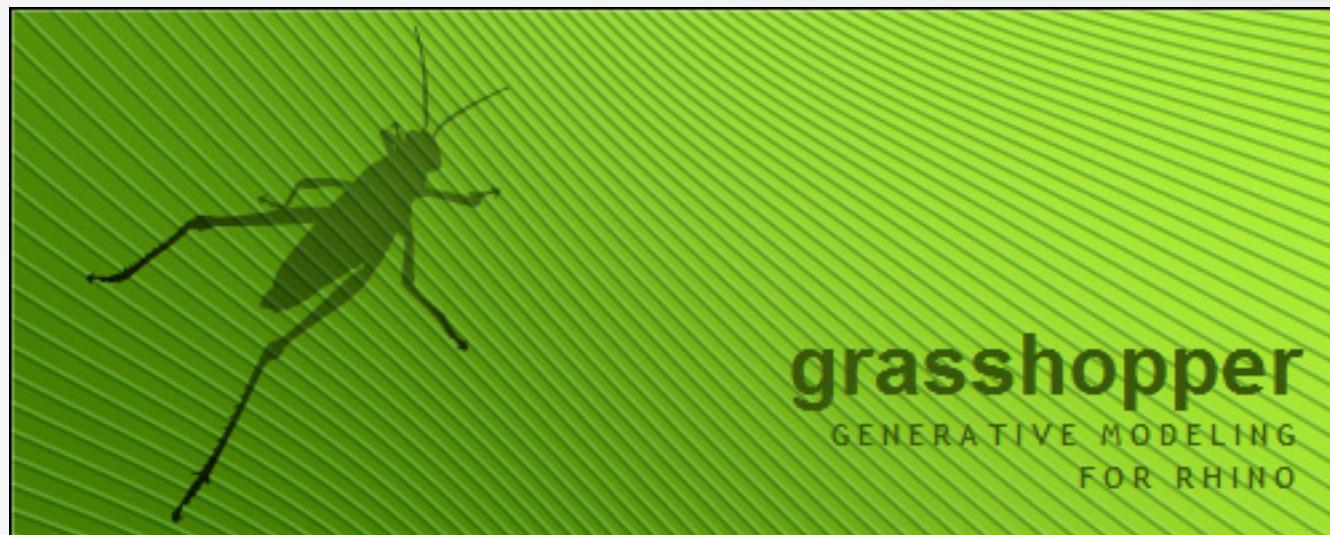




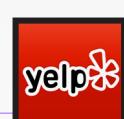
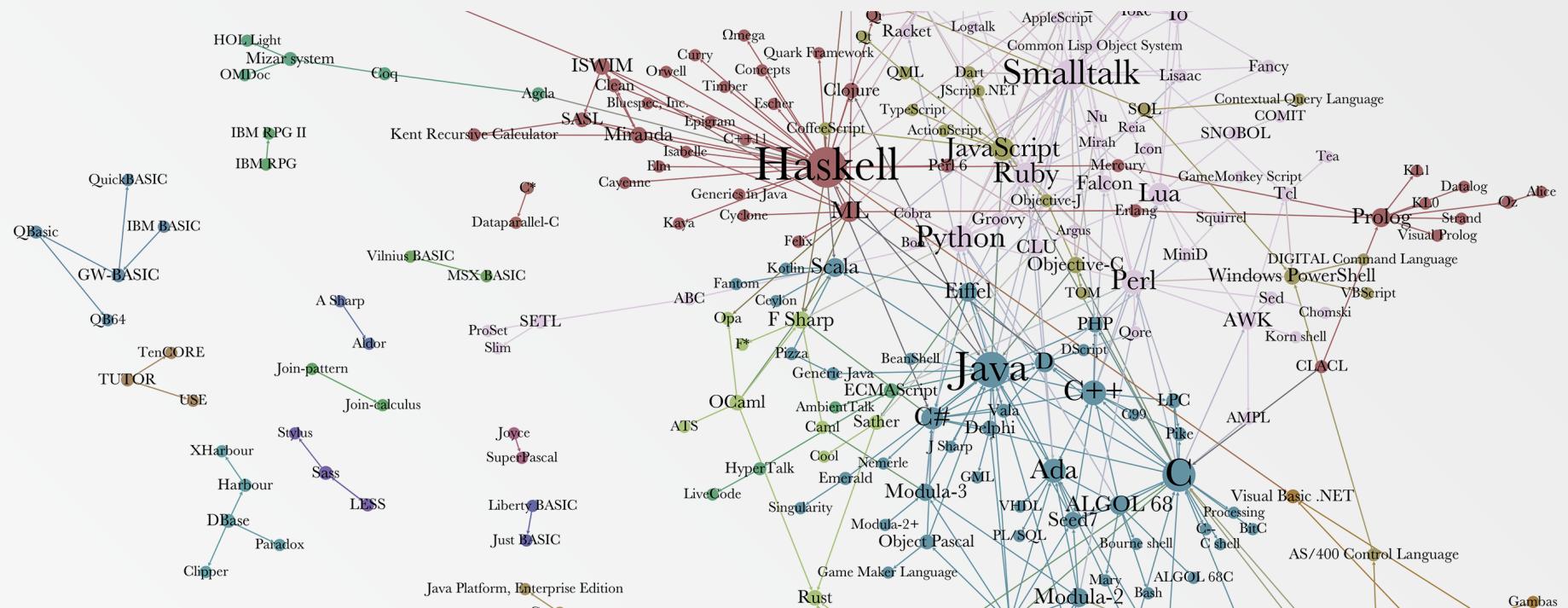
python™



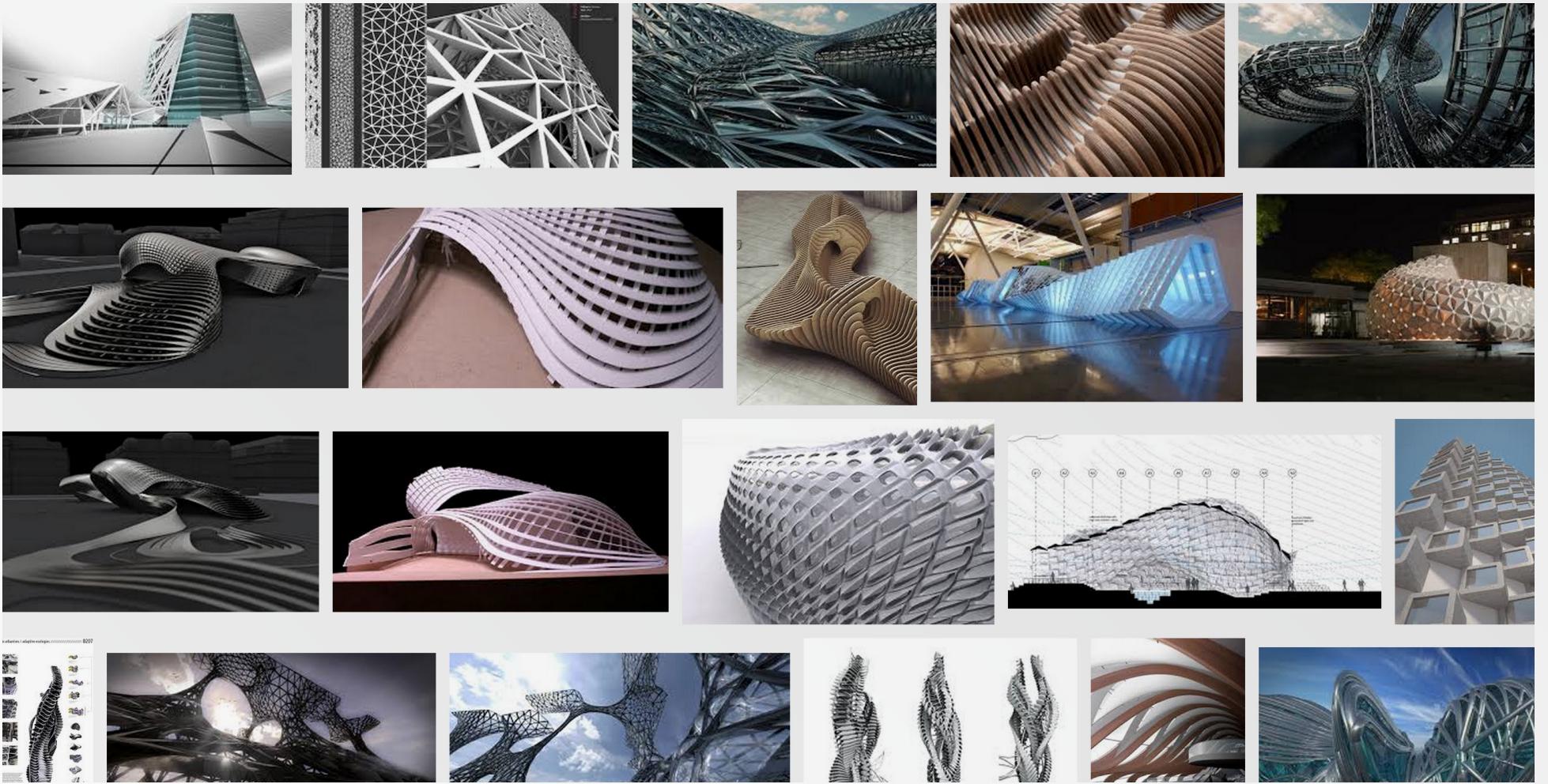
C# Microsoft® Visual Studio®



Karamba



METATOOL



LET'S TALK PARAMETRICS

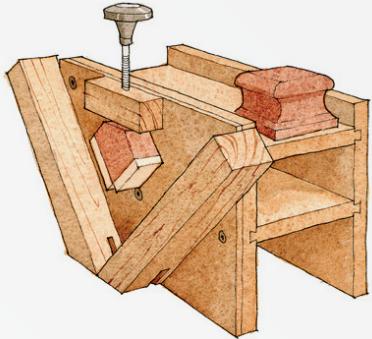
Q.

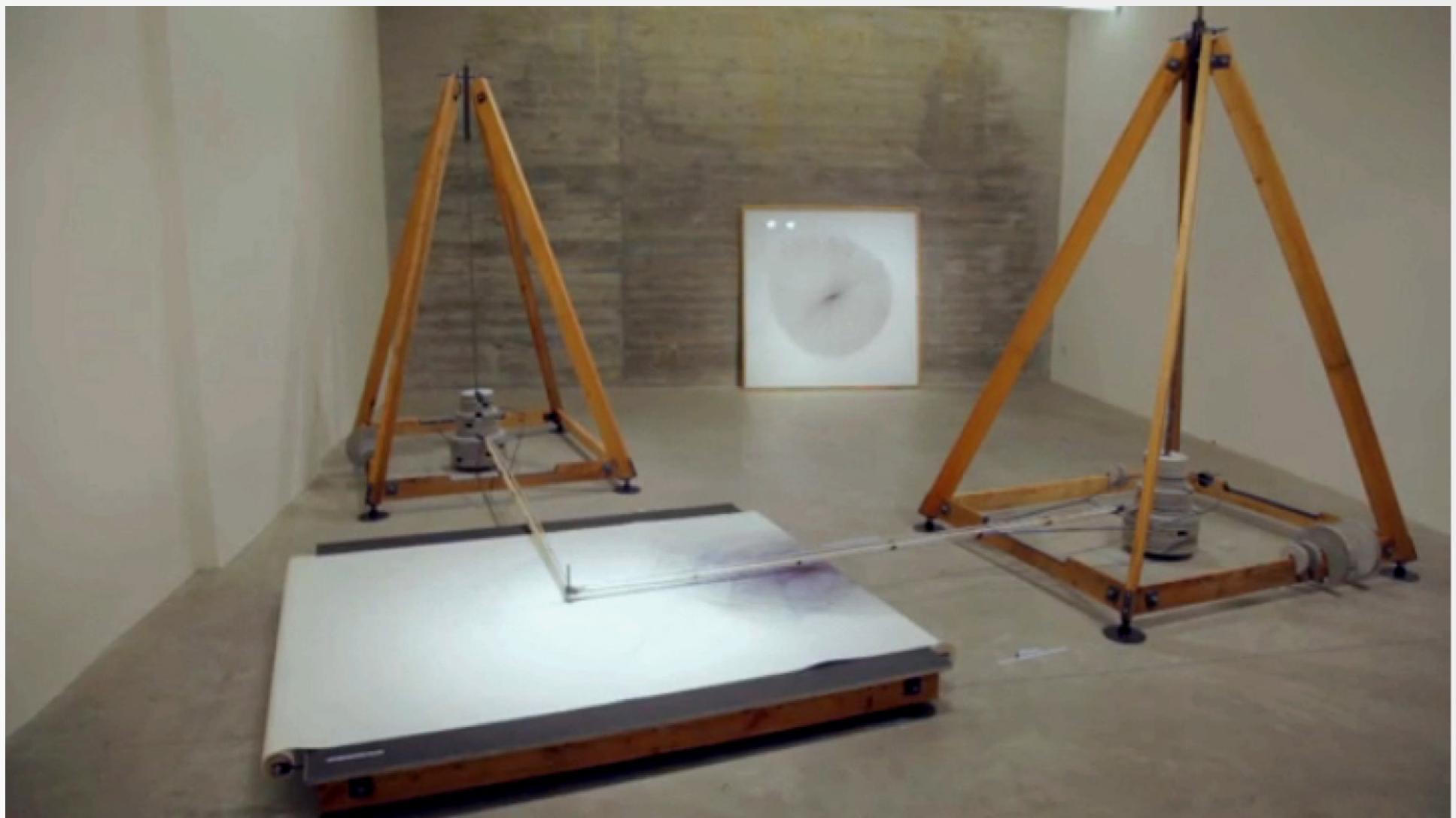
**HOW SHOULD ARCHITECTURE + COMPUTATION
BE INTEGRATED INTO DESIGN PROCESSES?**

THESIS:

**Architects should not only be able to *use* tools,
but should have the ability
to *design* new critical / experimental design tools.**

WHAT IS A TOOL?

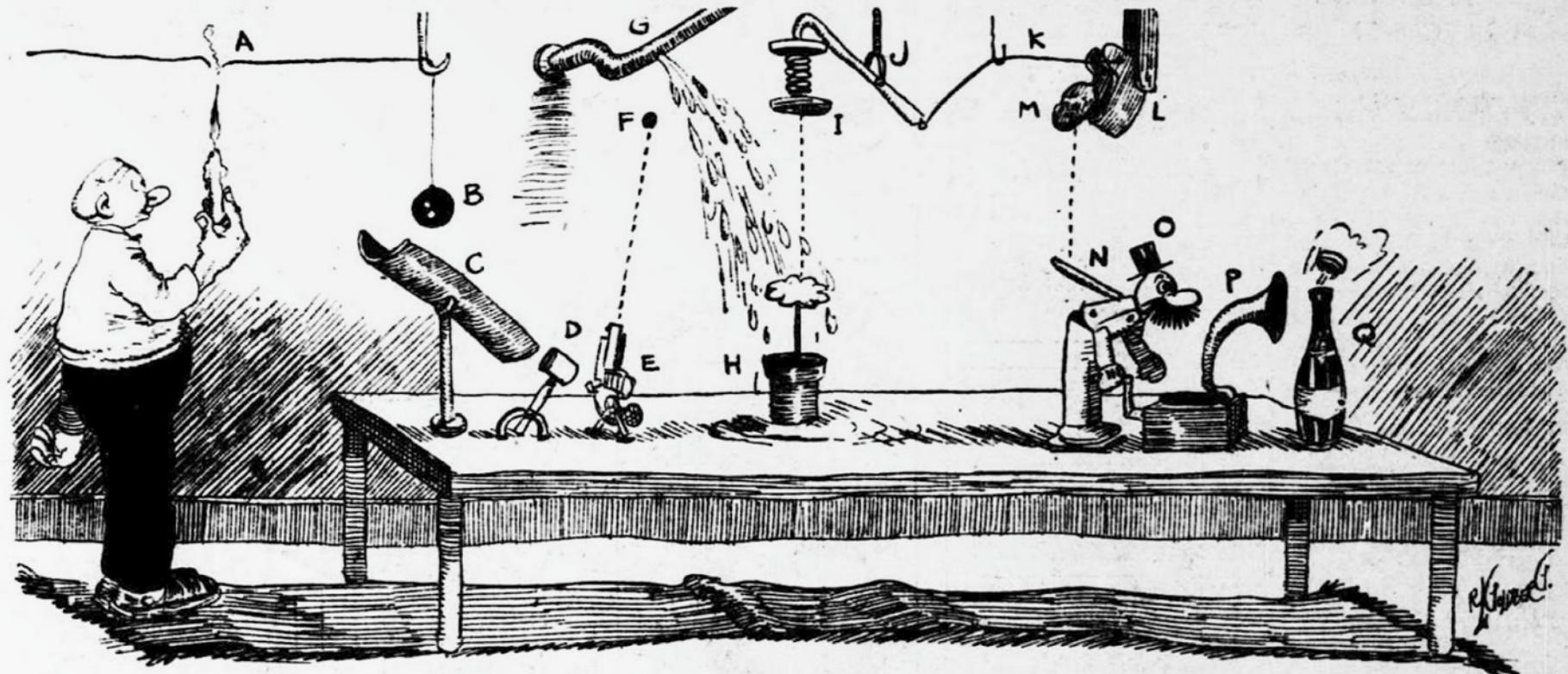




GREAT DISCOVERY (

HOW TO OPEN A BOTTLE OF BEER WITHOUT AN
OPENER.

) By Goldberg



HOLD LIGHTED CANDLE UNDER STRING (A) - STRING BURNS, RELEASES BALL(B) WHICH ROLLS DOWN TROUGH (C) AND KNOCKS HAMMER (D) AGAINST TRIGGER OF PISTOL (E) - BULLET (F) MAKES HOLE IN PIPE (G) RELEASING STREAM OF WATER WHICH FALLS ON PLANT (H) - PLANT GROWS UNTIL IT PRESSES UPWARD AGAINST SPRING (I) - LEVER (J) PULLS STRING (K) WHICH UPSETS SHELF (L) HOLDING POTATO (M) - POTATO FALLS ON HANDLE (N) WHICH STARTS DOLL (O) WINDING PHONOGRAPH (P) - PHONOGRAPH SAYS, IN A FEMALE VOICE "GOOD EVENING, BEER" - THE BOTTLE OF BEER, BEING POLITE, NATURALLY TAKES OFF ITS HAT - AND THERE YOU ARE !





A tool is any device with a specific function









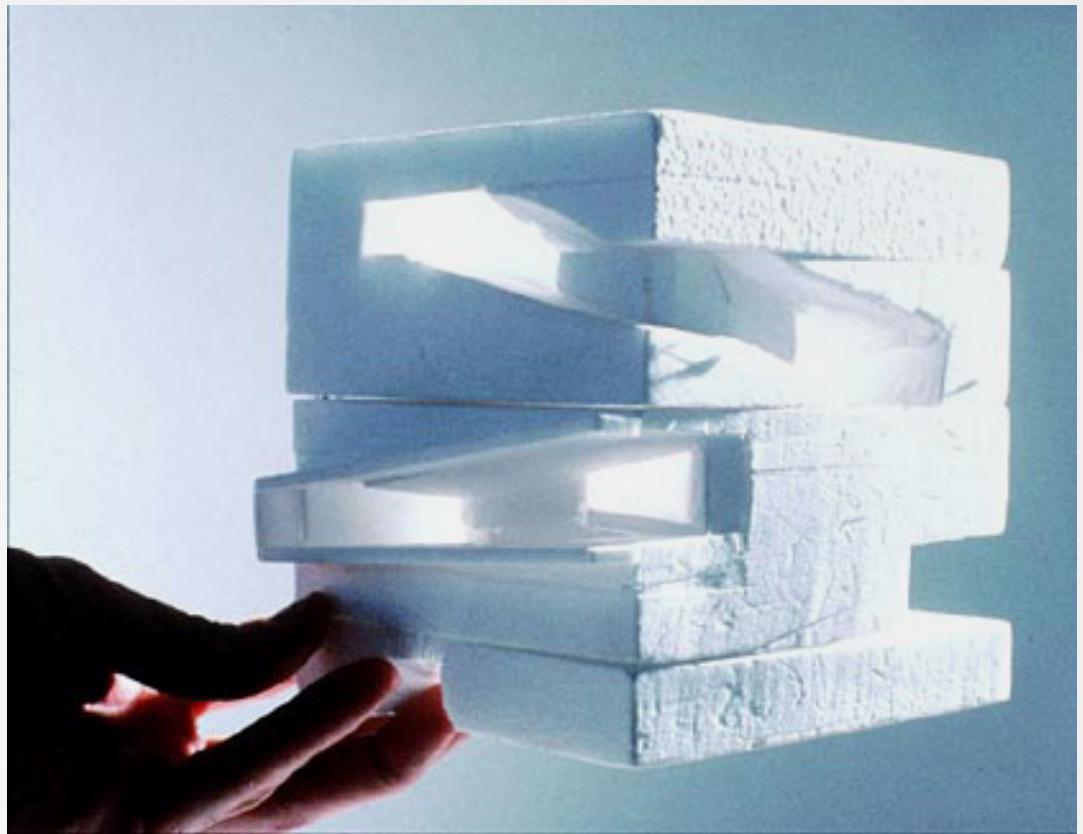








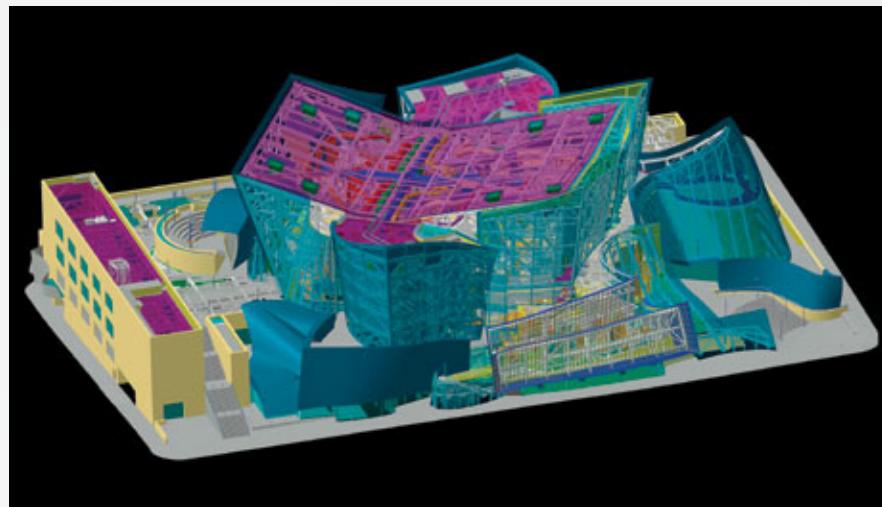


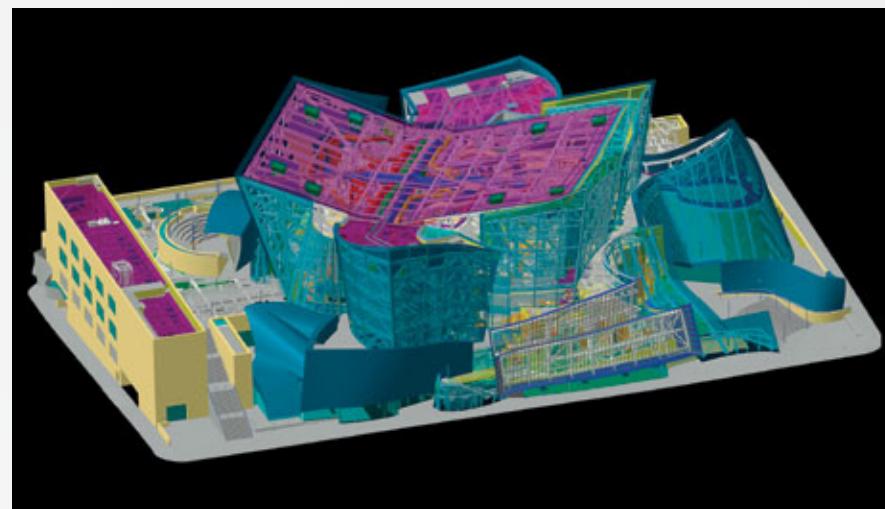






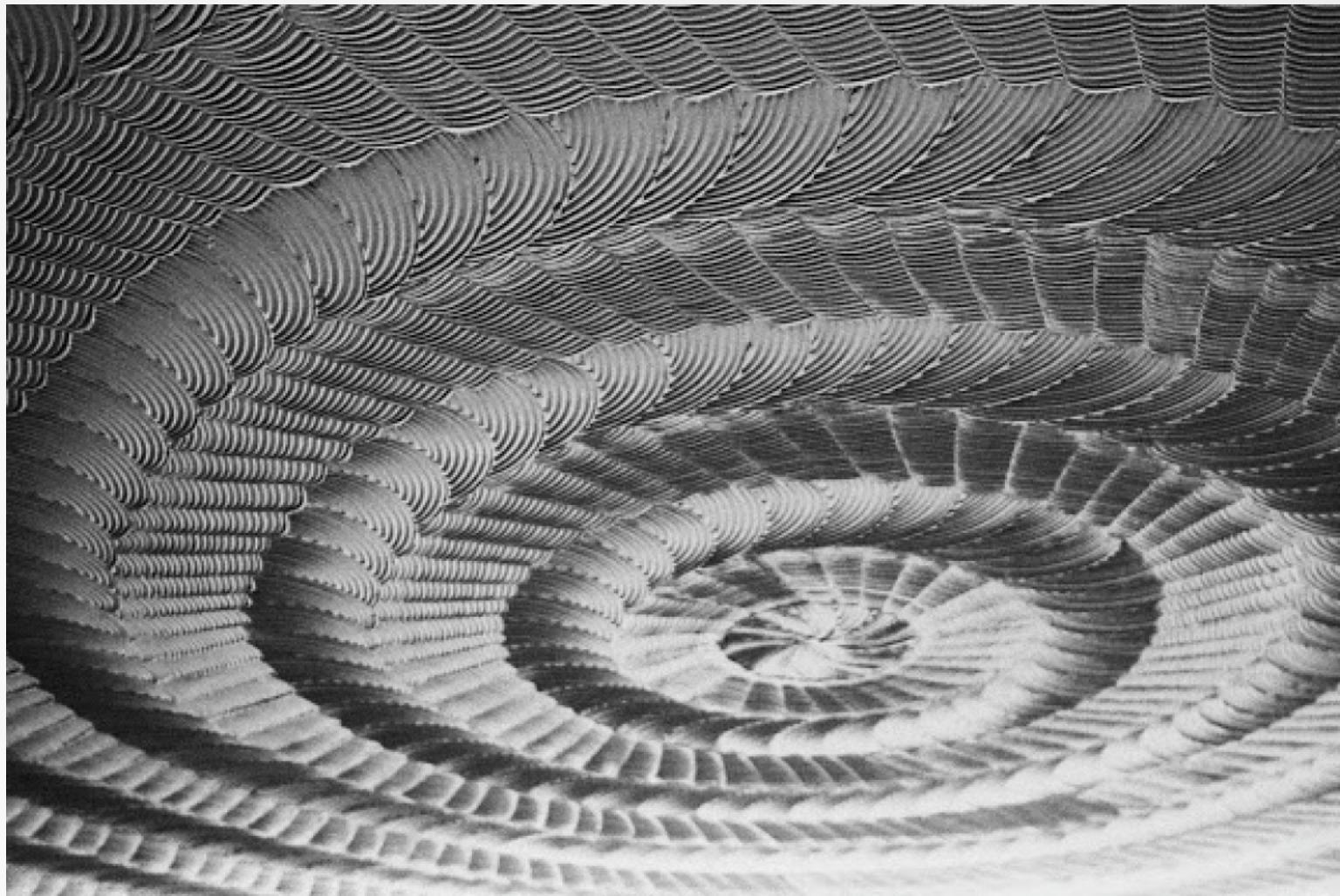
© Dassault Systèmes
CATIA is registered in the US Patent and Trade Mark office by Dassault Systèmes

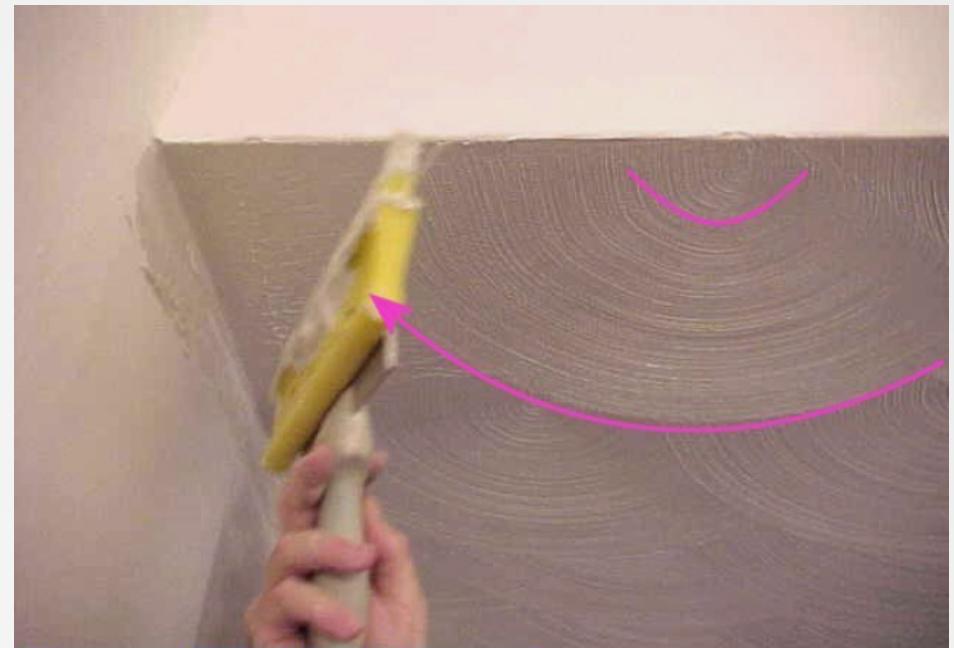




A tool is any device with a specific function

**A tool is any device with a specific function
that changes your mindset**







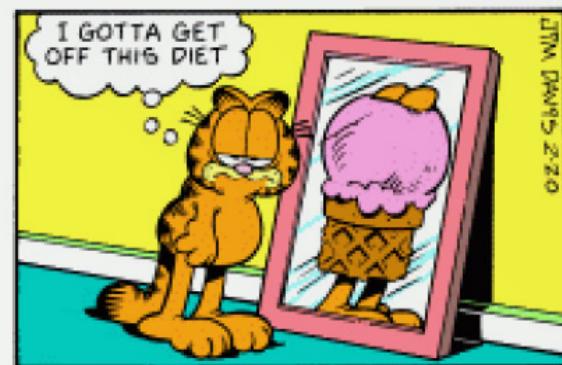
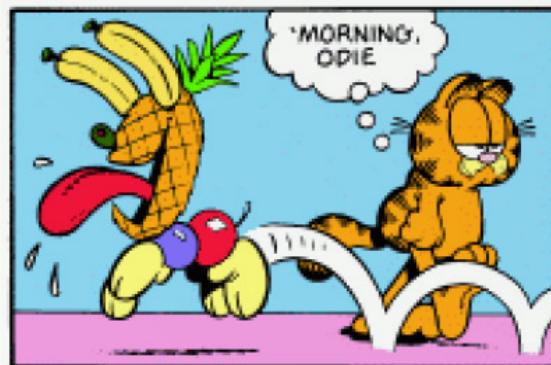
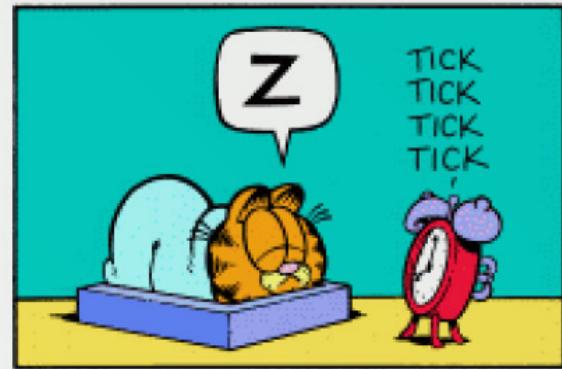


**The tools you have
influence your perception about the nature of objects**

“I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail.”

**— Abraham Maslow,
The Psychology of Science, 1956**

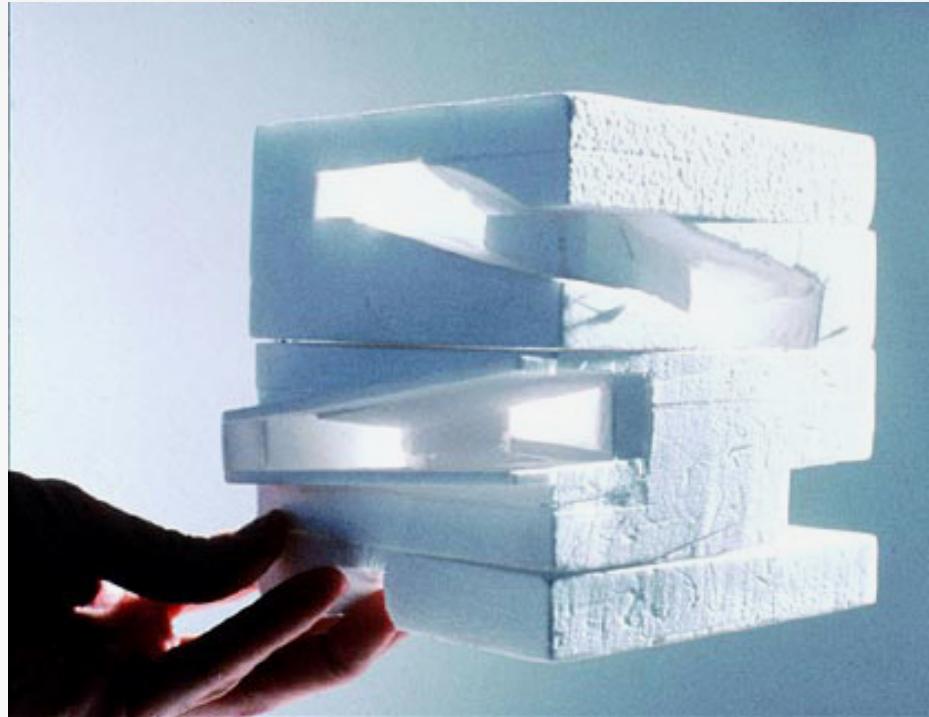
**“If all you have is a hammer,
everything looks like a nail.”**



**new tools generate new possibilities;
new possibilites generate a new mindset;
new mindset generates new designs**



certain tools



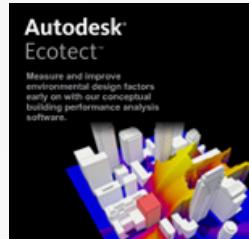
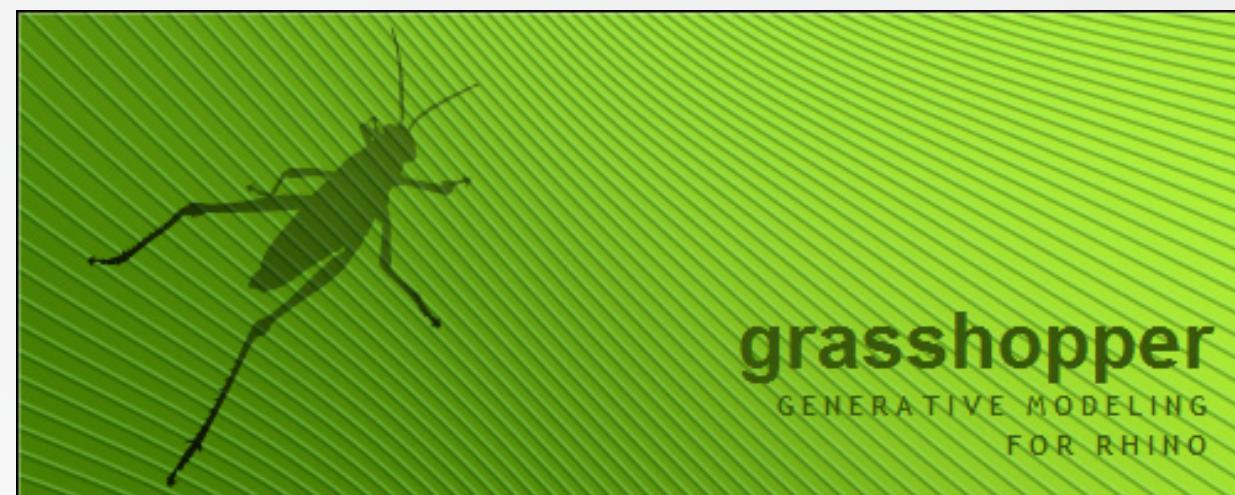
enable certain possibilities.



python™

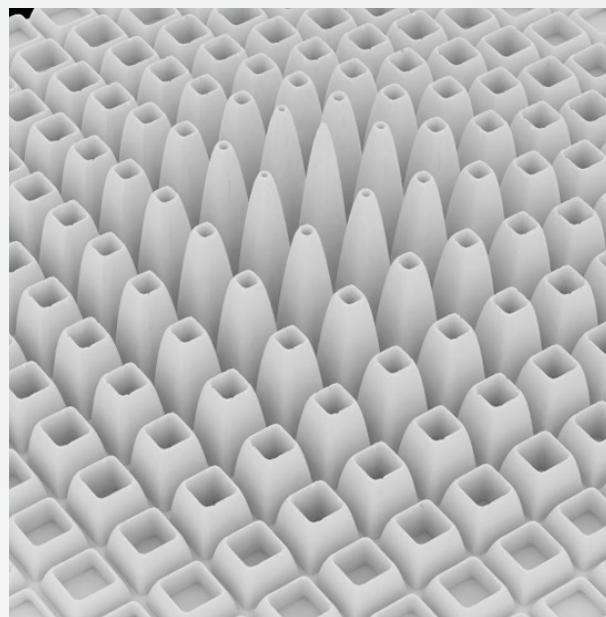
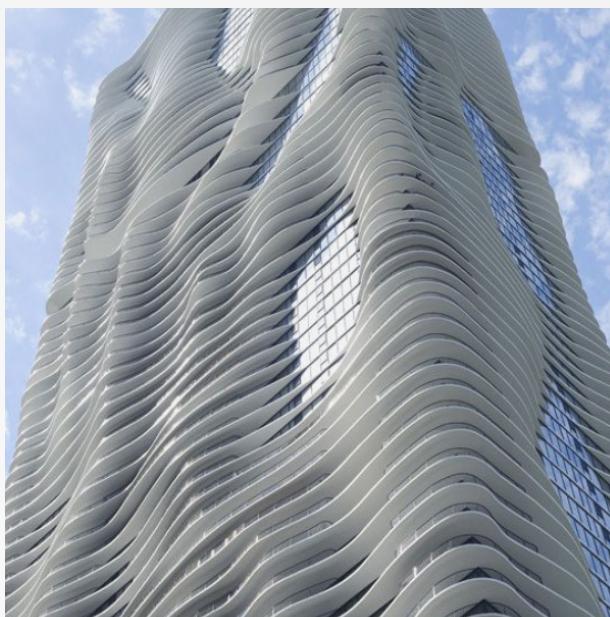
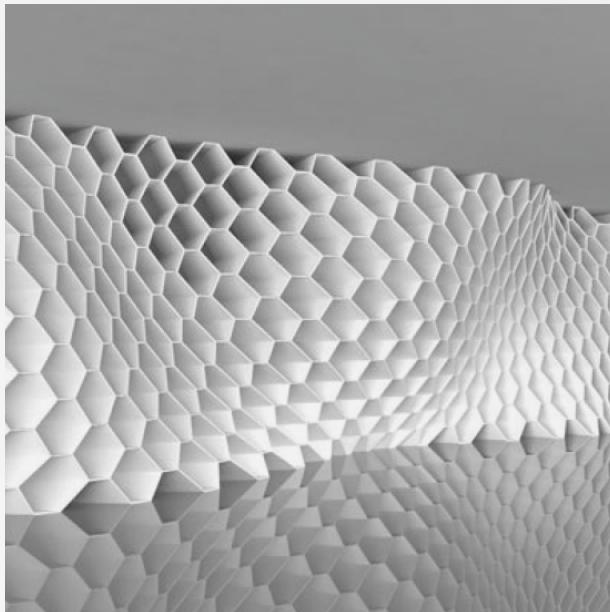


C# Microsoft® Visual Studio®



Karamba

Other tools



enable other possibilities.

users use tools, but

**users use tools, but
tools also influence, even define a user.**

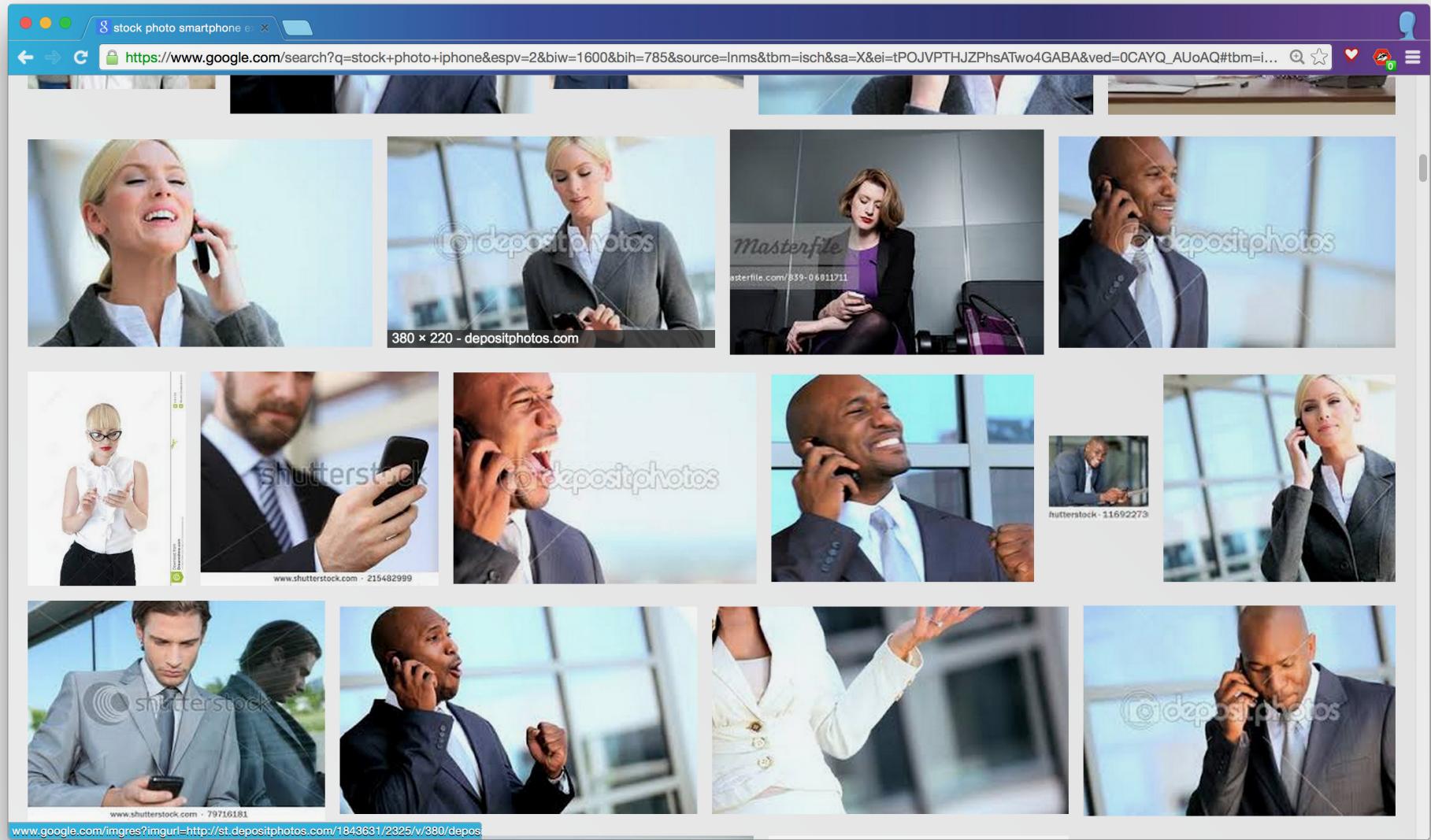
To try to philosophize about what it is to be “thrown into the world” without defining more precisely, more literally (Sloterdijk is first of all a literalist in his use of metaphors) the sort of envelopes into which humans are thrown, would be like trying to kick a cosmonaut into outer space without a spacesuit. Naked humans are as rare as naked cosmonauts. **To define humans is to define the envelopes, the life support systems, the *Umwelt* that make it possible for them to breathe.**

Bruno Latour, “A Cautious Prometheus? A Few Steps Toward a Philosophy of Design (with Special Attention to Peter Sloterdijk)”

Umwelt is the idea that because their senses pick up on different things, different animals in the same ecosystem actually live in very different worlds. Everything about you shapes the world you inhabit--from your ideology to your glasses prescription to your web browser.



an “astronaut” and a “superhero/supervillain” **are defined by their tools**, whether these tools are a space suit, or a special ability



these “executives” would perhaps be helpless without their cellphone, or email,
or the managerial structure of a company -
the “executive” is defined by a mix of social position and technology,
among other “tools”



**in other words,
the user uses the tool,
and the tool creates a mindset
that modifies the user.**

**artificial lighting / air conditioning / automobile / trains /
planes / clocks / computers / smartphones**

schedule \longleftrightarrow **clock?**

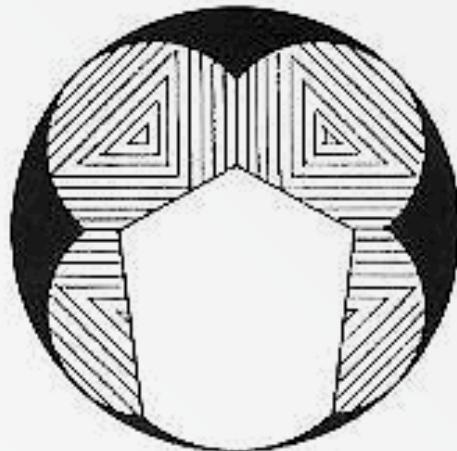
skyscraper \longleftrightarrow **artificial lighting + elevator + air conditioning?**



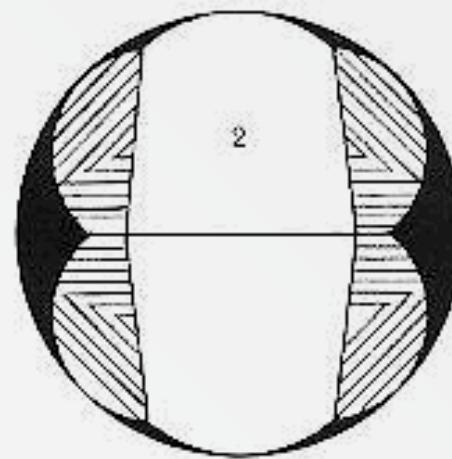
certain tools, then, actively induce certain possibilities

BOTTOM/ONDER

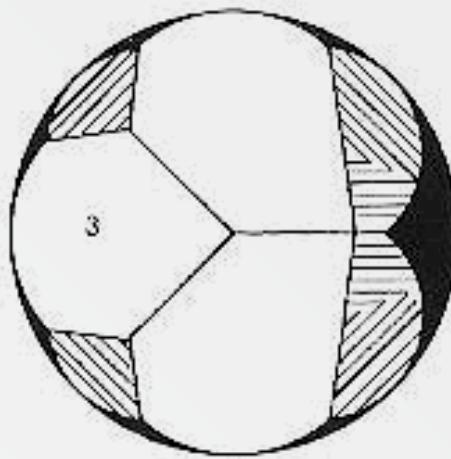
Bottom view



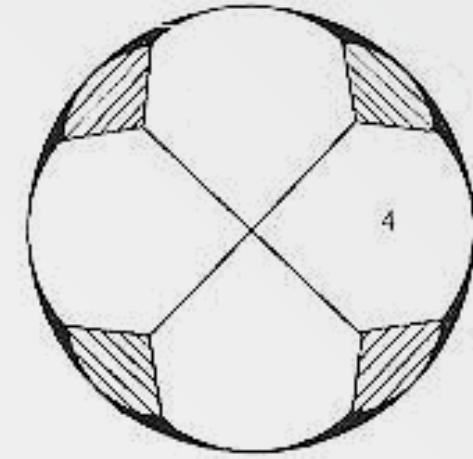
1st Corner



2nd Corner

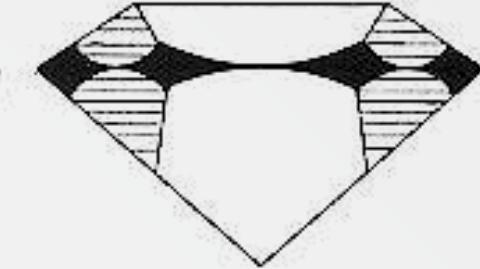
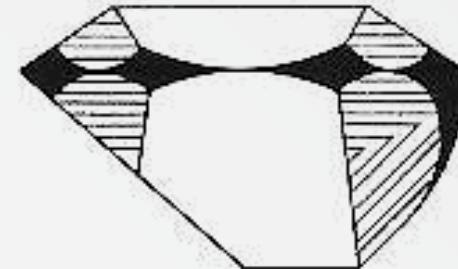
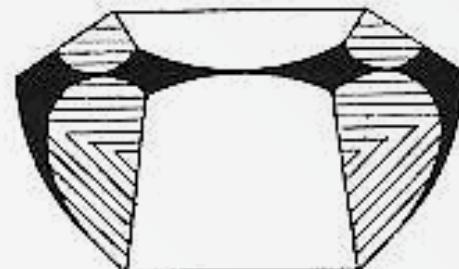
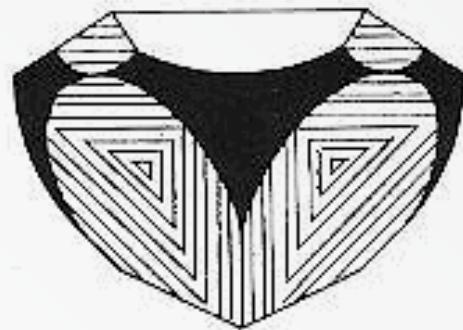


3rd Corner

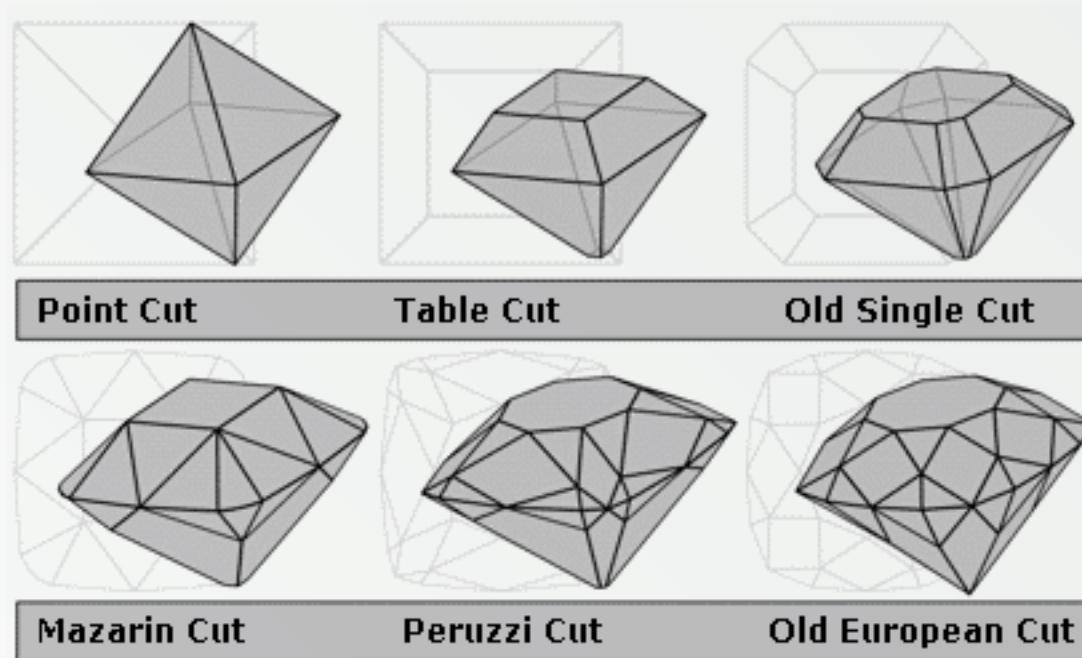
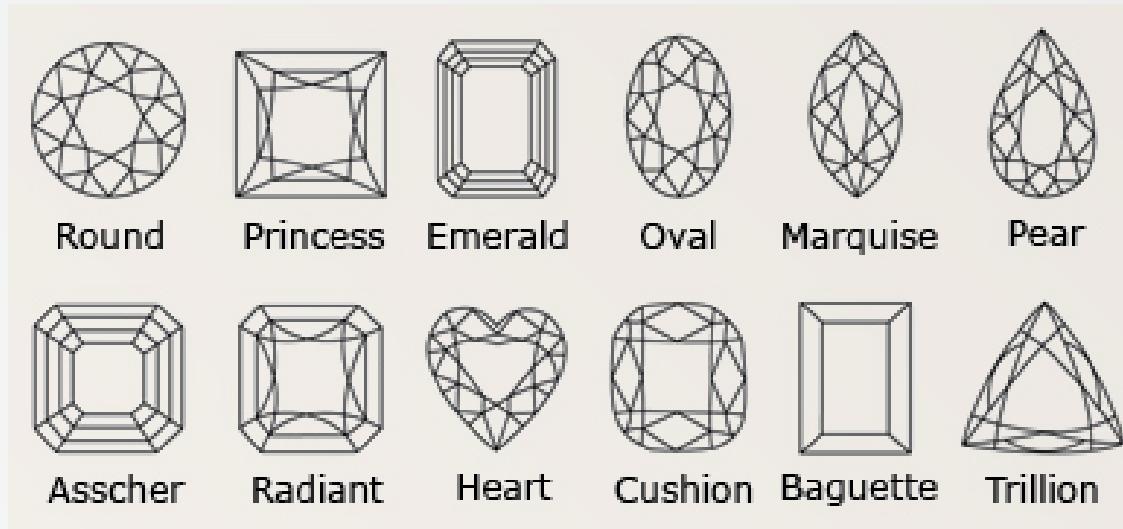


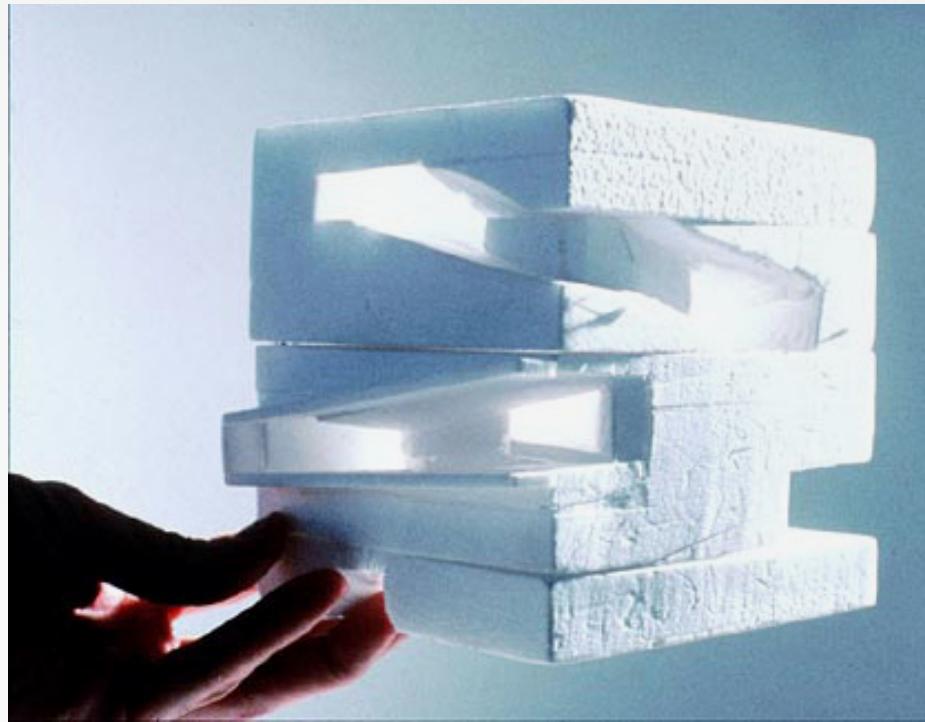
Last Corner

Side view

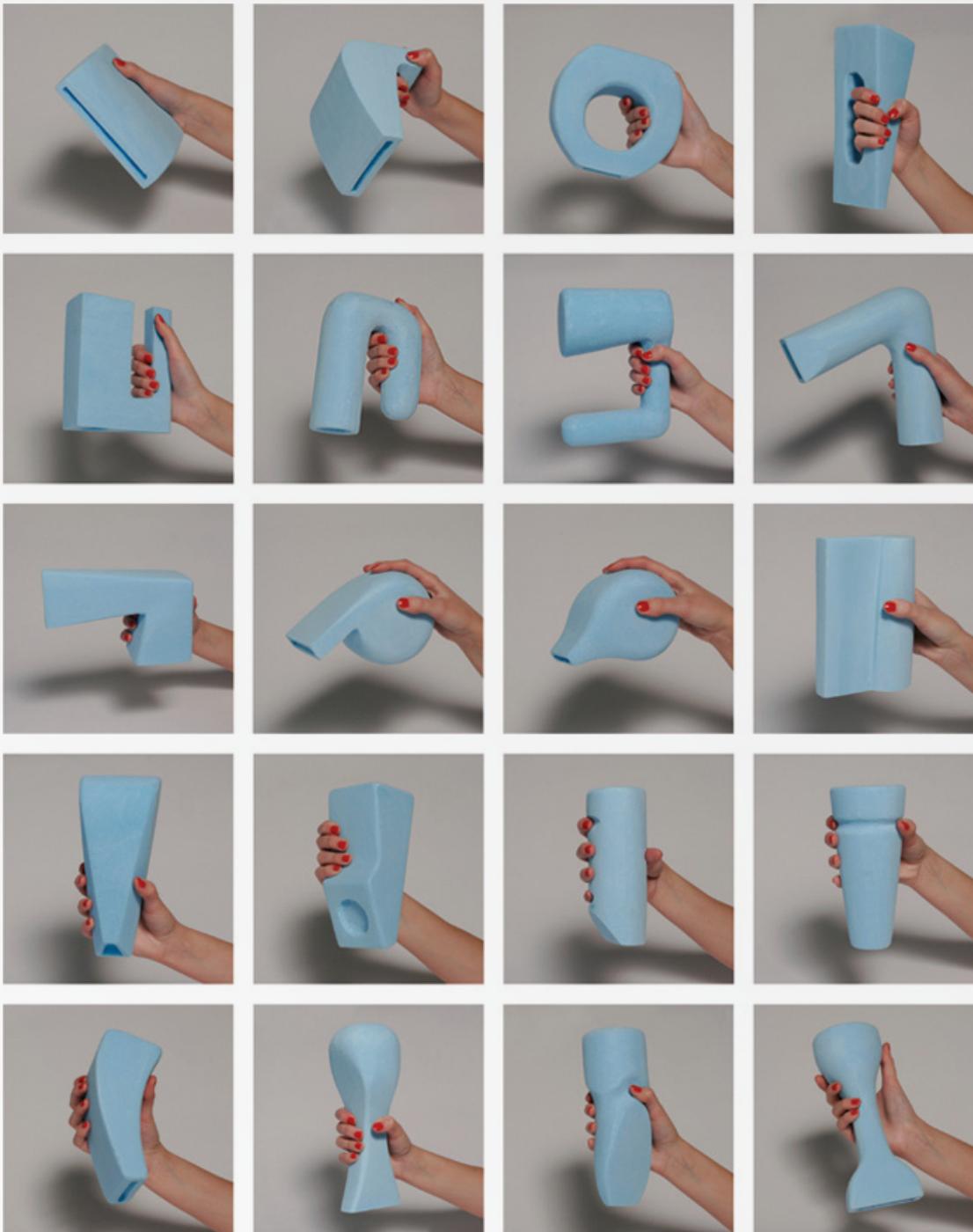


a tool that cuts a volume induces faceting, chamfering





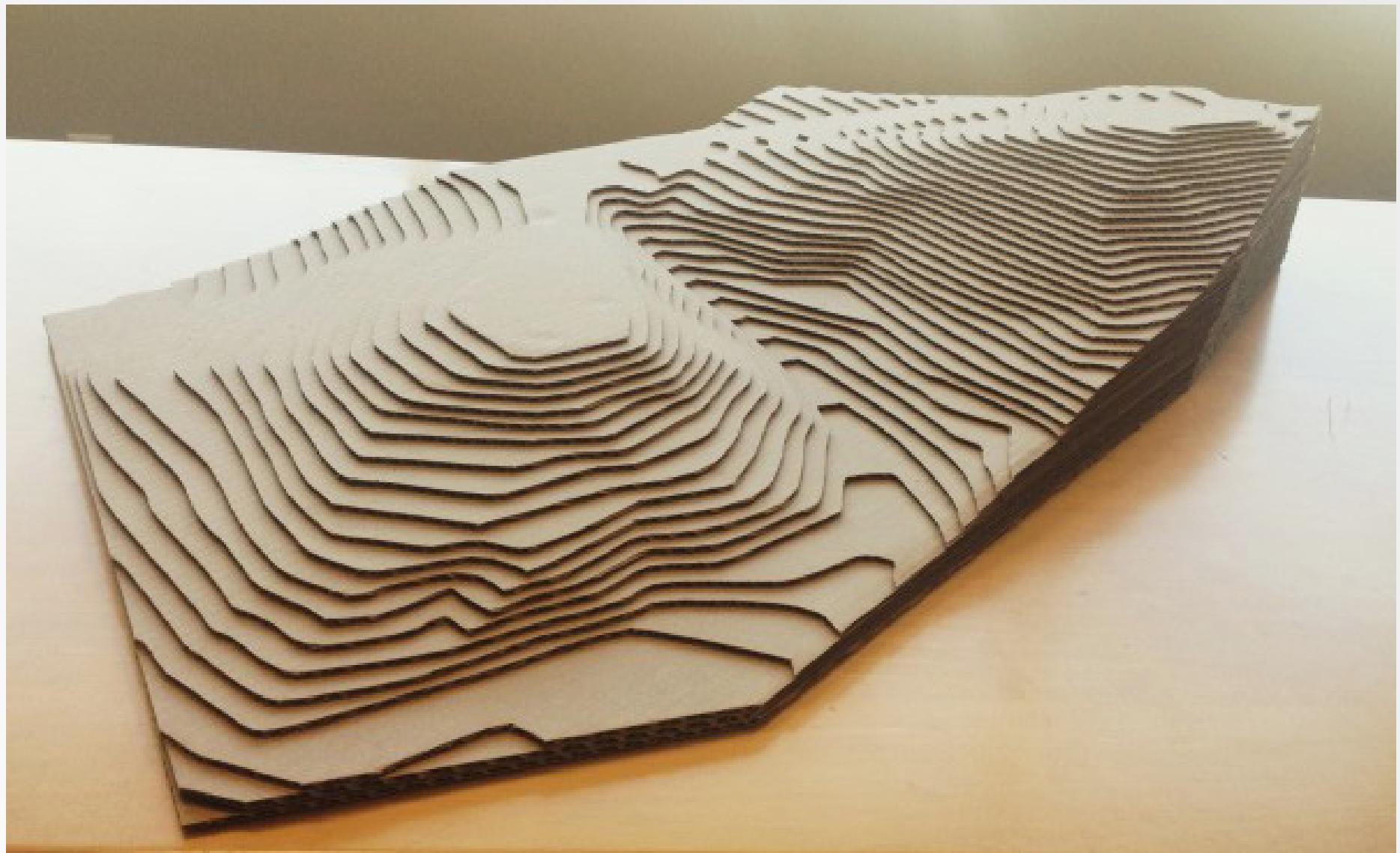
or deals mainly with blocky masses, filled volumes,



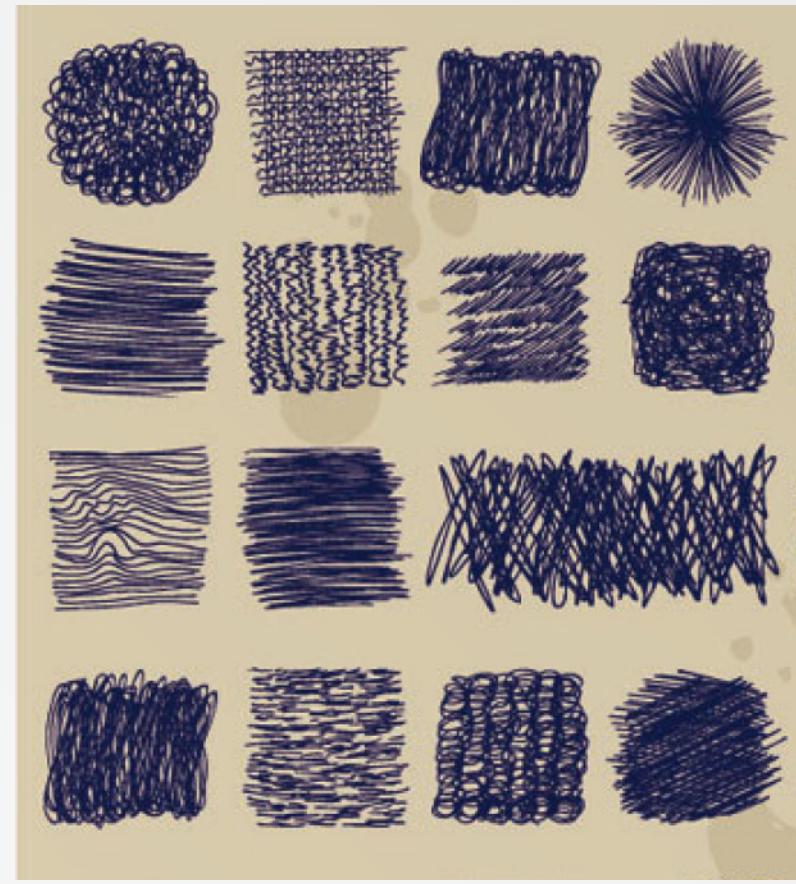
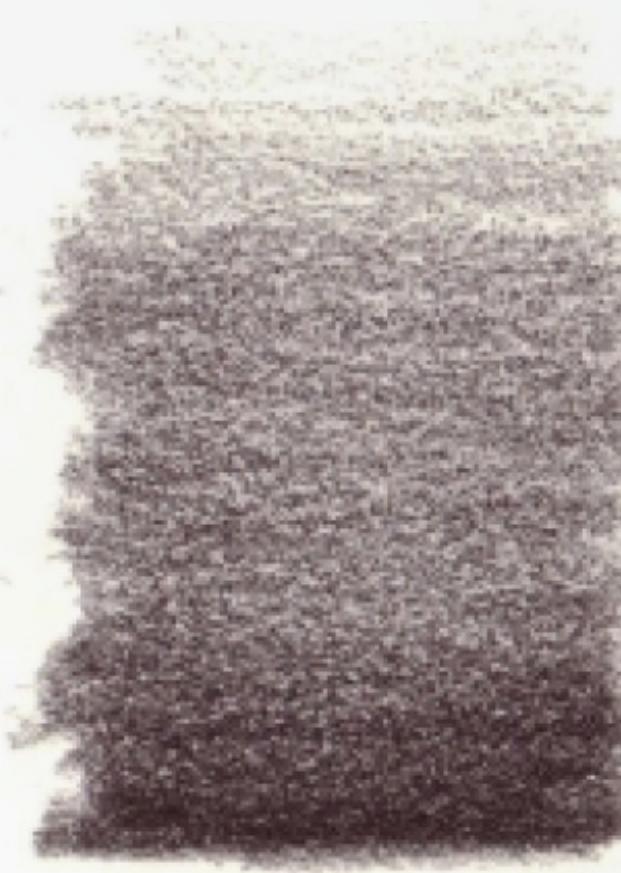


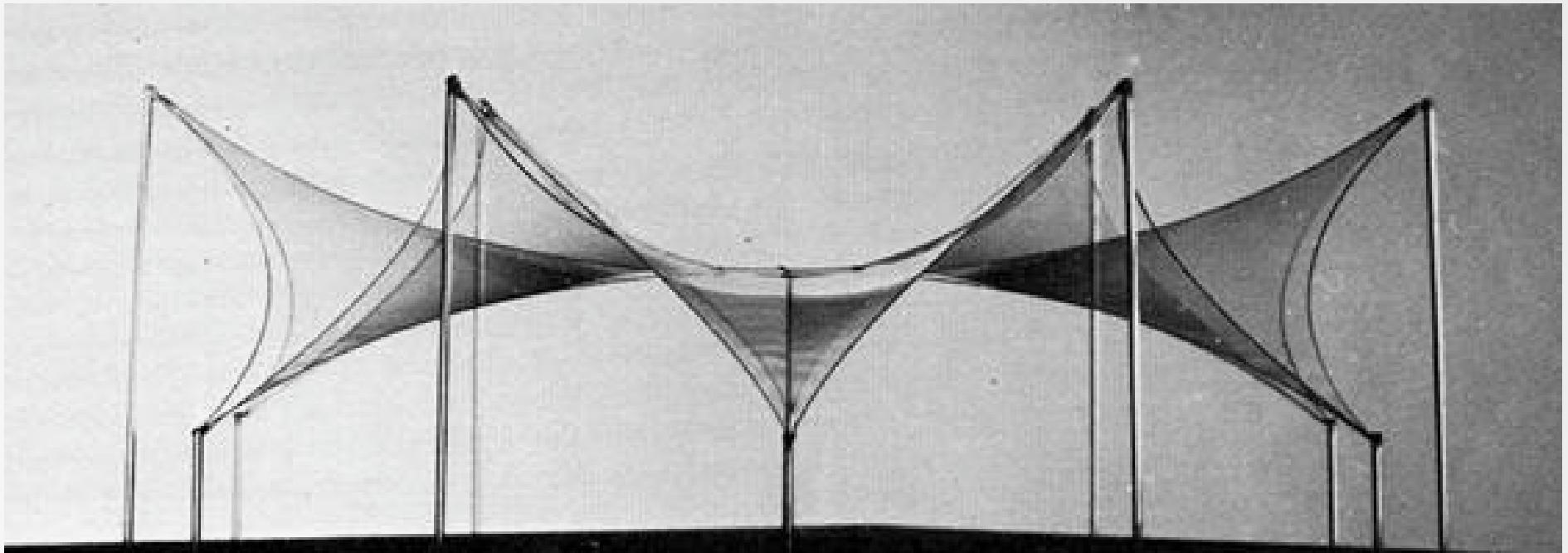
**other tools like chipboard induces architectural models made out
of voids, planes, surfaces**





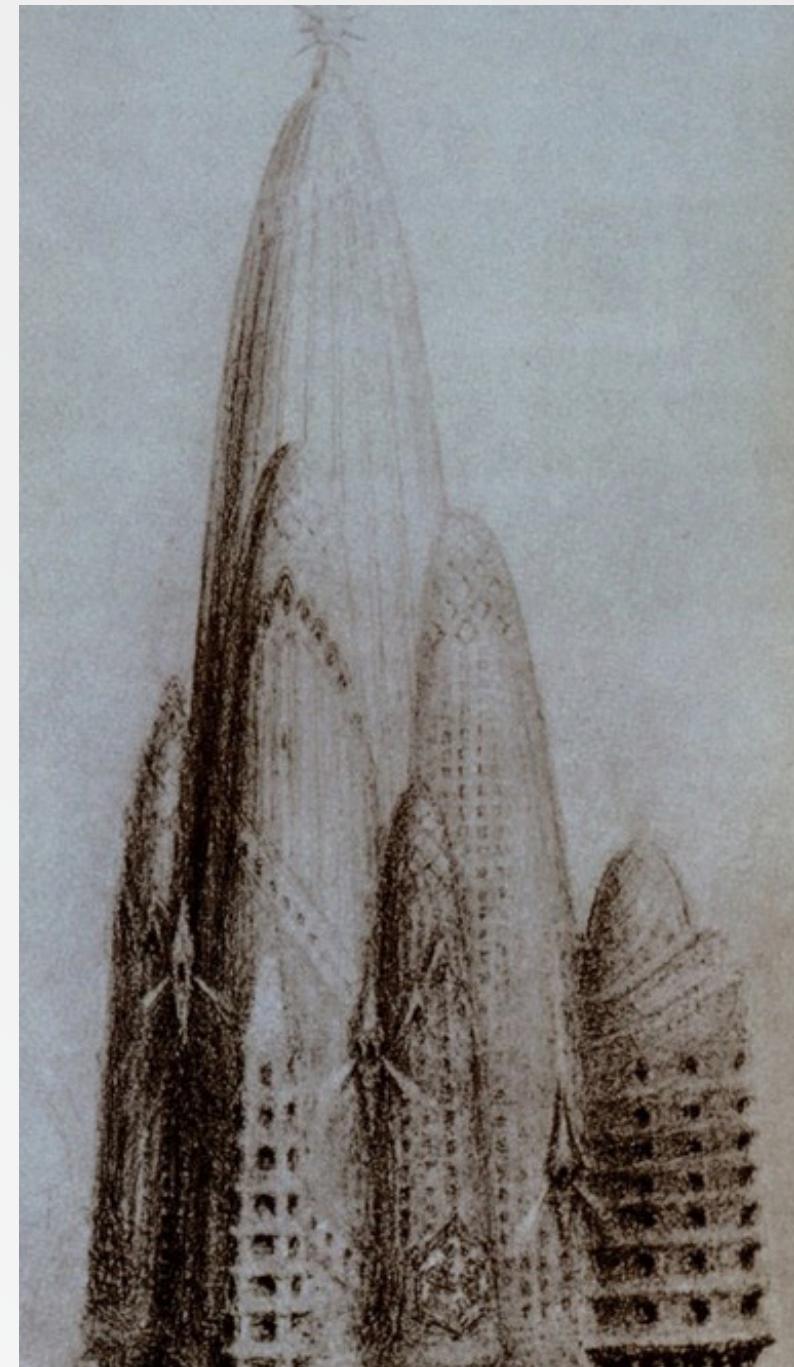
or induces layers, in the form of topographic site models, etc.





Frei Otto:
soap bubble ← → tensile membrane structures?

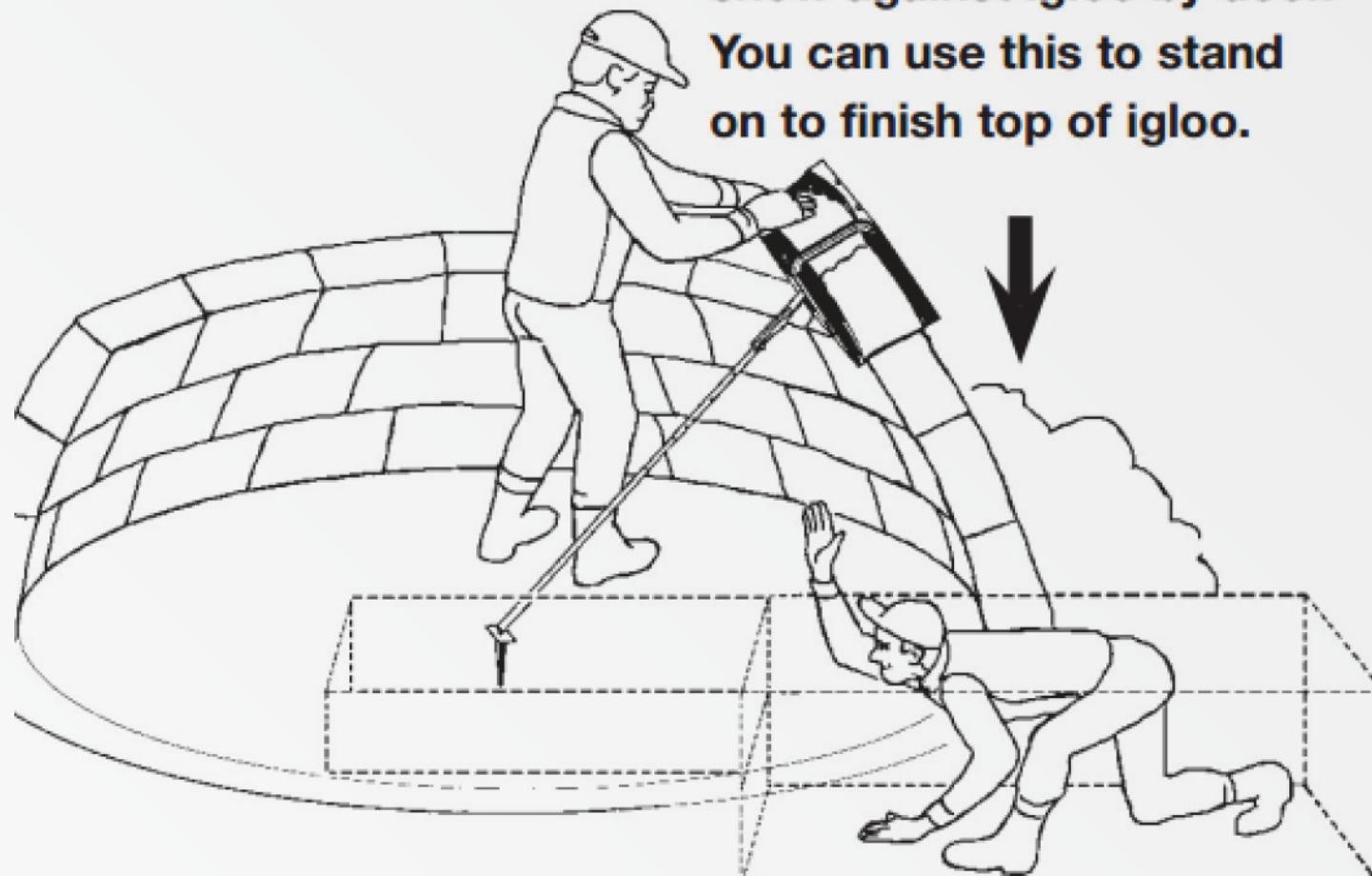




Gaudi used the catenary curve; the catenary curve influenced Gaudi



**When digging door, pile
snow against igloo by door.
You can use this to stand
on to finish top of igloo.**



**“I wasn’t planning on making an igloo this weekend,
but the tool made it so easy!”**



The tool almost literally changes the user's mindset:



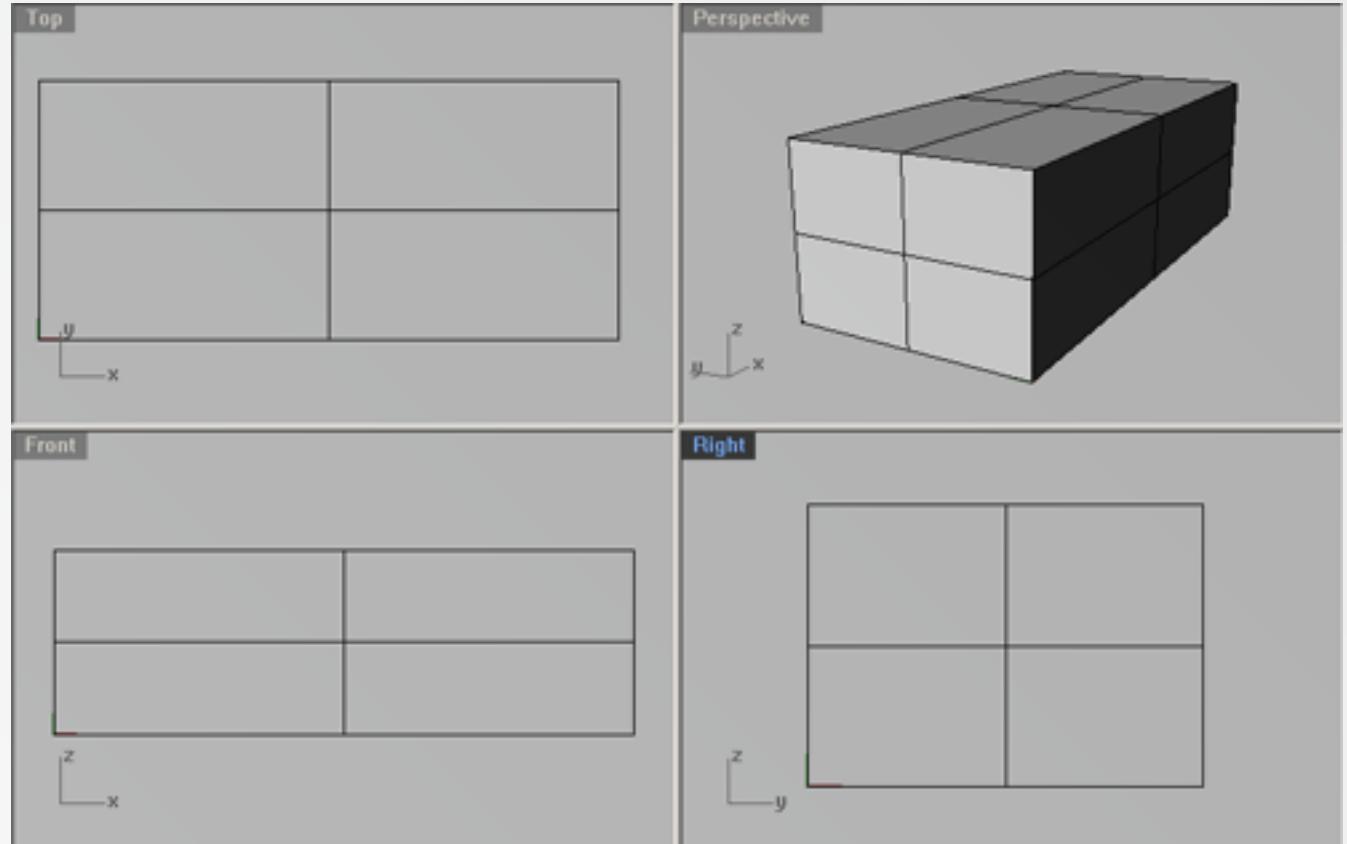
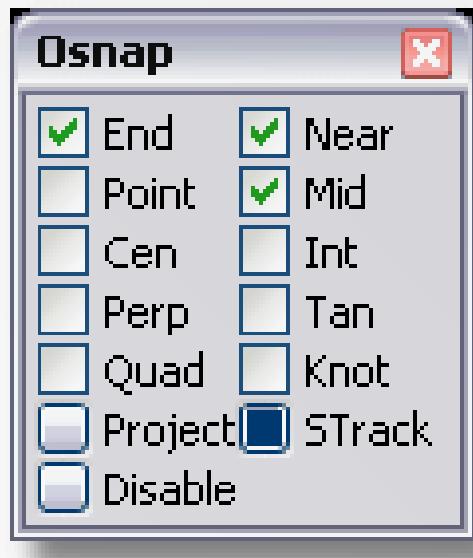




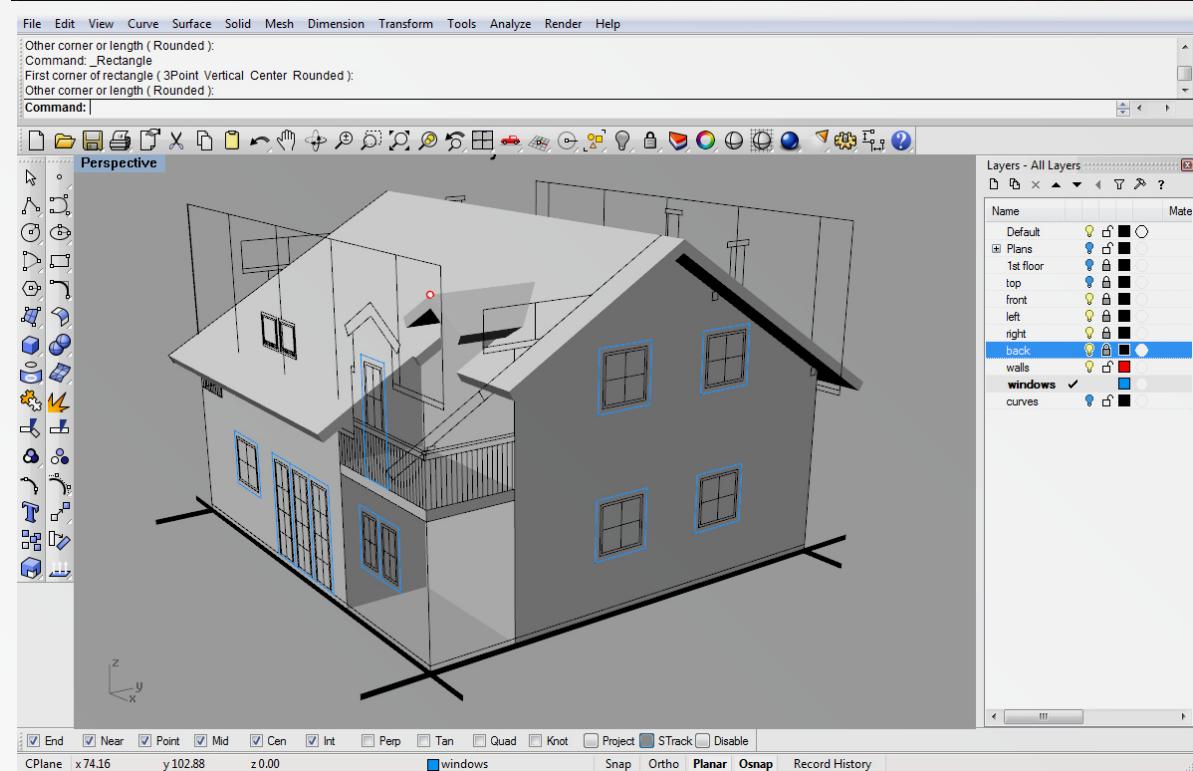
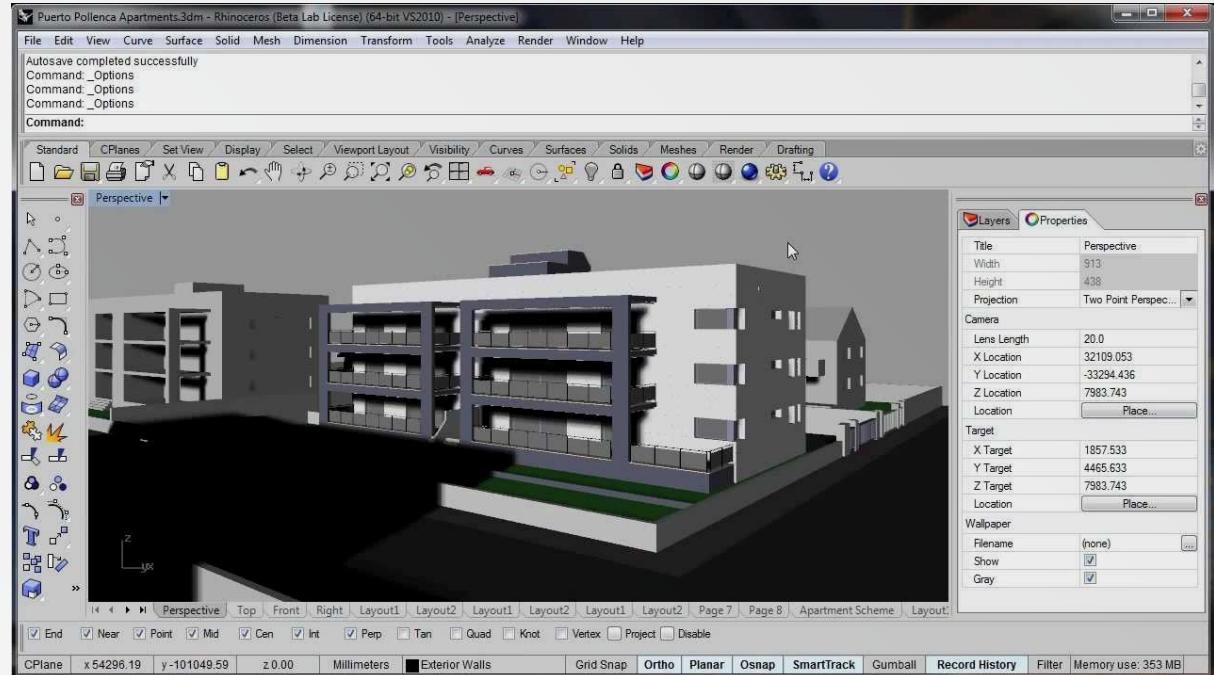
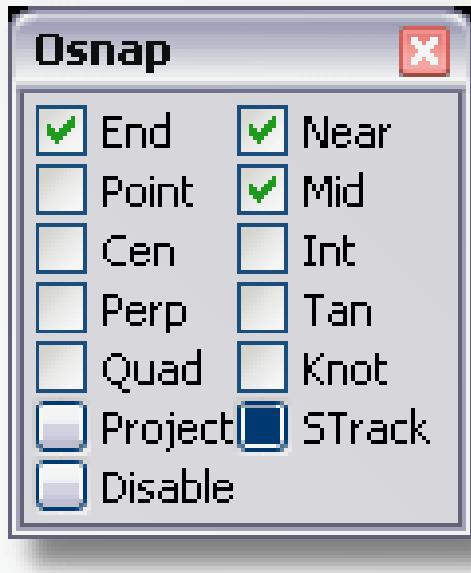


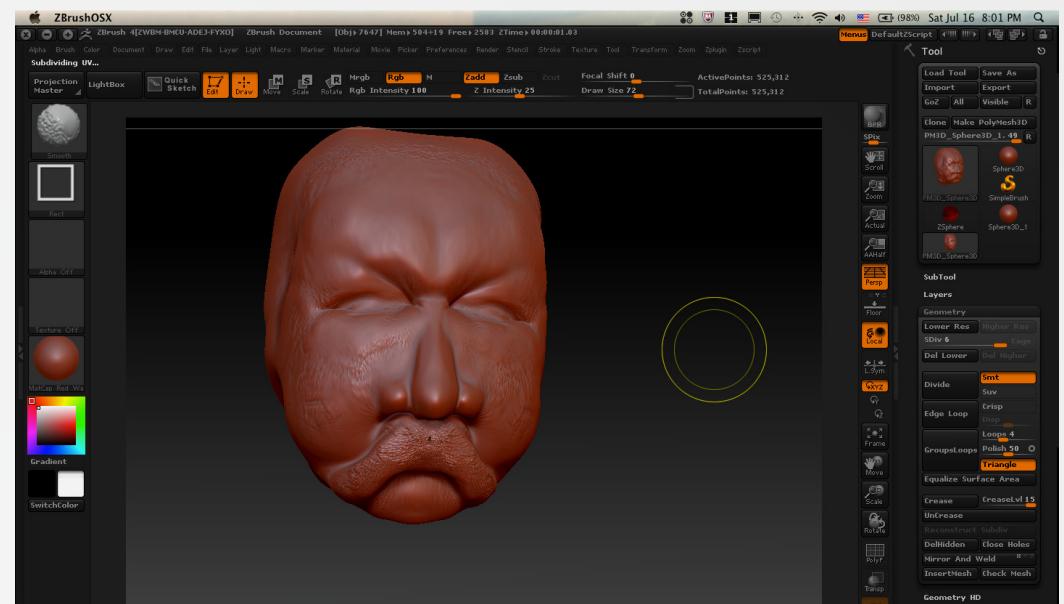


The tool almost literally changes the user's mindset:



**3d modeling snaps focus the user's attention
on alignment and straightness**





**sculpting-based 3d modeling software, like ZBrush,
focuses explicitly on organic forms, like modeling clay**

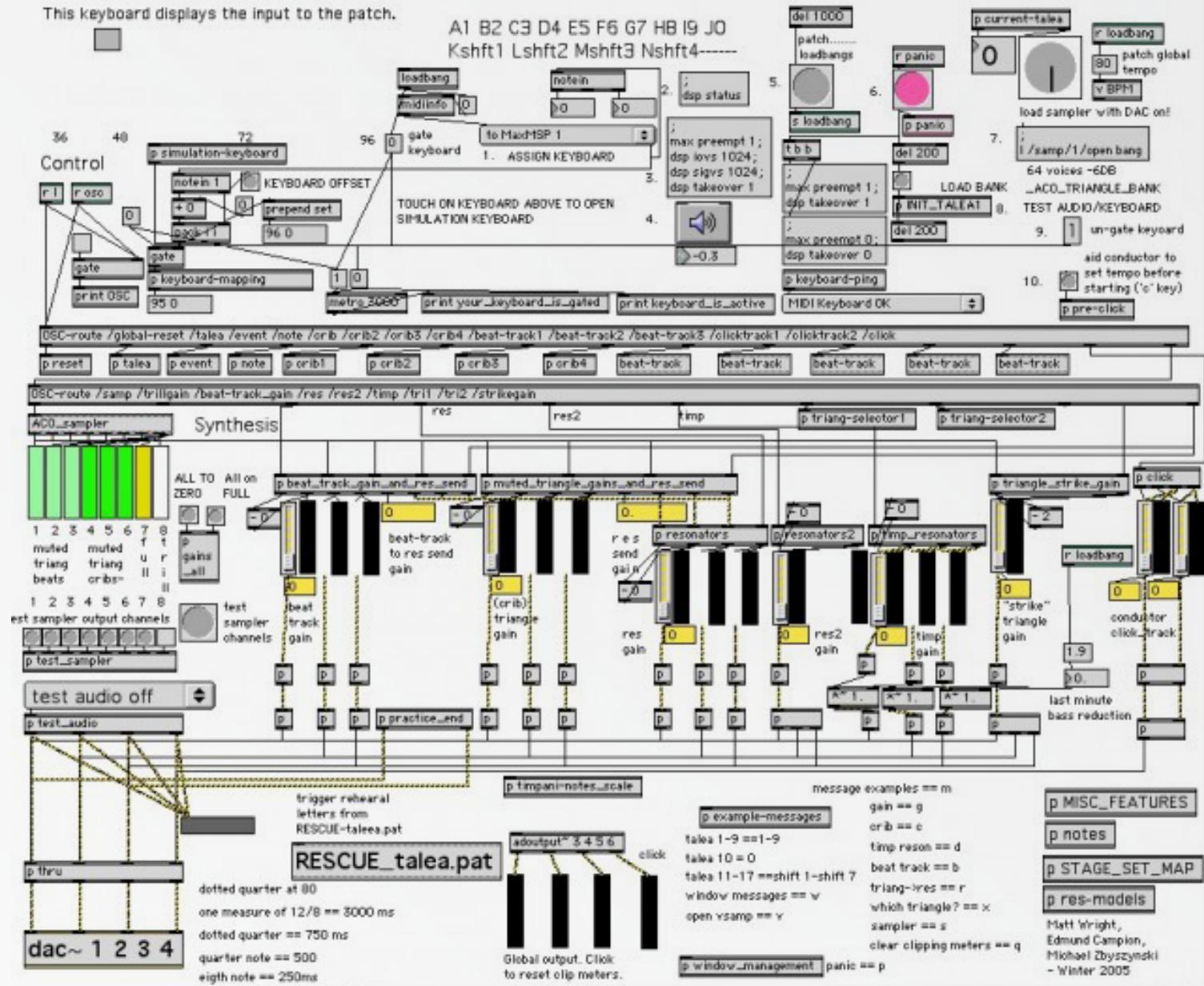


000 x 691 - webneel.com



**sculpting-based 3d modeling software, like ZBrush,
focuses explicitly on organic forms, like modeling clay**

This keyboard displays the input to the patch.



flow-based programming languages
are almost always used for real-time audio/video/data

```
1 #!/usr/bin/python
2
3 myName = "Dan"
4 myCity = "Brooklyn"
5
6 print "Hello, my name is " + myName + " and I live in " + myCity
7
8
9
```

imperative programming
outlines a workflow as a series of commands executed in sequence

**Steve Yegge:
“Execution in the Kingdom of Nouns”**

**And within computer science and software development,
many debates continue about the effect of different software paradigms
on the programmer or the software itself**



python™

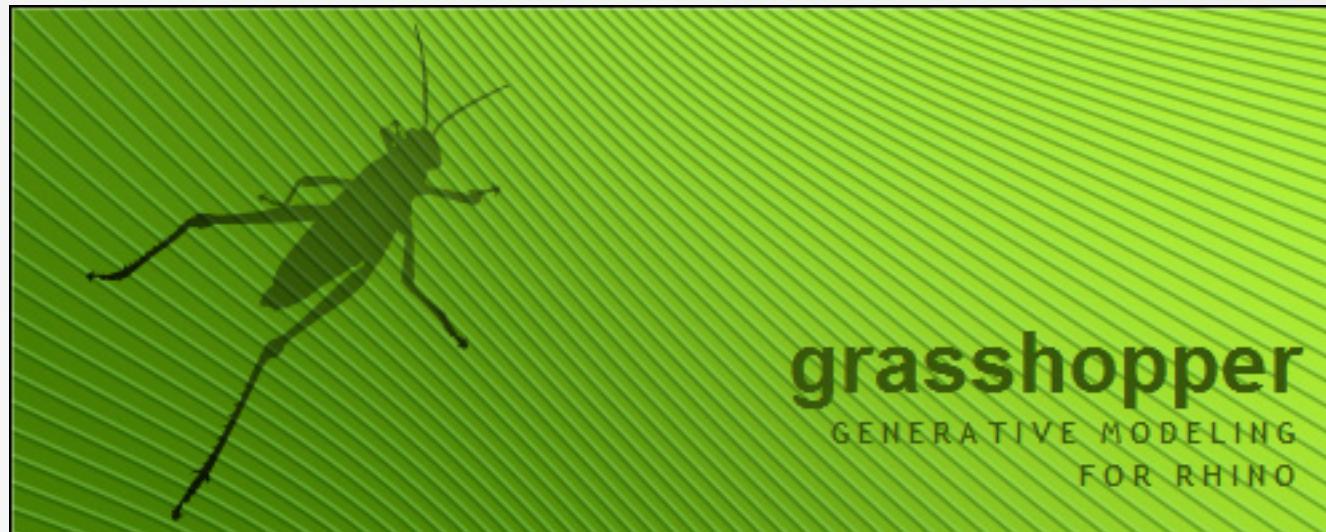


C#

Microsoft®



Visual Studio®



Karamba

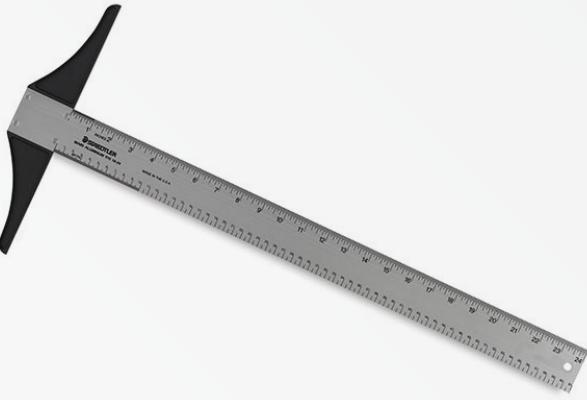


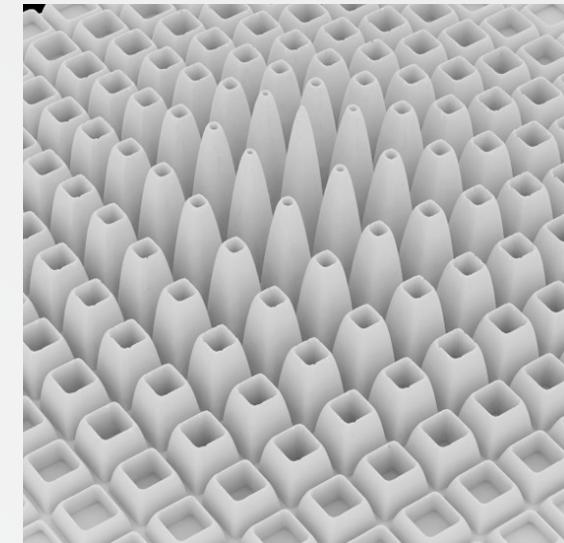
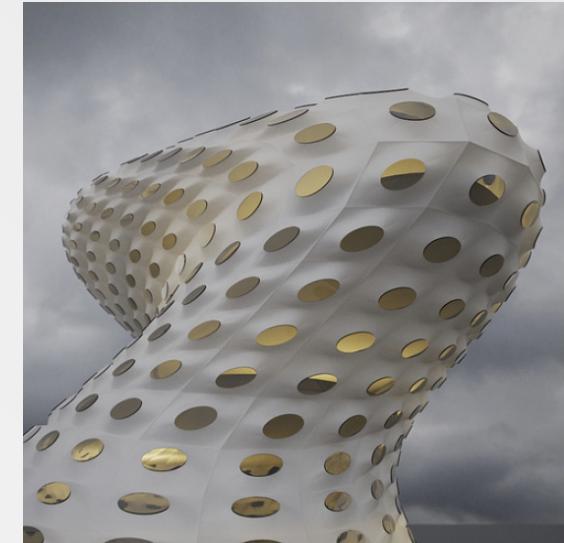
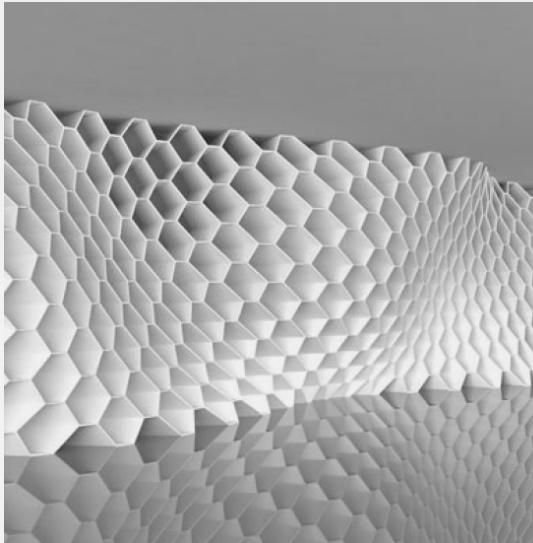
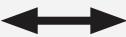
The image shows a side-by-side comparison of a 3D model and its corresponding generative script in Grasshopper.

Perspective View: On the left, the "Perspective" tab displays a 3D model of a grasshopper's body. The body is elongated and segmented, with a red mesh visible on its surface. A coordinate system (x, y, z) is shown at the bottom left.

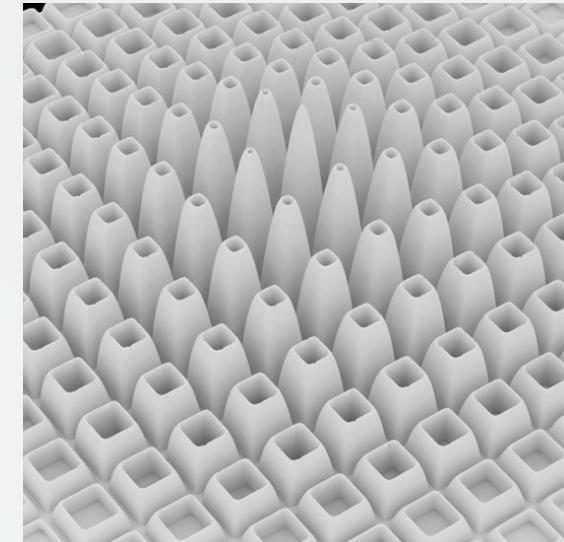
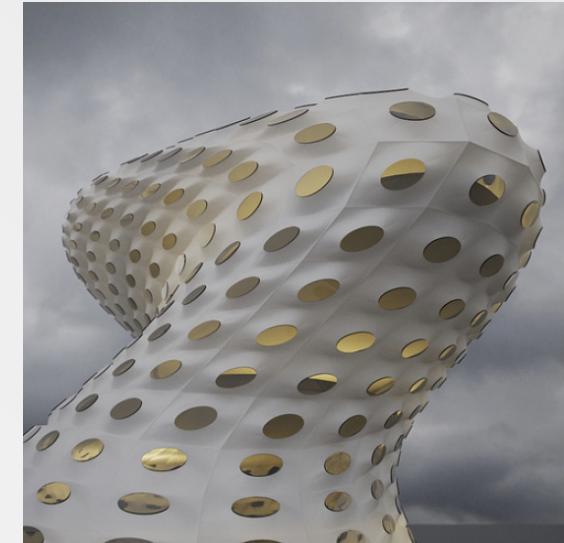
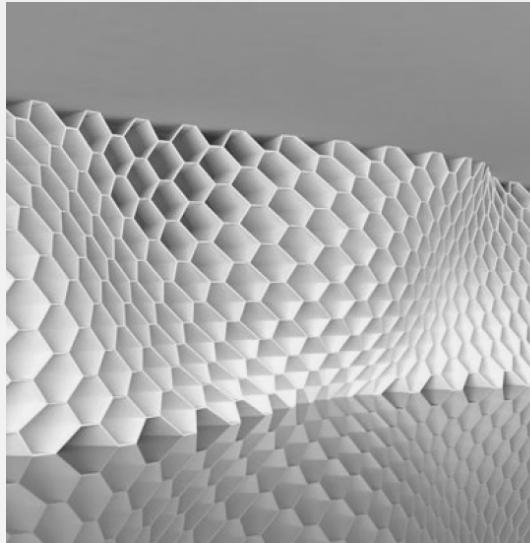
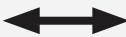
Generative Script: On the right, the "Math" tab displays the generative script. The script consists of the following components and connections:

- A purple "PFrames" component (labeled C, N, A, F, t) is connected to a dashed blue curve.
- An "Orient" component (labeled G, A, B, X) is connected to the curve and a green "45" value.
- An orange "Rotate" component (labeled G, A, P, X) is also connected to the curve and the "45" value.
- A green "Loft" component (labeled C, O, L) is connected to the "Orient" and "Rotate" components.



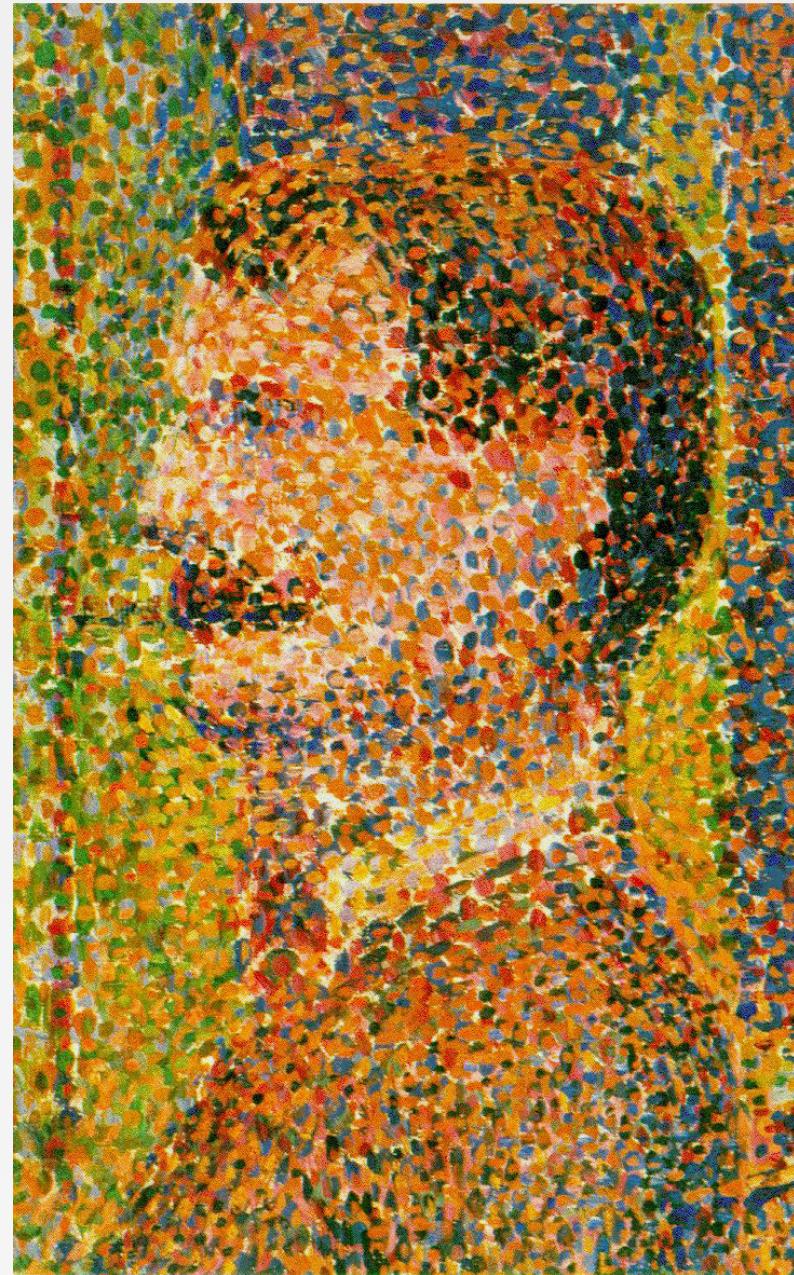


To what extent does the current use of Grasshopper seem to induce these formal aesthetics, or even a form in the first place?



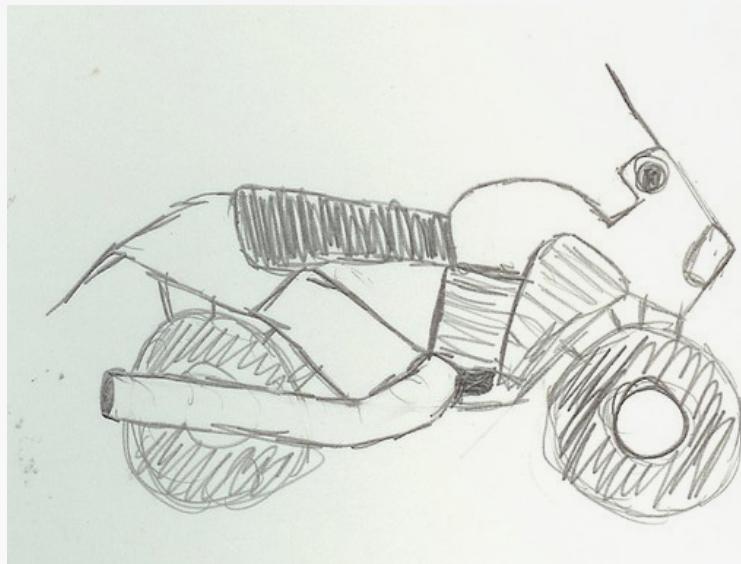
To what extent does the current use of Grasshopper seem to induce these formal aesthetics, or even a form in the first place?

What other software tools can be created, by the designer that influence the designer in other, new ways?



**Of course - tools are not deterministic;
they do not control the user; there is much freedom within the environment of a tool.**



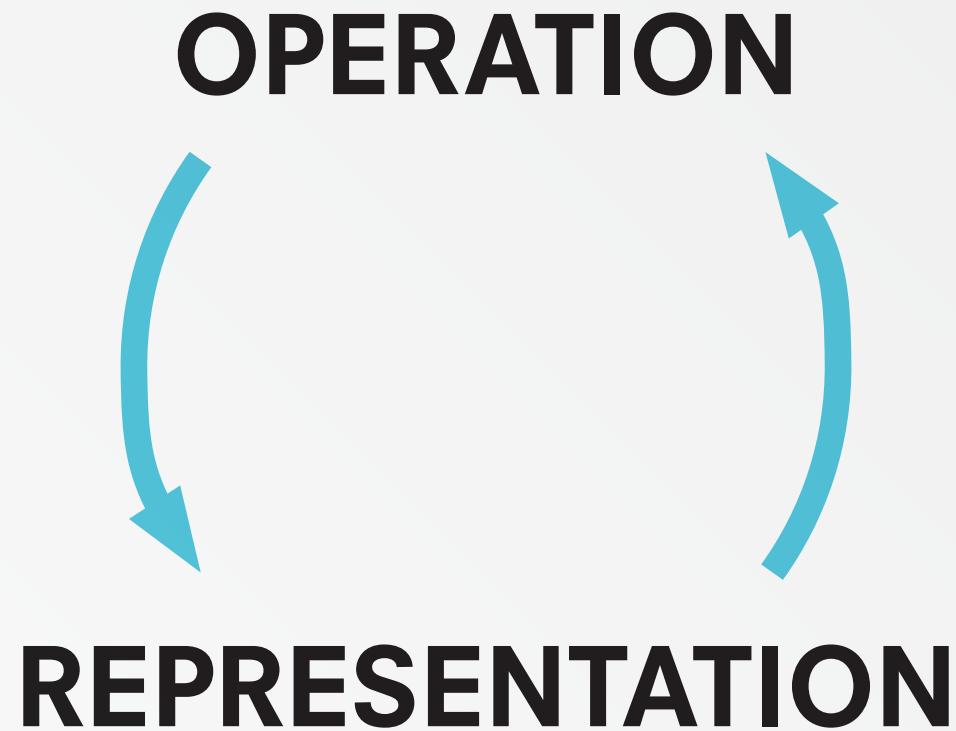


**The complexity of the tool
does not necessarily correlate with the helpfulness/output of a tool, either.**

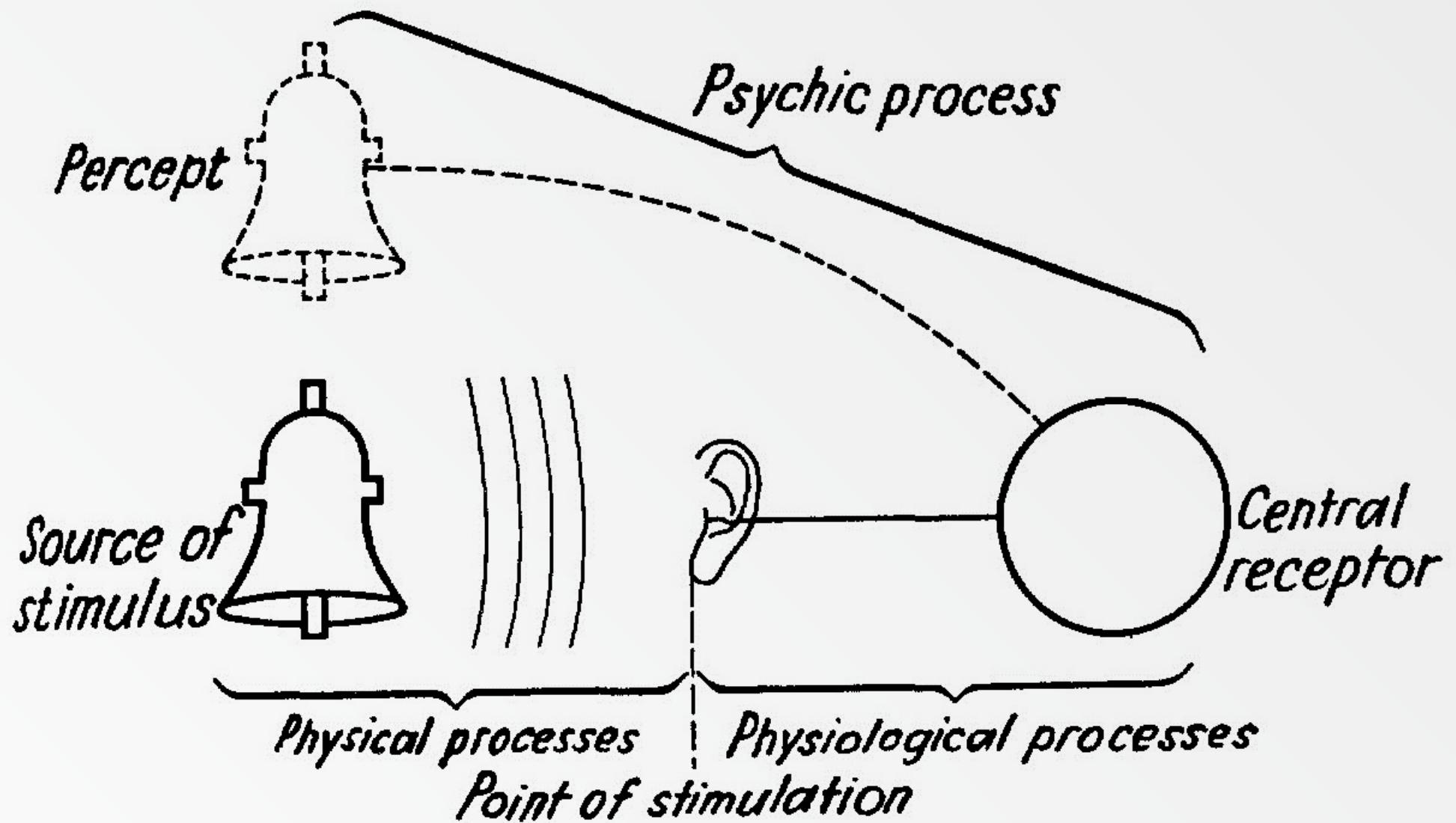
even in computer science:
github <----> git
open source <----> github

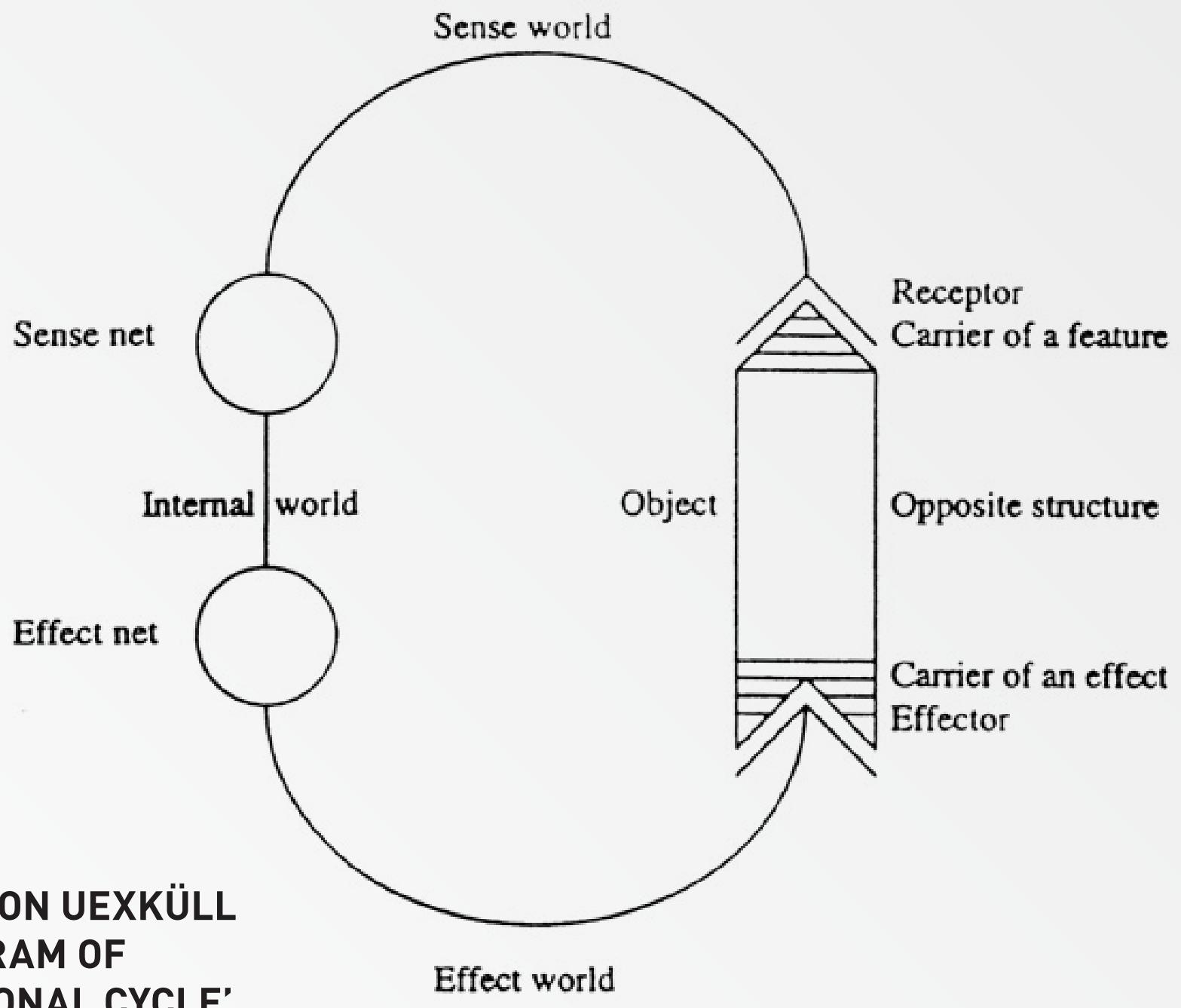
**What is a tool made out of?
How is it different than technology?**

**All tools are a feedback loop between
an operation
and a representation**



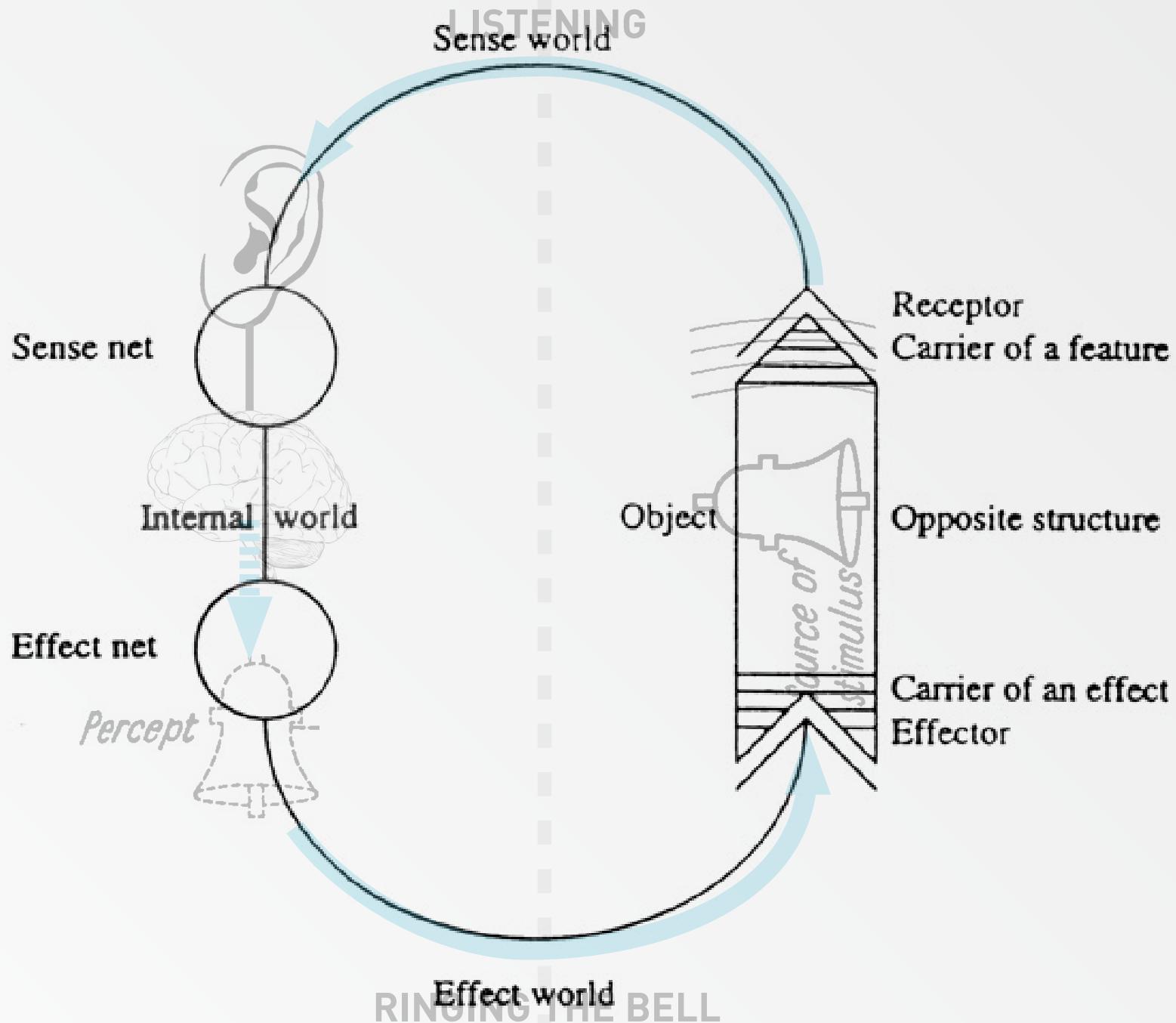
**Umwelt theory -
with this feedback loop,
the tool modifies the cognitive model
with which you imagine the world**





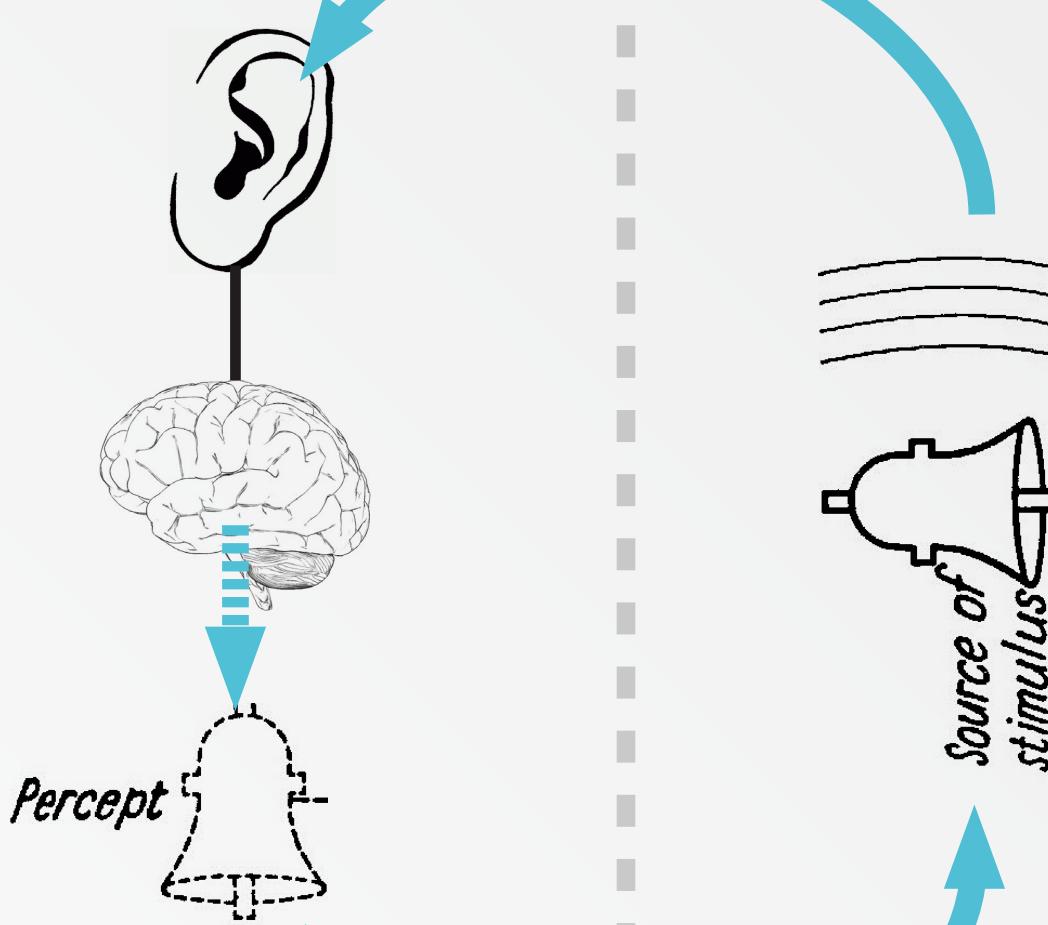
JAKOB VON UEXKÜLL — DIAGRAM OF 'FUNCTIONAL CYCLE'

SUBJECTIVE WORLD



SUBJECTIVE WORLD

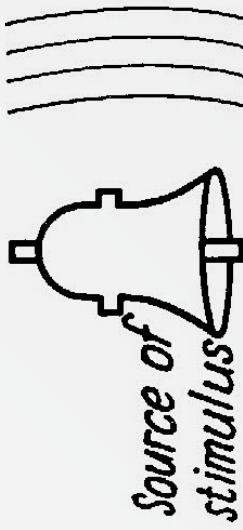
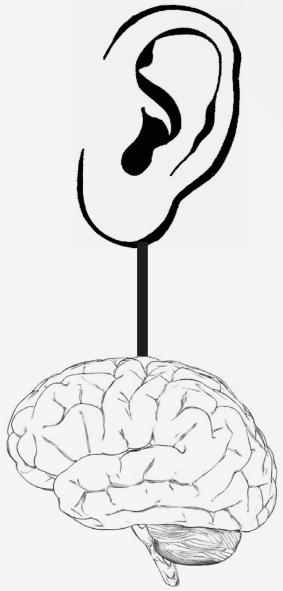
LISTENING



RINGING THE BELL

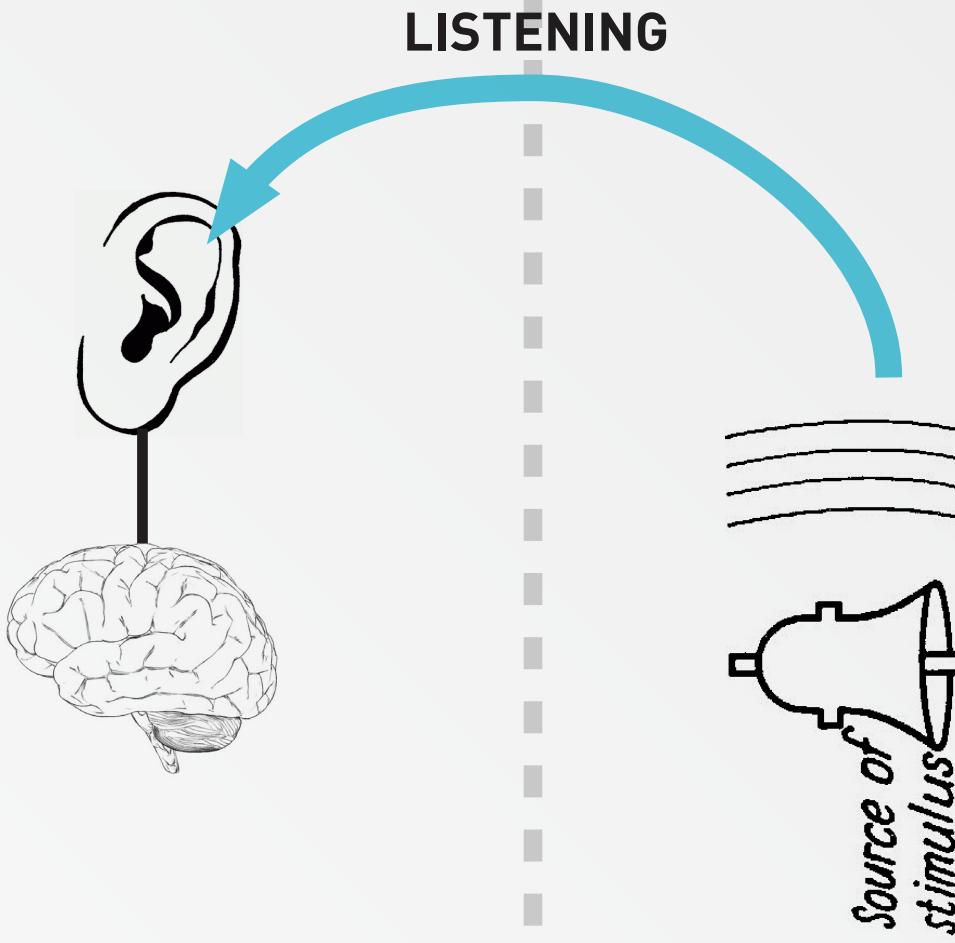
EXTERNAL WORLD

SUBJECTIVE WORLD

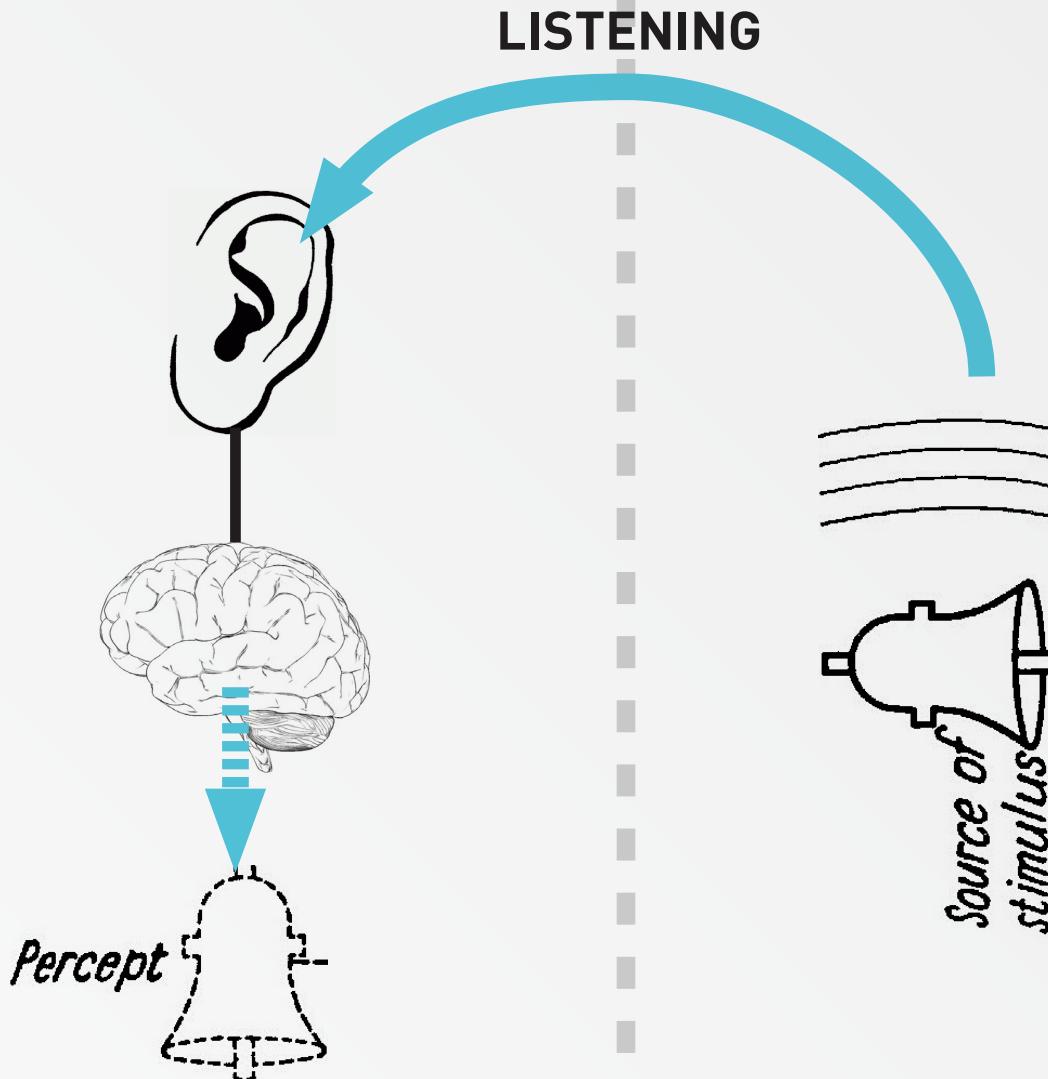


EXTERNAL WORLD

SUBJECTIVE WORLD



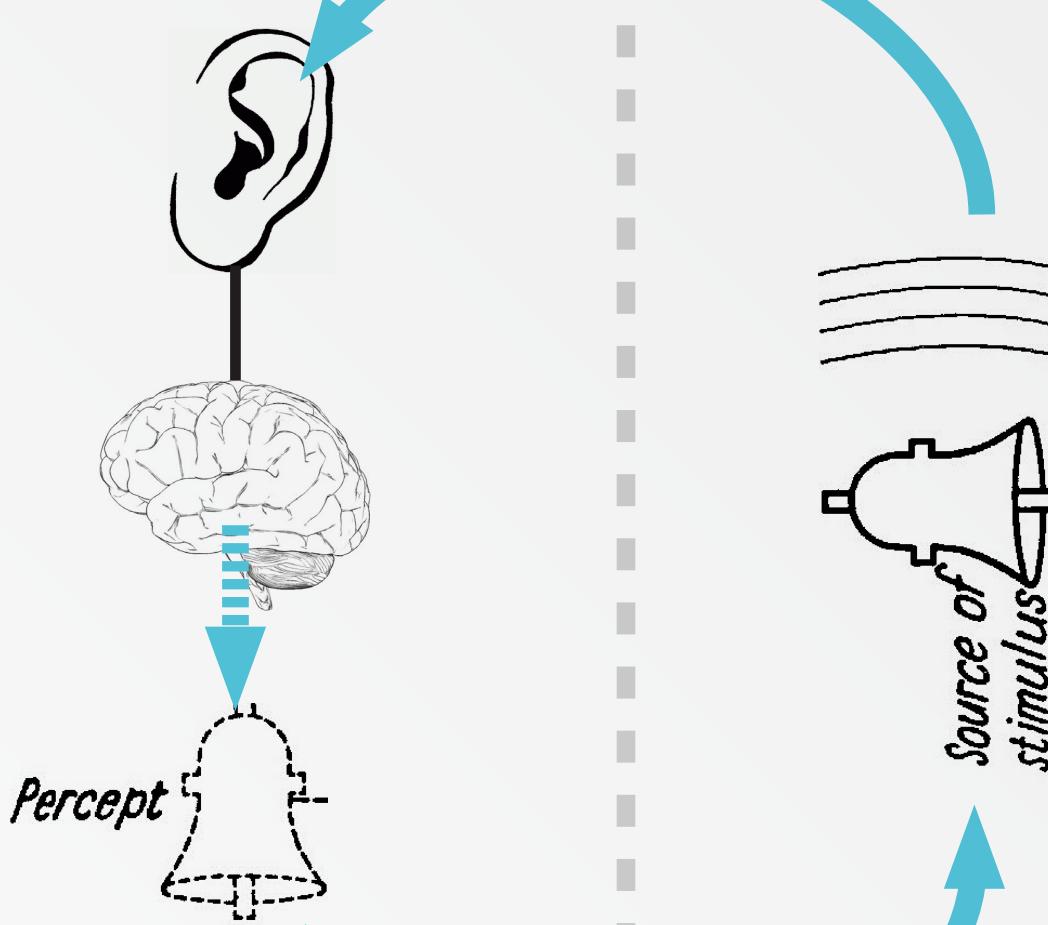
SUBJECTIVE WORLD



EXTERNAL WORLD

SUBJECTIVE WORLD

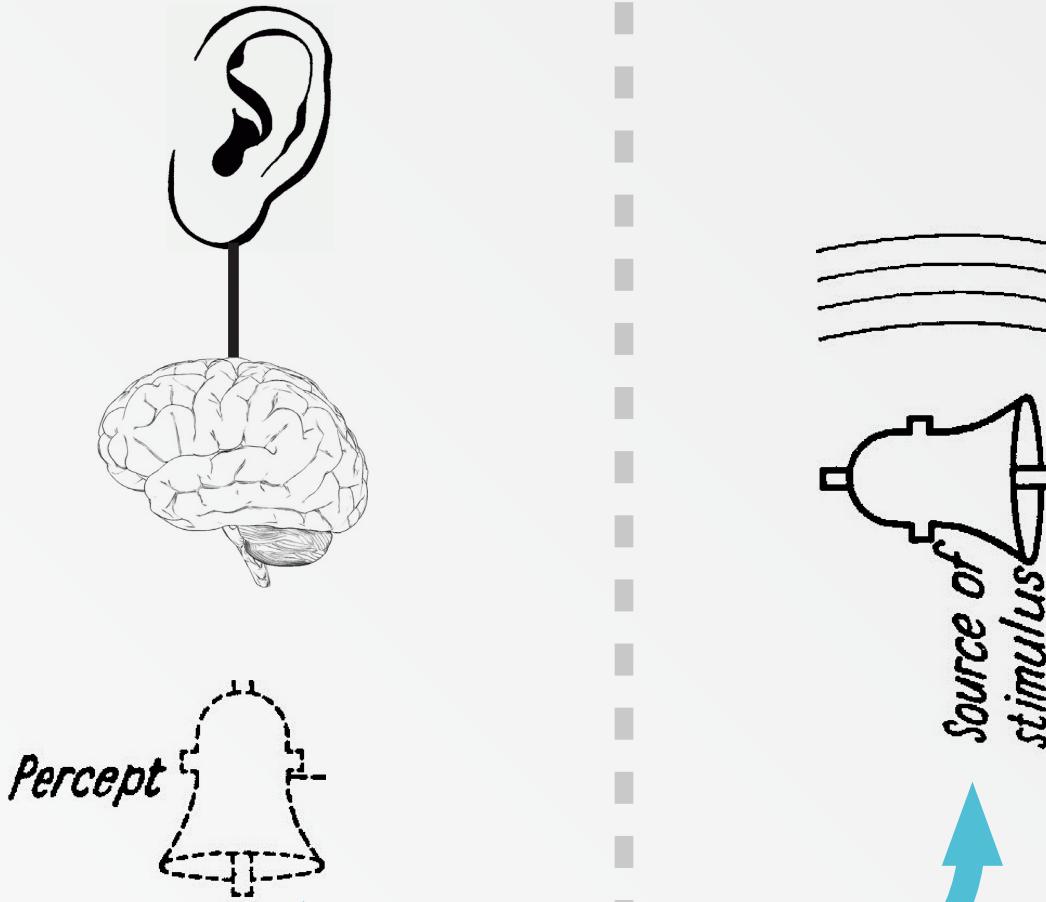
LISTENING



EXTERNAL WORLD

RINGING THE BELL

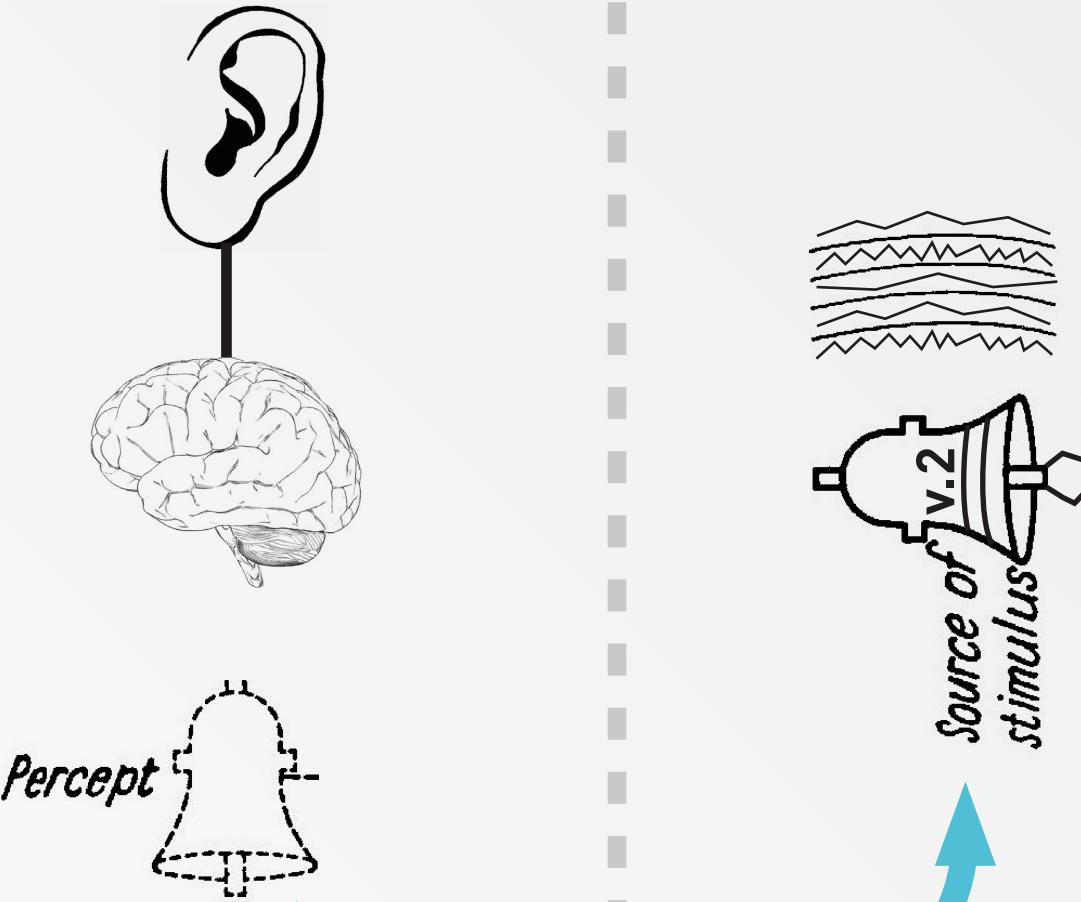
SUBJECTIVE WORLD



RE-DESIGNING THE BELL

EXTERNAL WORLD

SUBJECTIVE WORLD

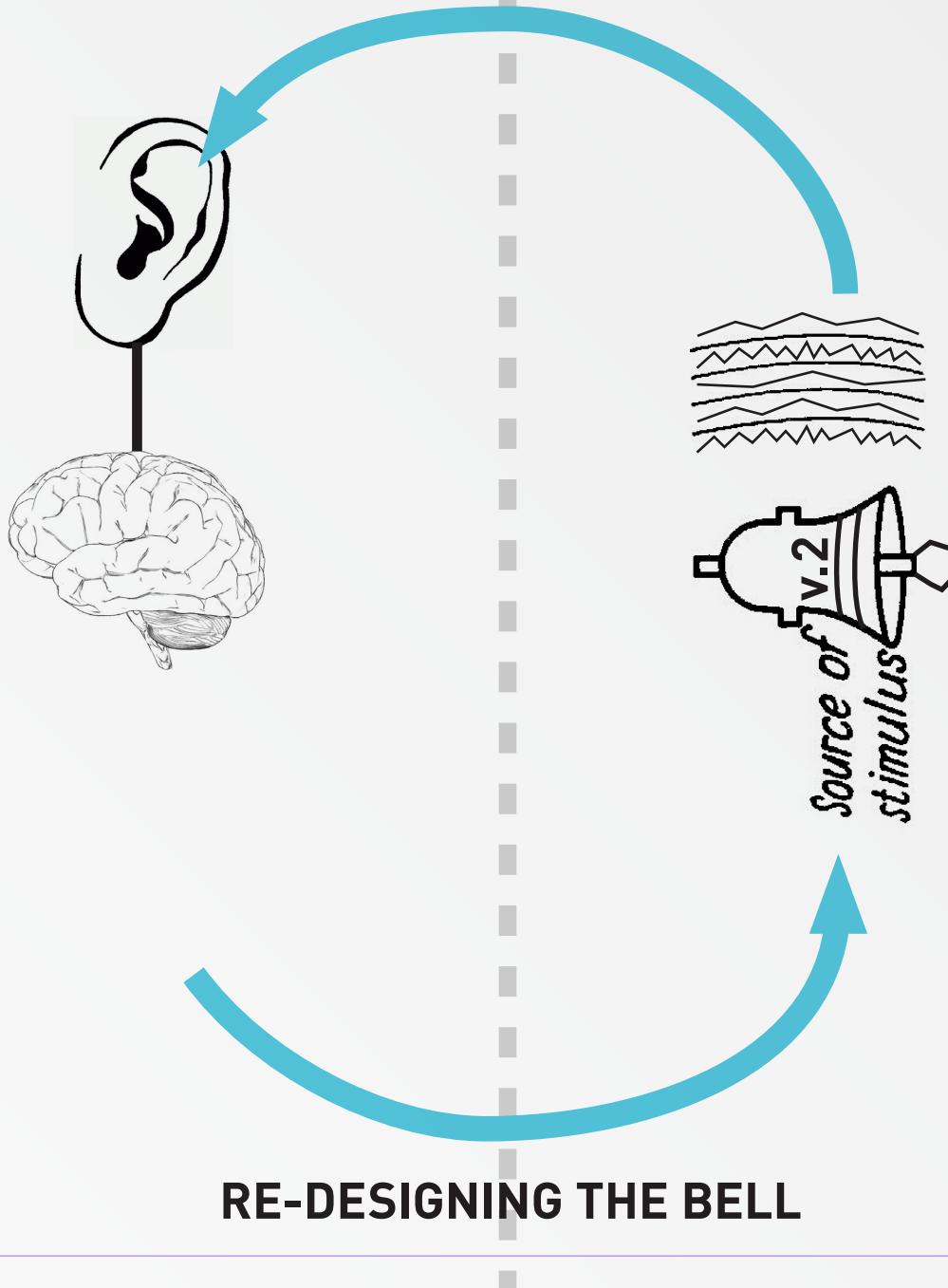


EXTERNAL WORLD

RE-DESIGNING THE BELL

SUBJECTIVE WORLD

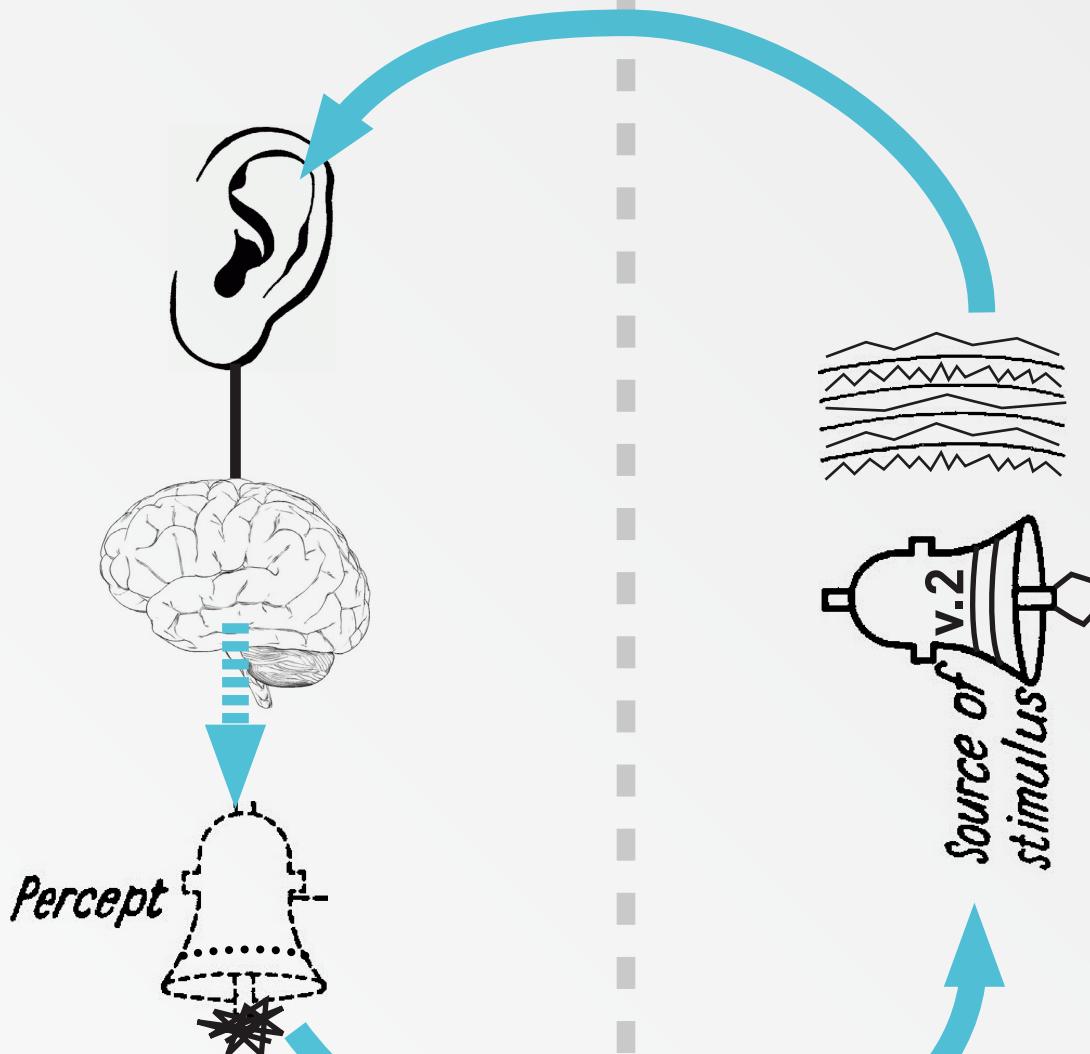
LISTENING TO THIS ITERATION



EXTERNAL WORLD

SUBJECTIVE WORLD

LISTENING TO THIS ITERATION

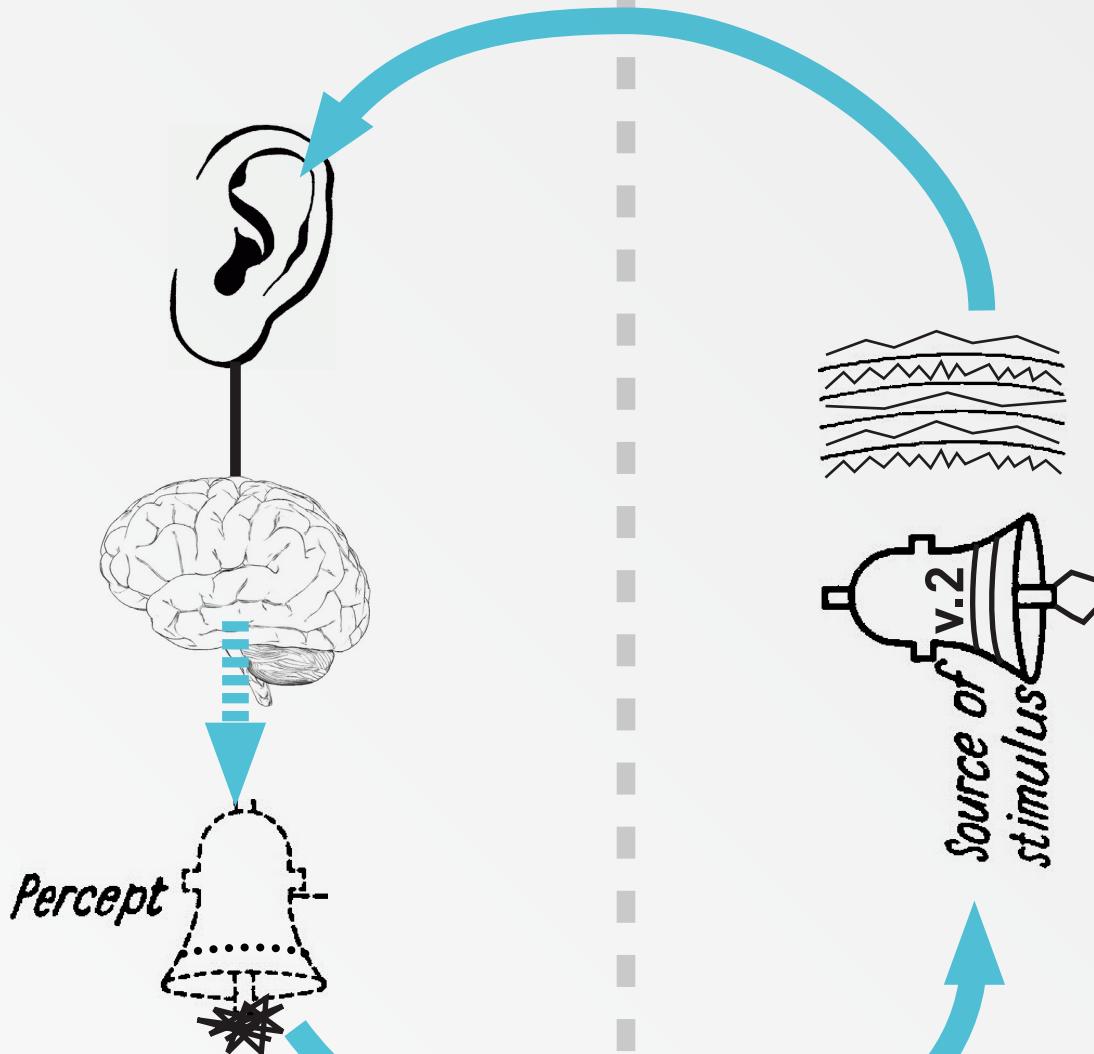


RE-DESIGNING THE BELL

EXTERNAL WORLD

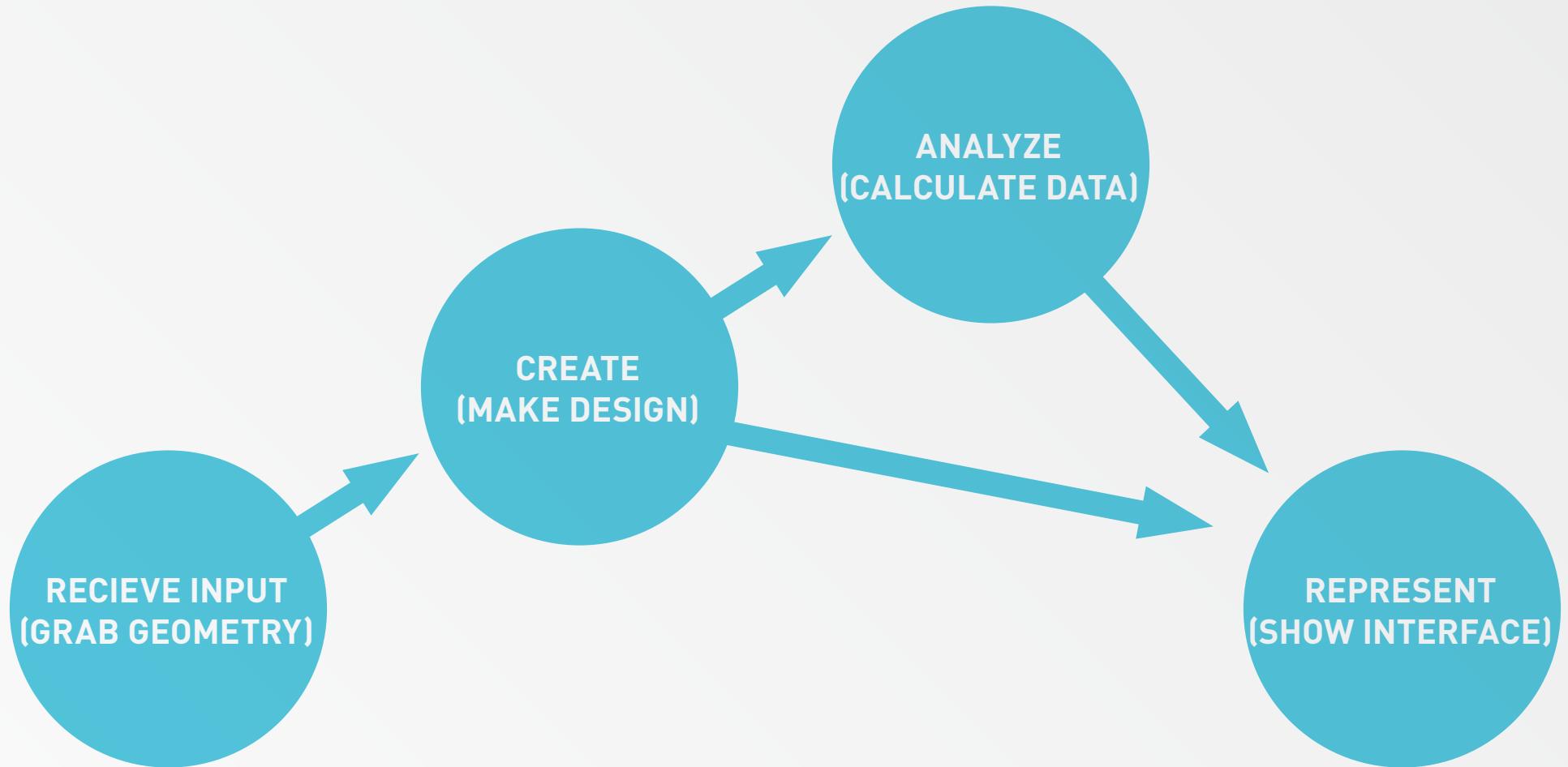
SUBJECTIVE WORLD

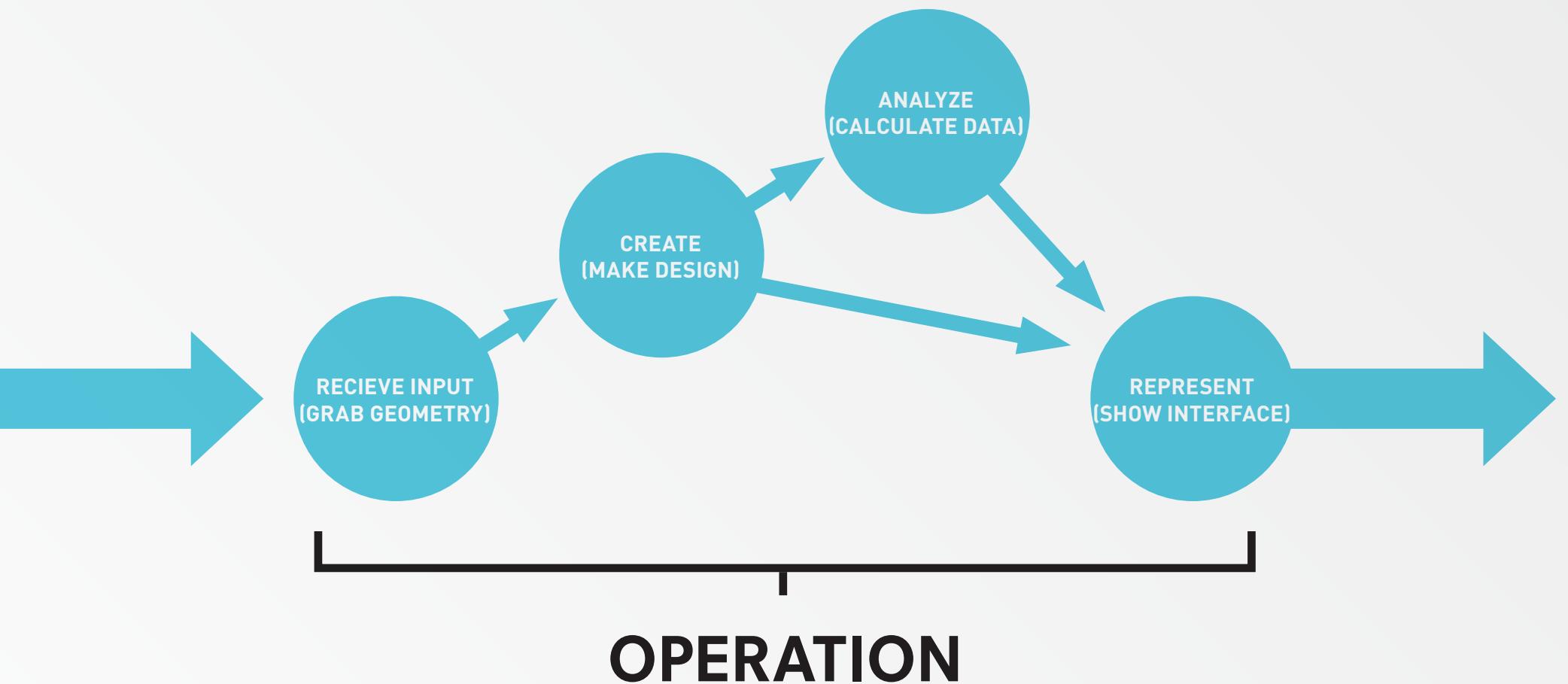
LOOKING AT RESULTS OF TOOLS



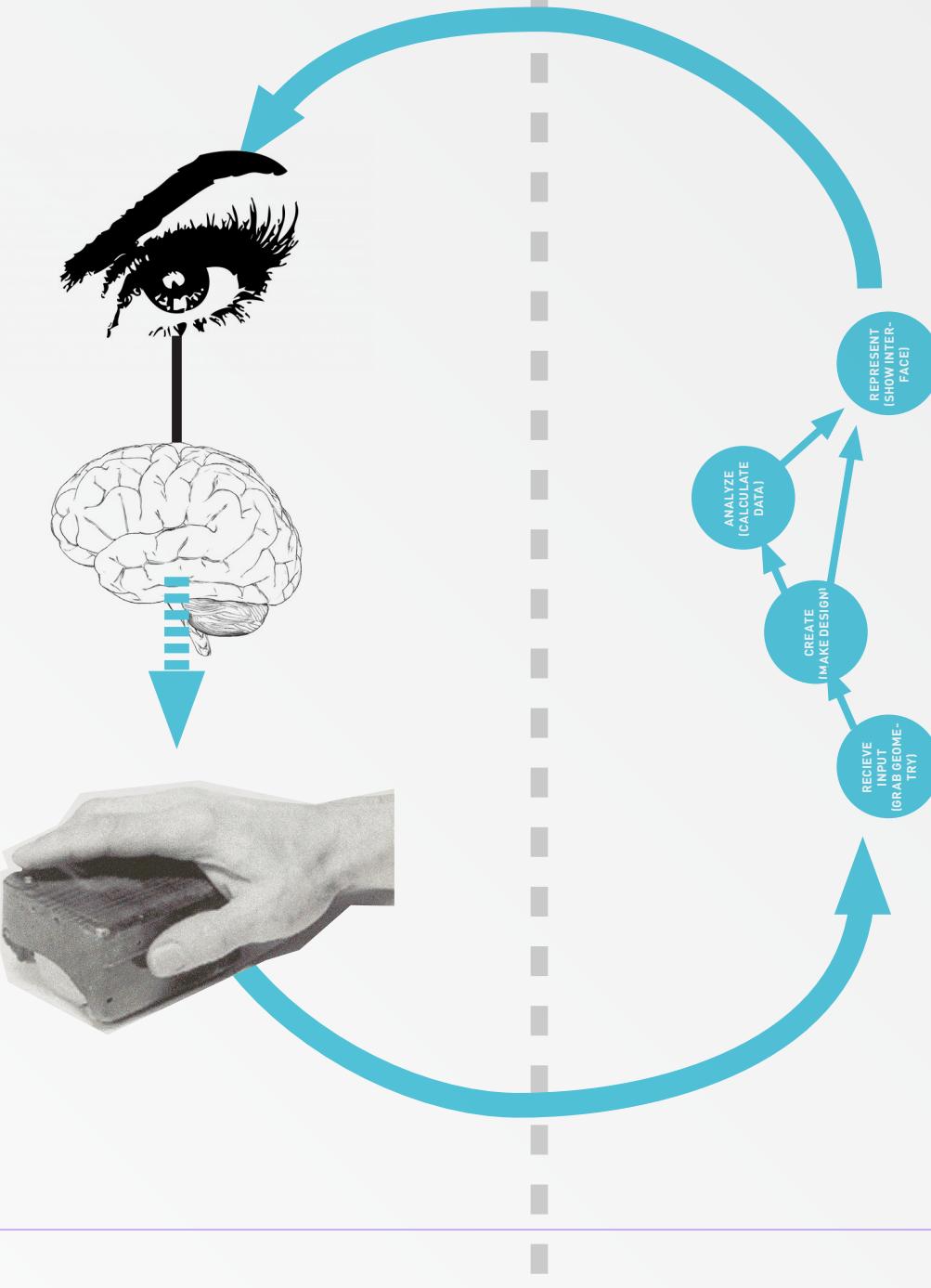
MANIPULATION IN RHINO

EXTERNAL WORLD (DIGITAL WORLD)





SUBJECTIVE WORLD (REPRESENTATION)



EXTERNAL WORLD
(OPERATIONS)

SUBJECTIVE WORLD
(REPRESENTATION)

REPRESENTATION

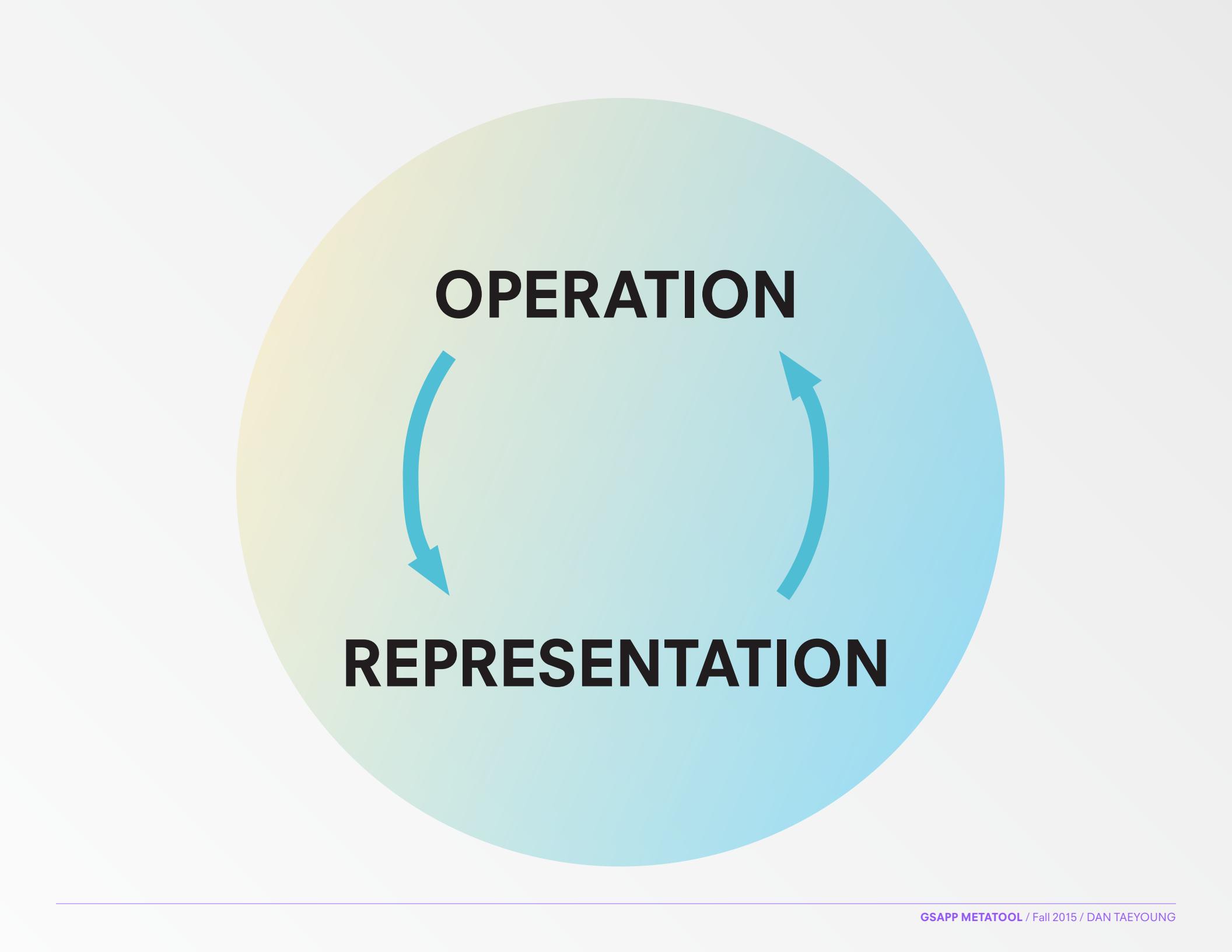


EXTERNAL WORLD
(OPERATION)

OPERATION

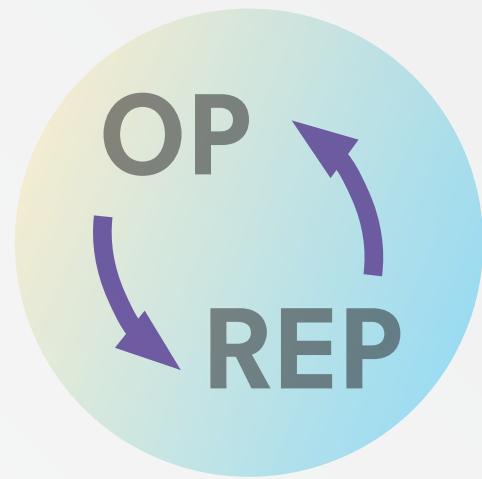


REPRESENTATION

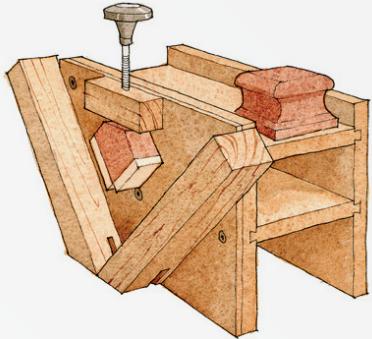


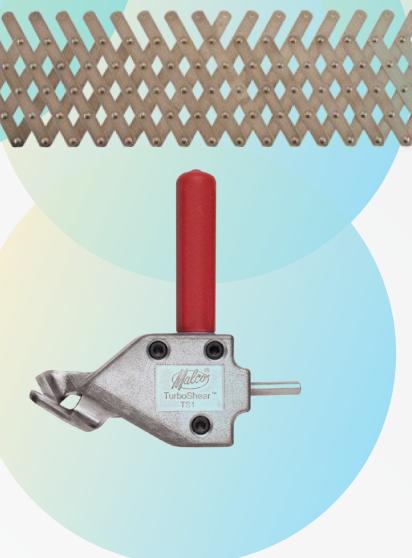
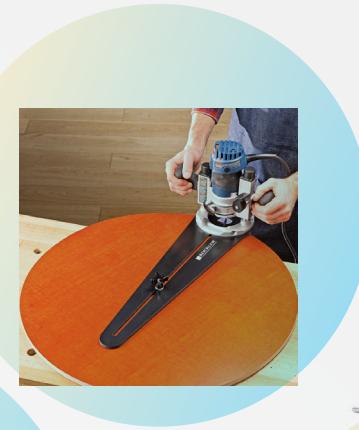
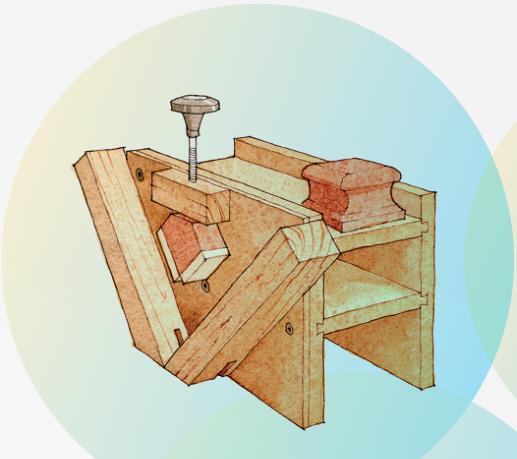
OPERATION

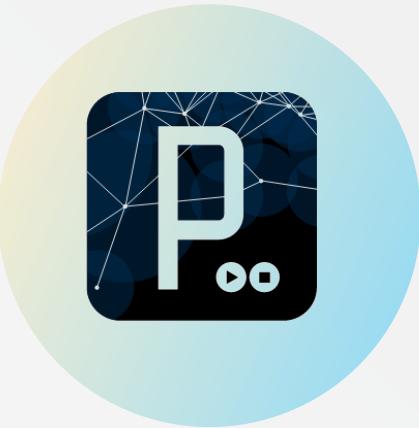
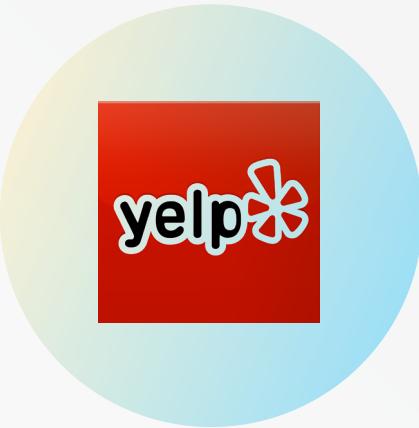
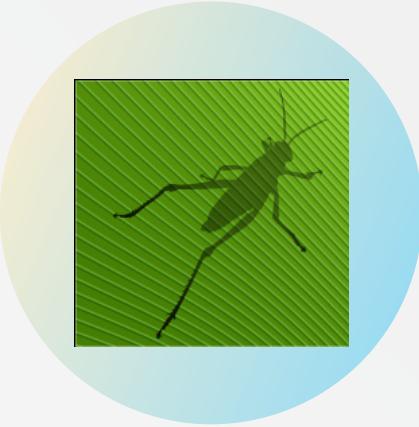
REPRESENTATION

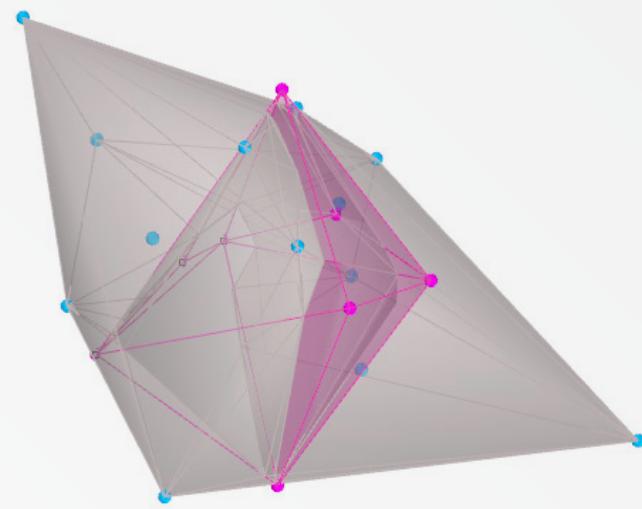


TOOL

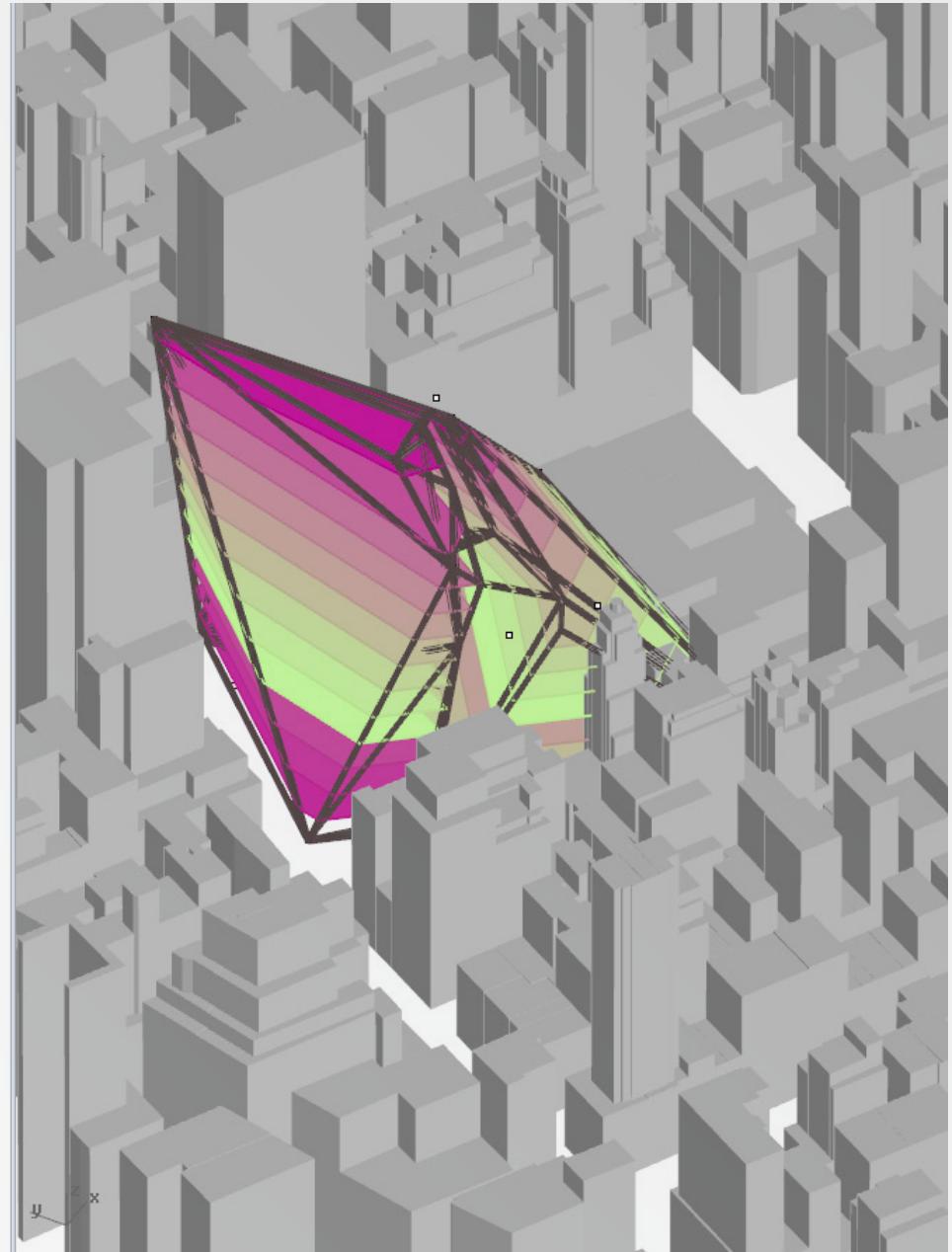








OPERATION

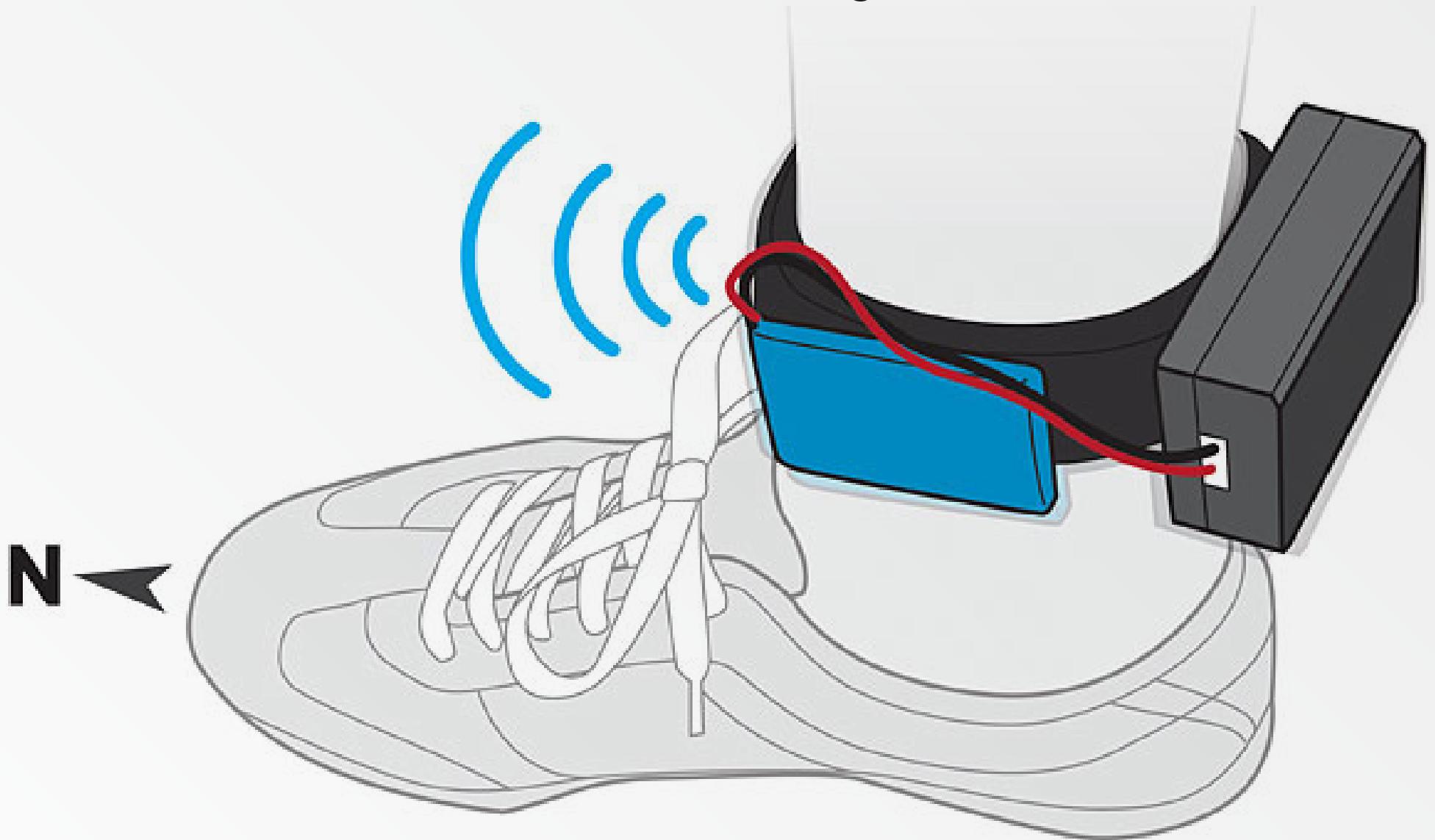


REPRESENTATION

“vibrate motor that is most closest to north”

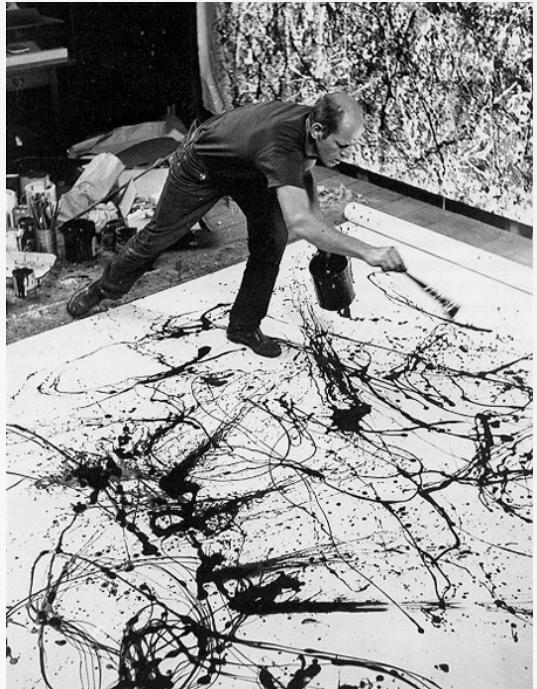


“create a sixth sense of magnetic direction”

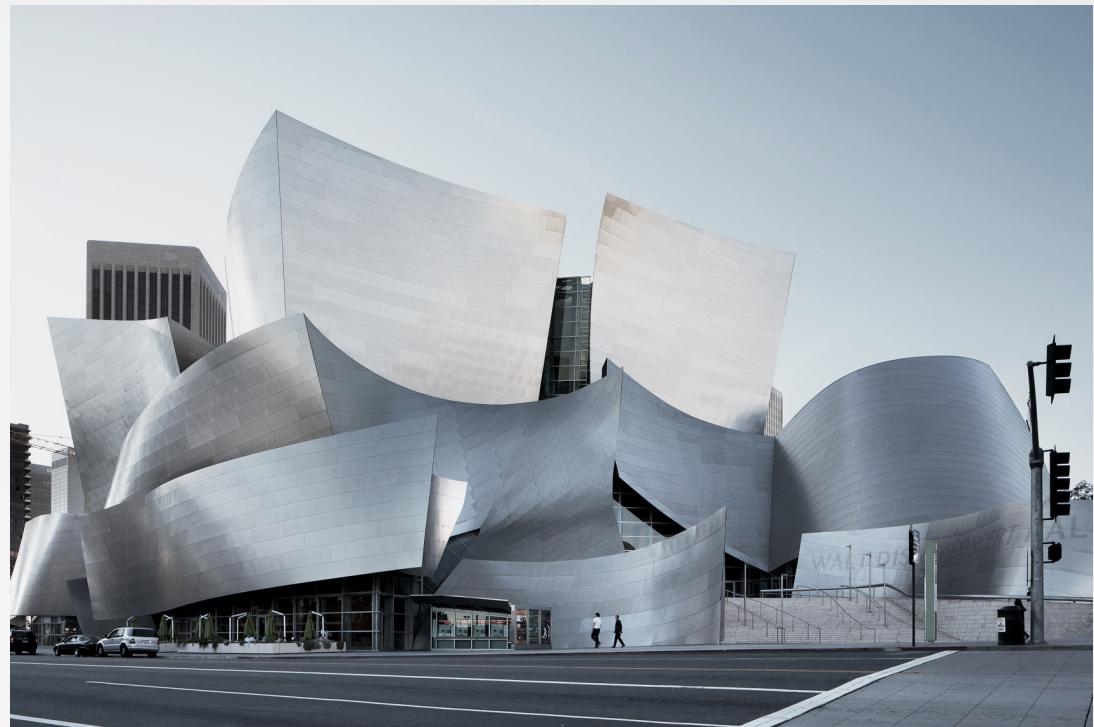
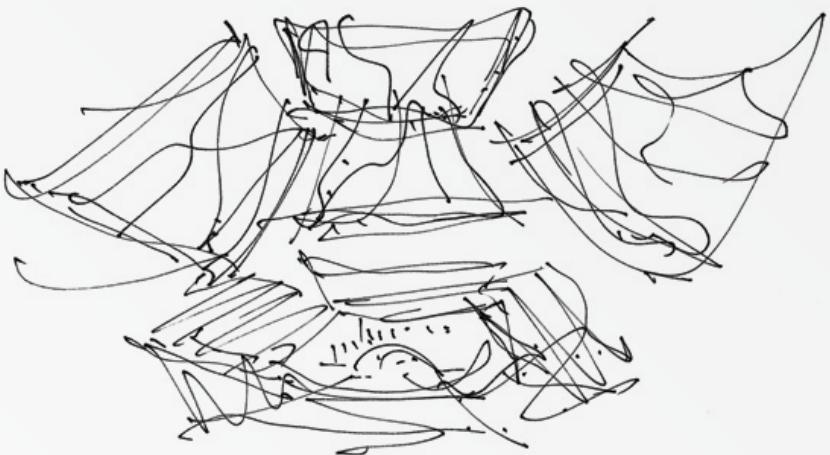




**Most tools are not easily described.
How would you describe the sensation
of knowing intuitively where north is?**



All of our tools appear to us as ‘intuition’



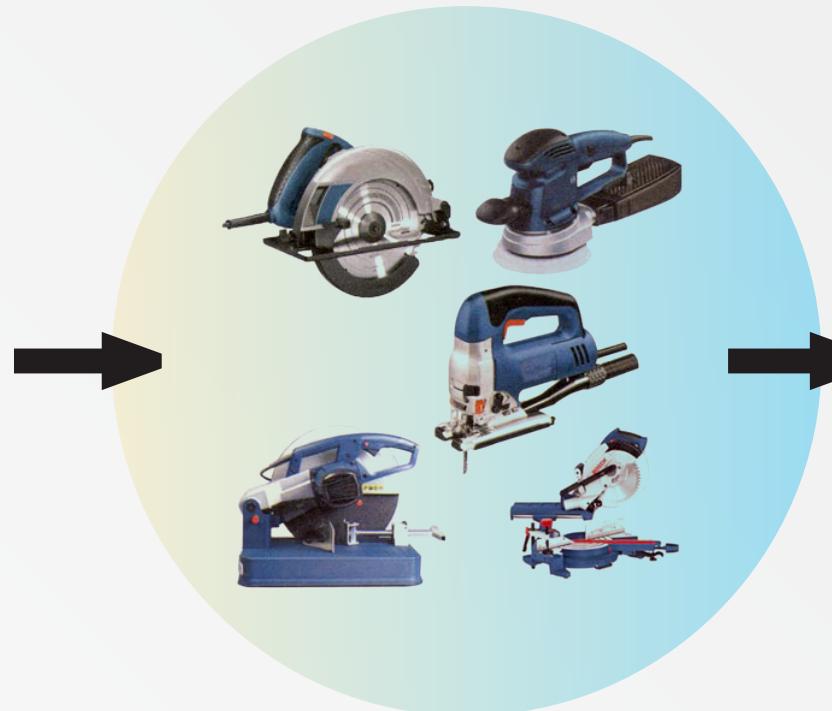
All of our tools appear to us as 'intuition'



All of our tools appear to us as 'intuition'

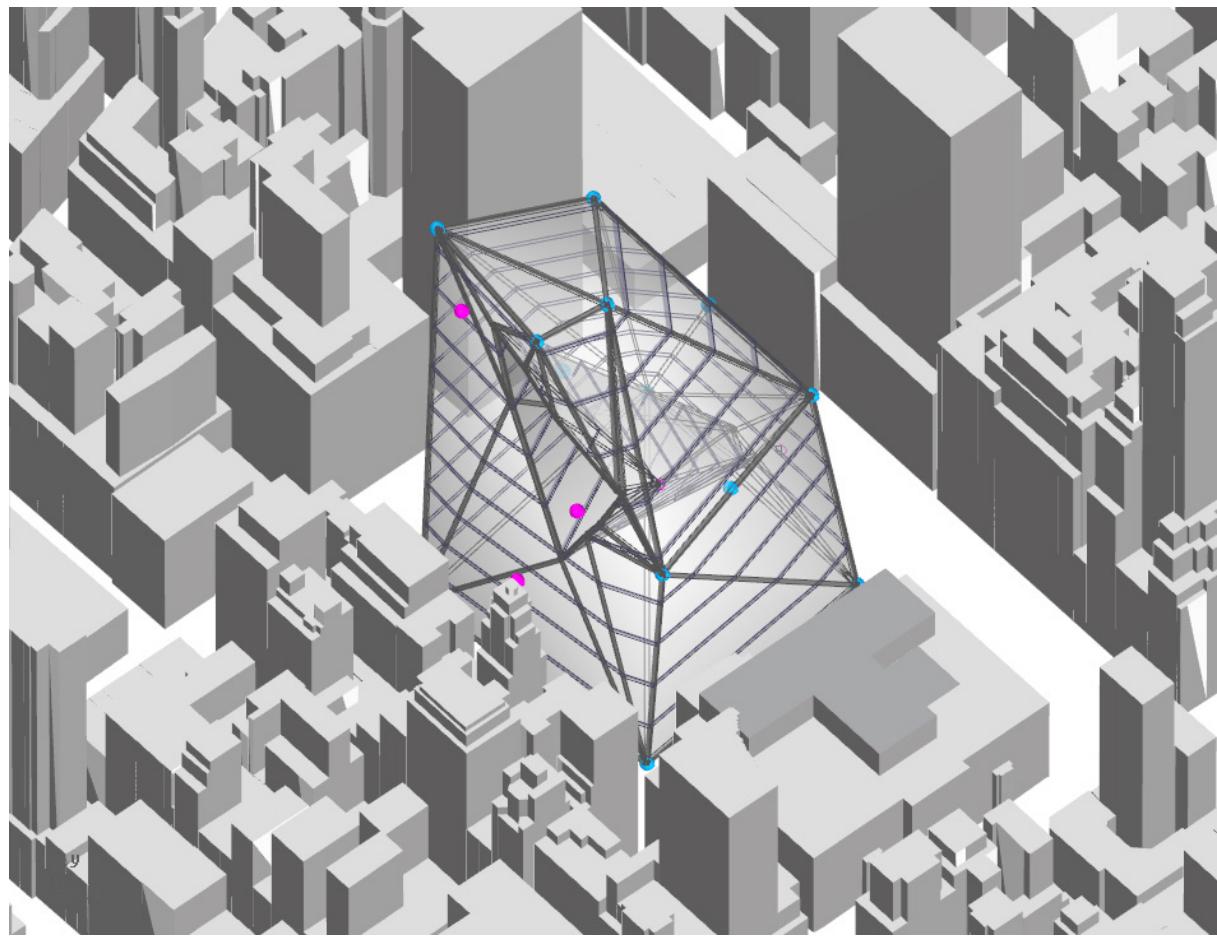


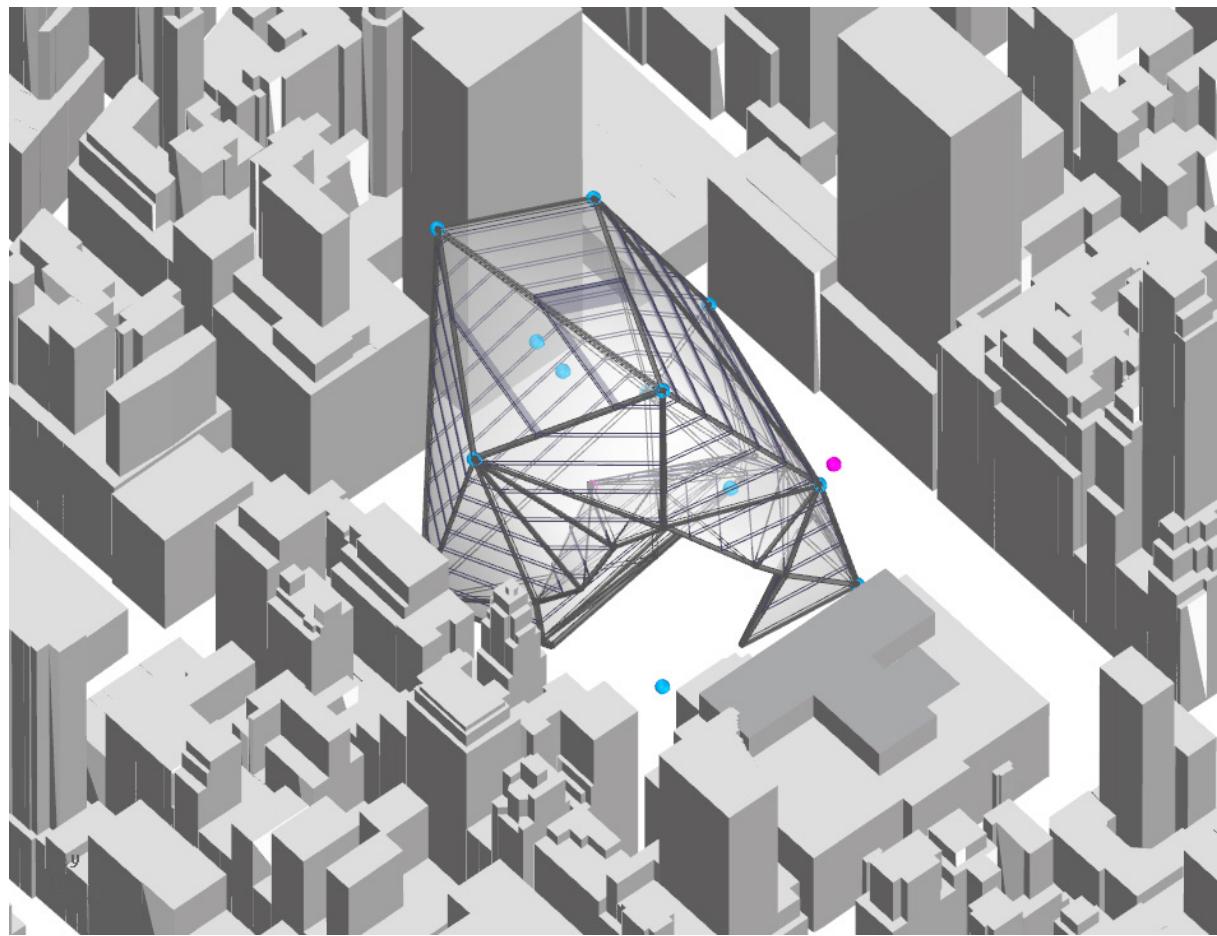


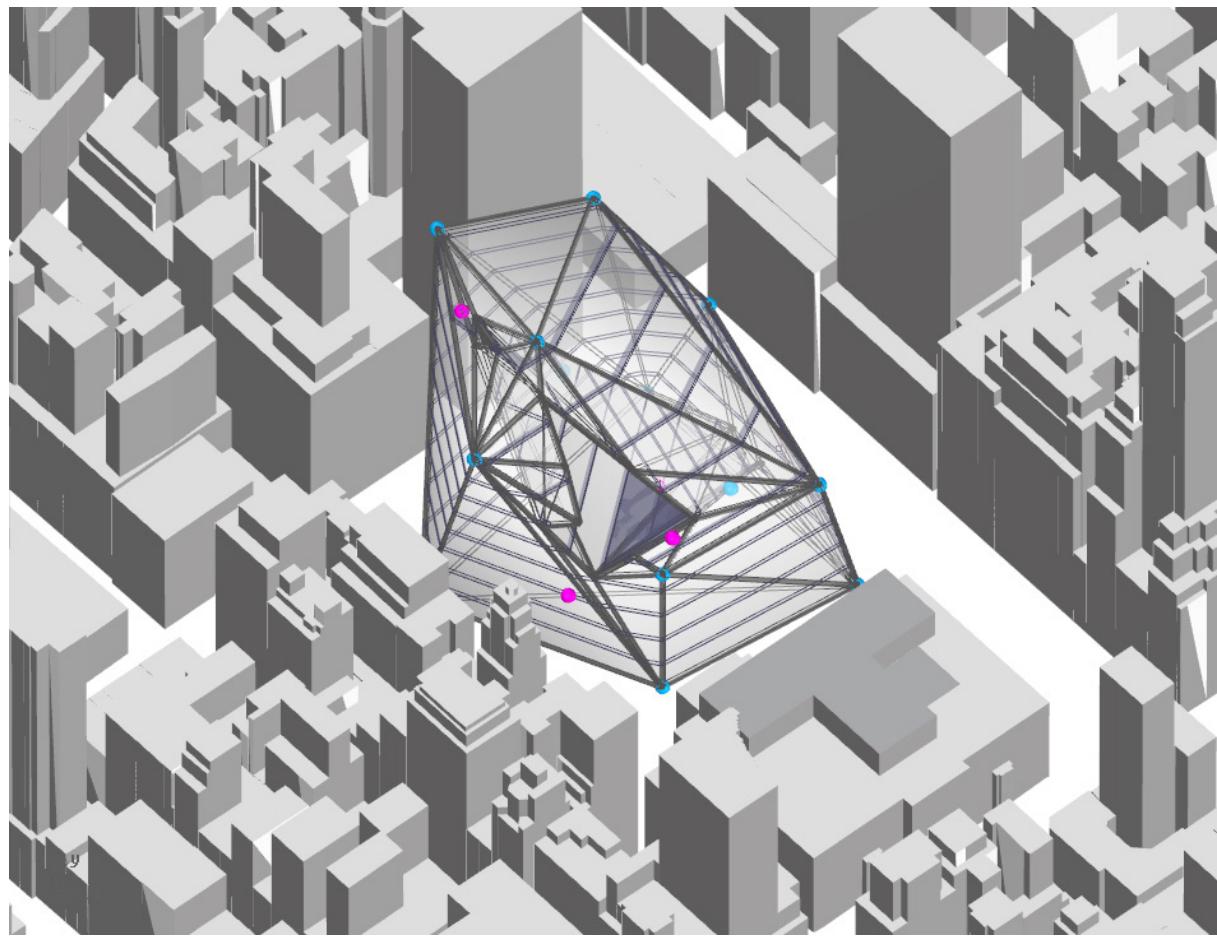


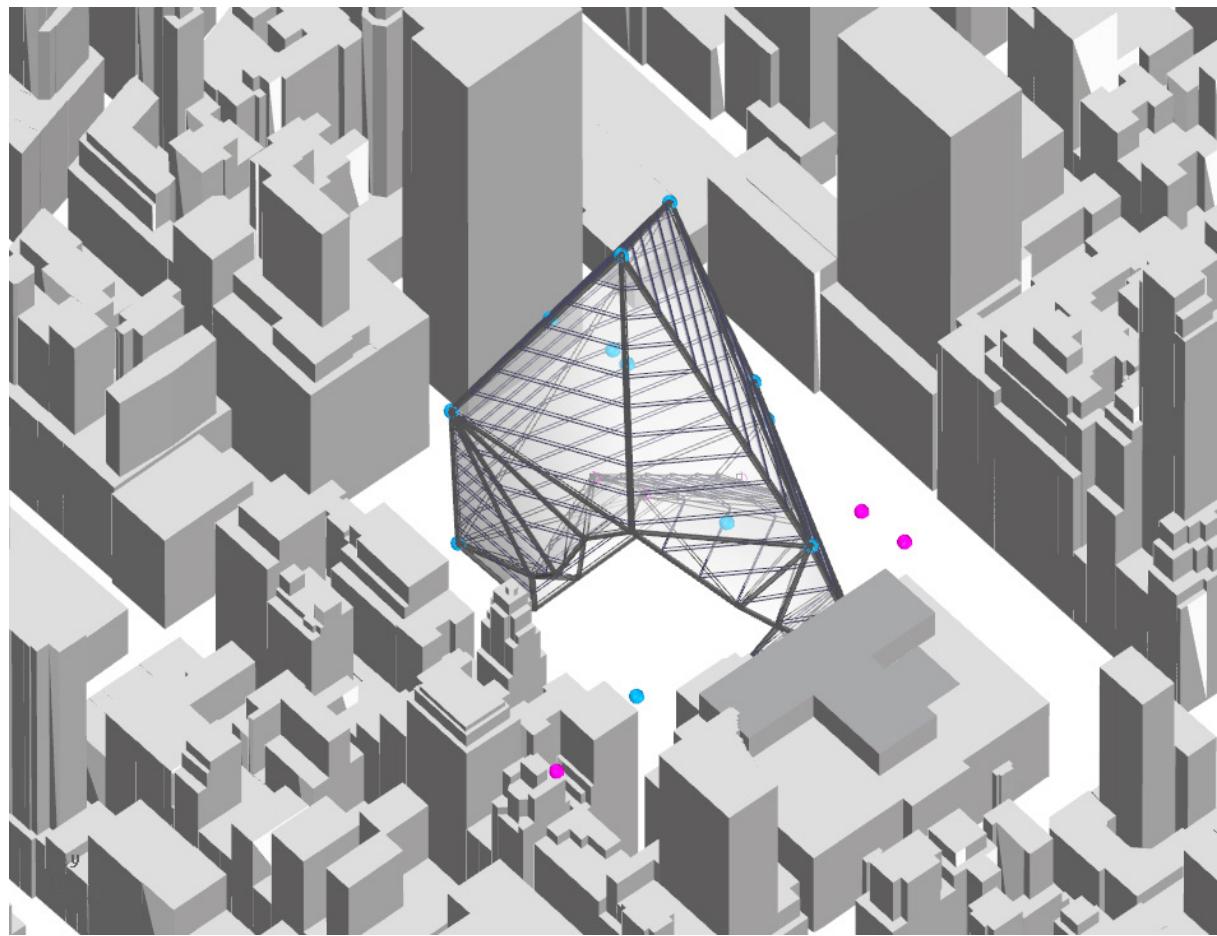


Finally, some tool examples

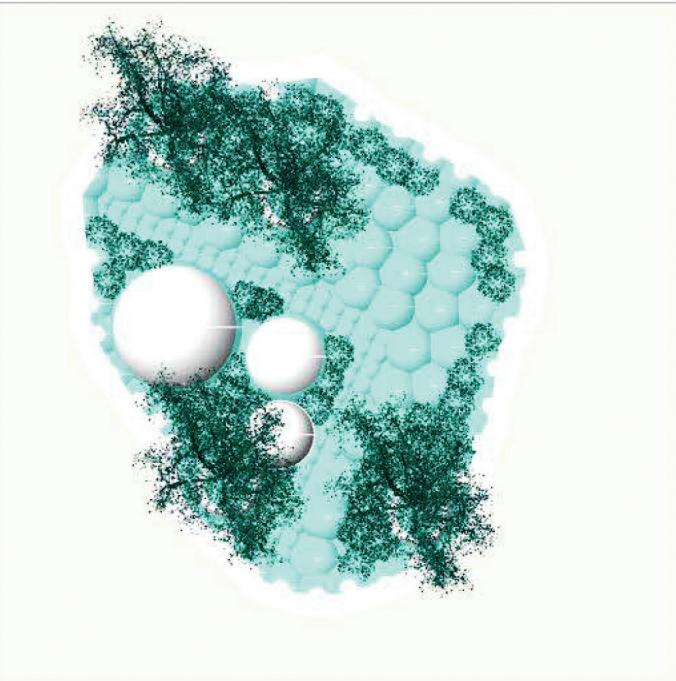




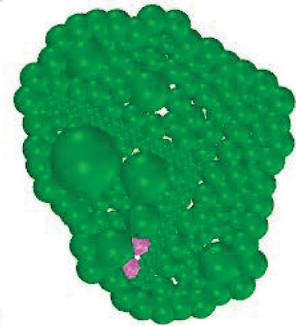




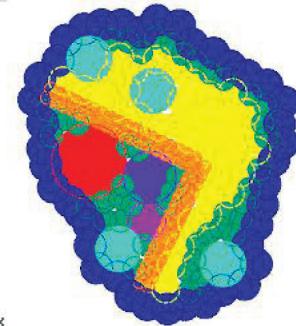
Plan



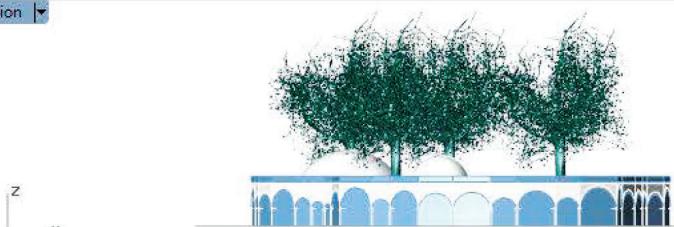
PlanDiag1



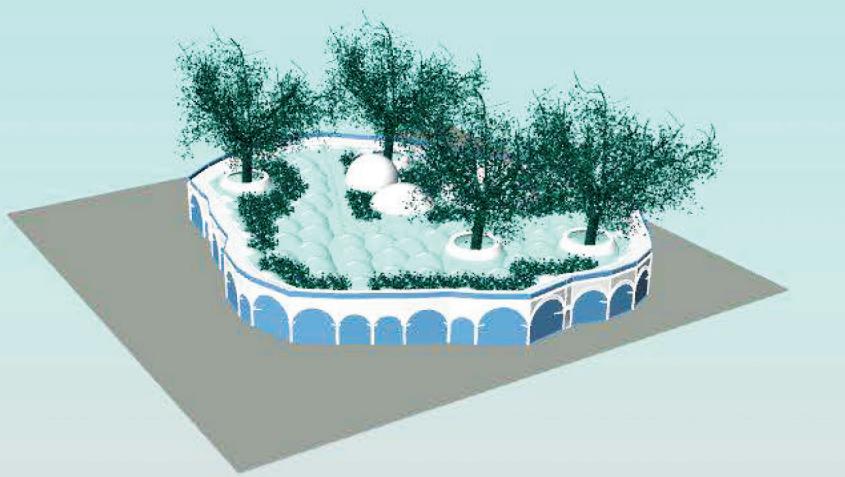
PlanDiag2

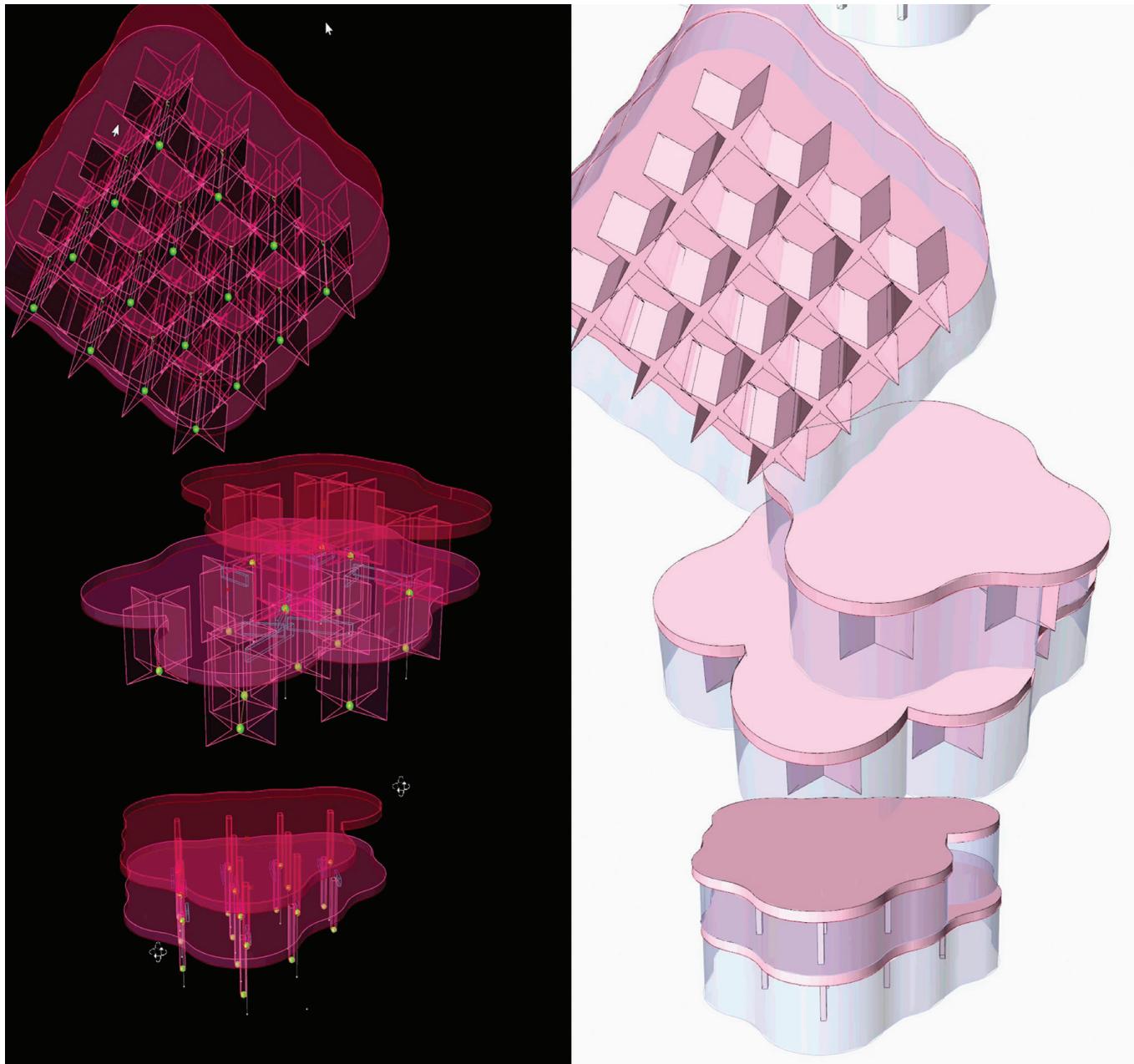


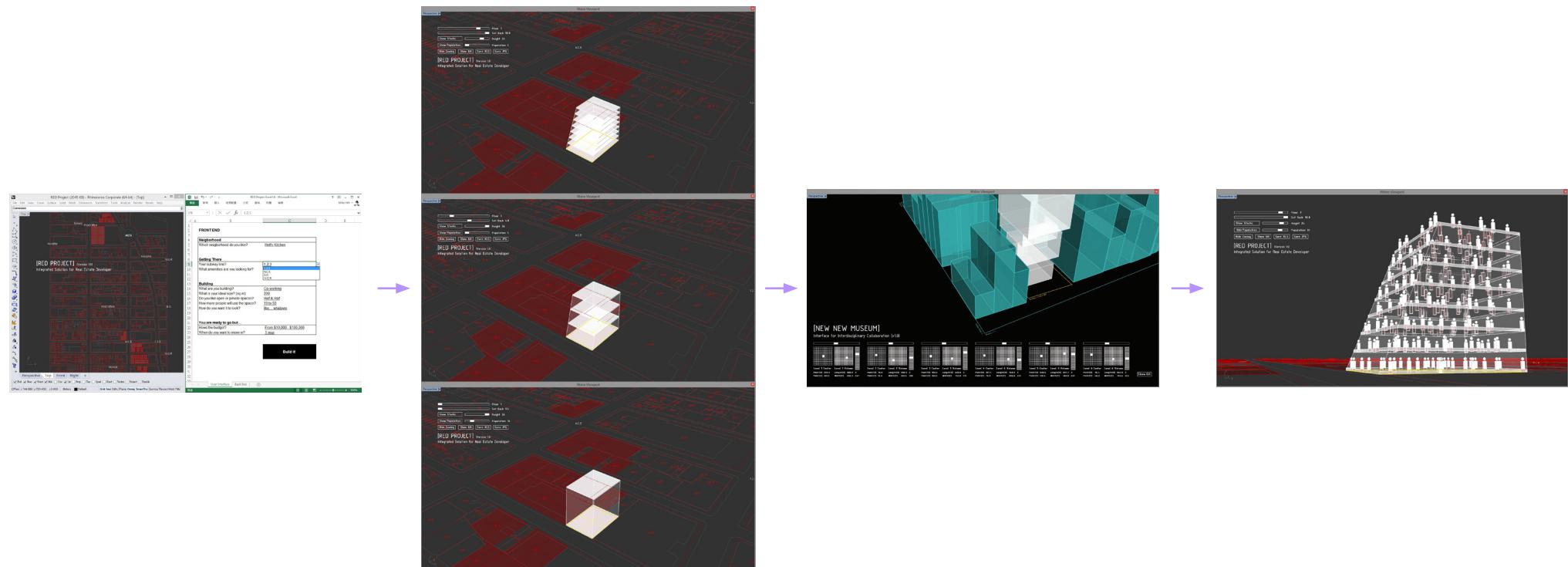
Section

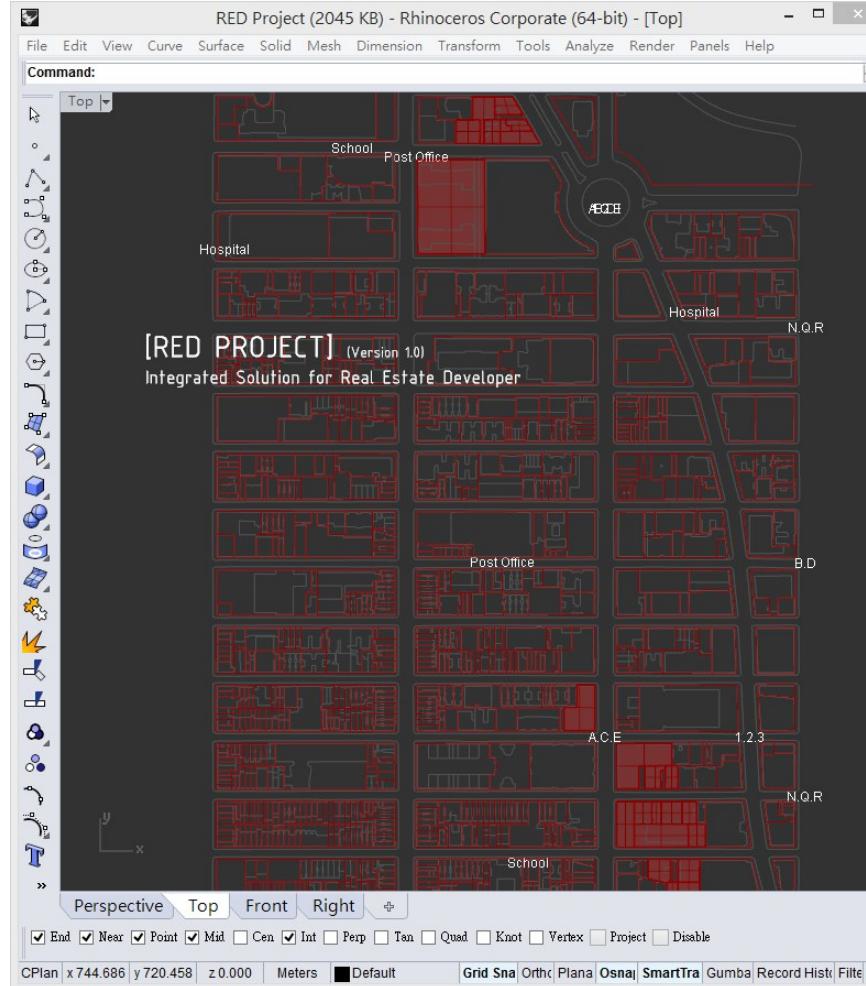


Perspective









RED Project Excel UI - Microsoft Excel

Mike Yeh

C9 : fx 1.2.3

A B C D E

1 FRONT END

2

3

4 **Neighborhood**

5 Which neighborhood do you like? Hell's Kitchen

6

7

8 **Getting There**

9 Your subway line? 1.2.3

10 1.2.3

11 A.C.E

12 B.D

13 N.Q.R

14 **Building**

15 What are you building? Co-working

16 What is your ideal size? (sq m) 200

17 Do you like open or private spaces? Half & Half

18 How many people will use the space? 10 to 50

19 How do you want it to look? like... whatever

20

21 **You are ready to go but...**

22 How's the budget? From \$10,000 - \$100,000

23 When do you want to move in? 1 year

24

25

26

27

28

29

30

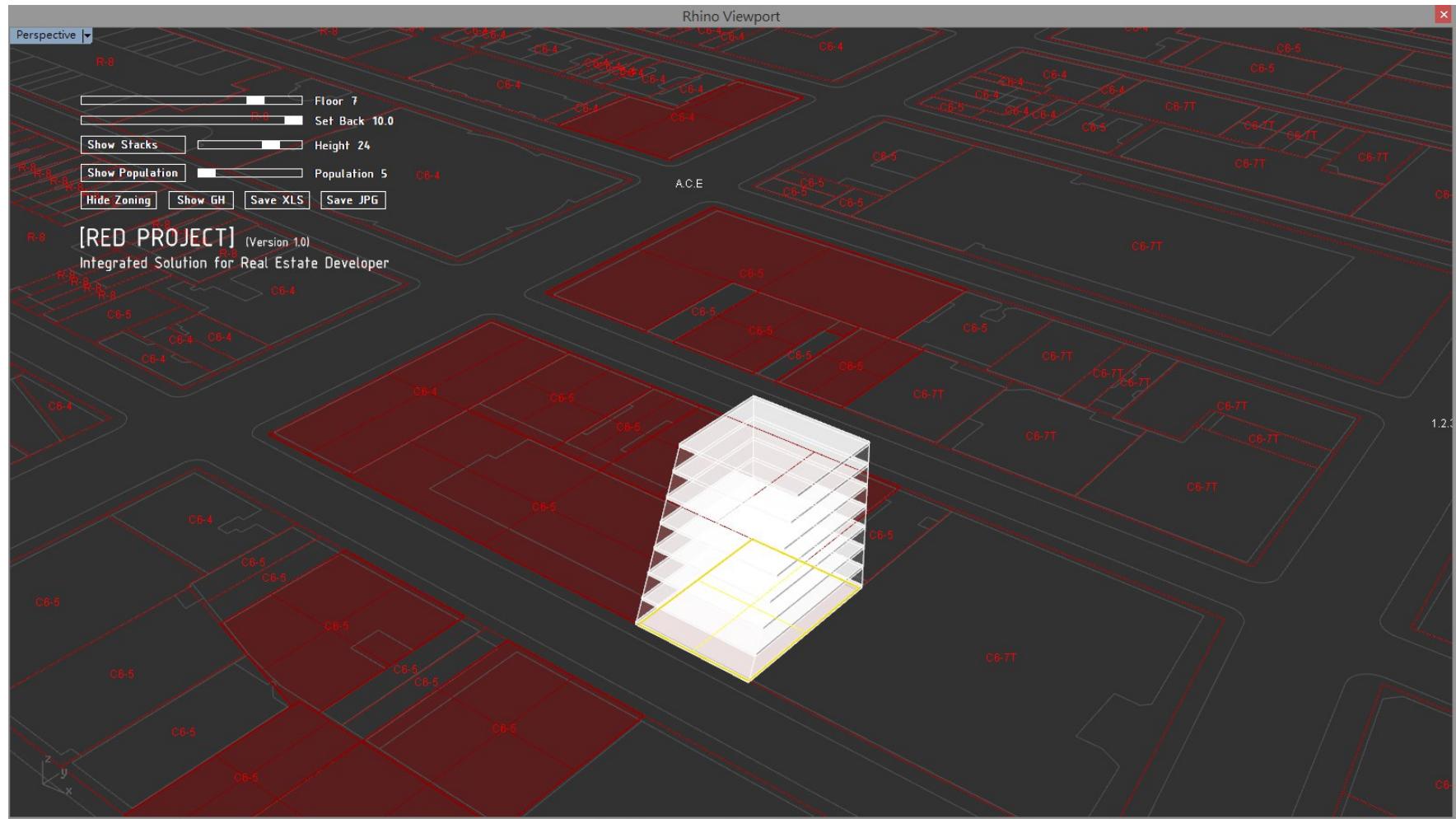
31

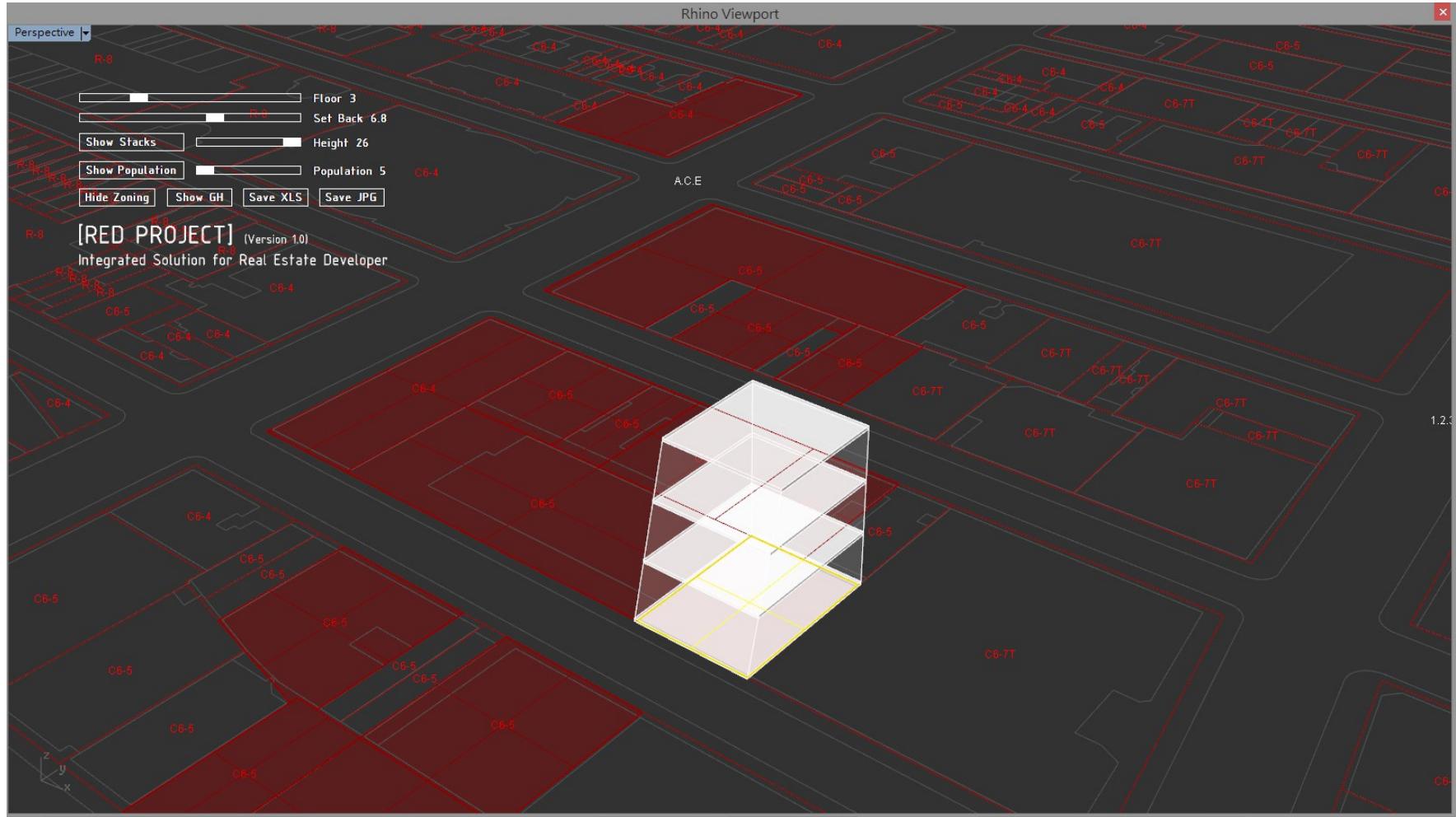
32

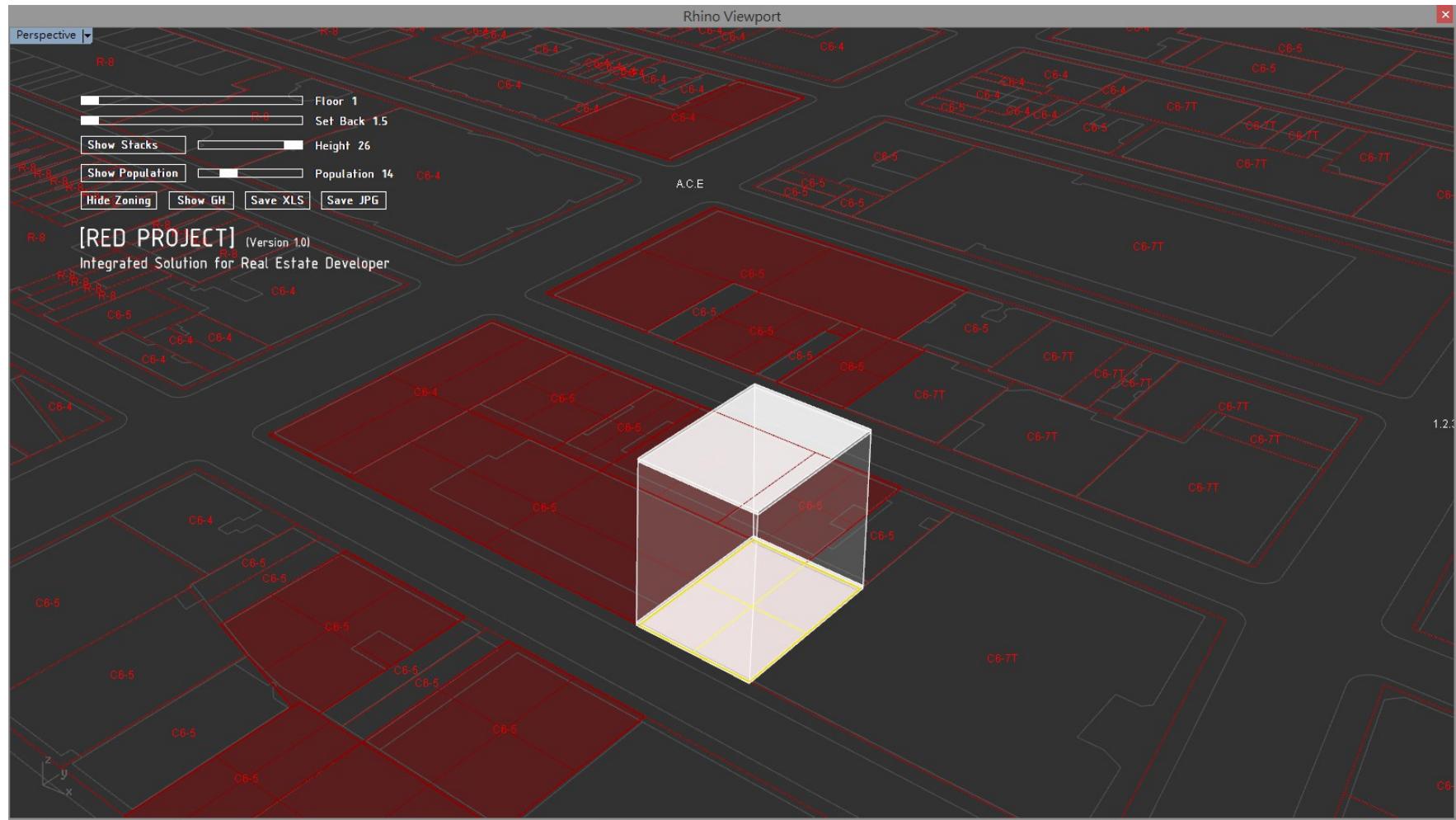
33

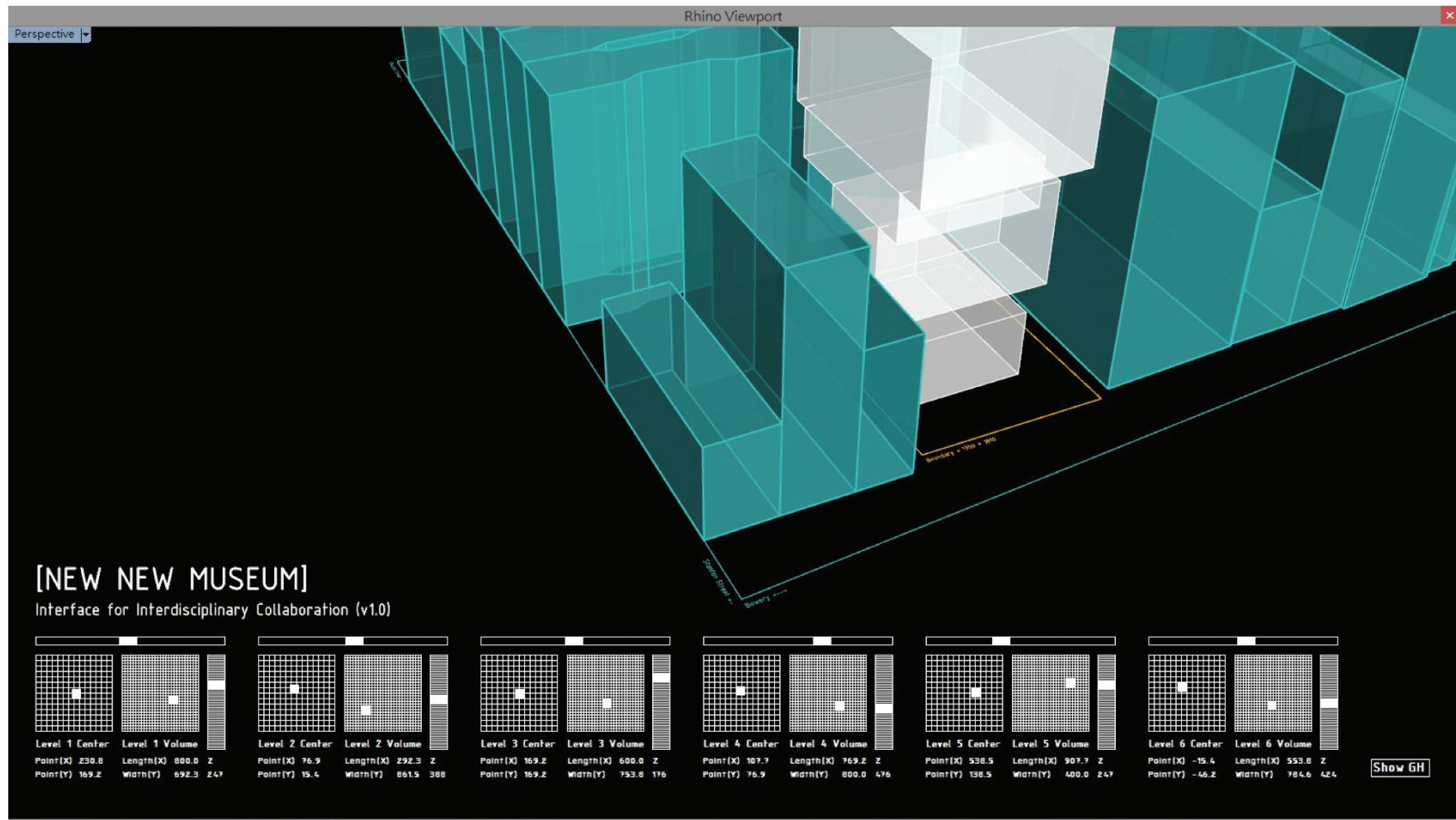
User Interface Back End

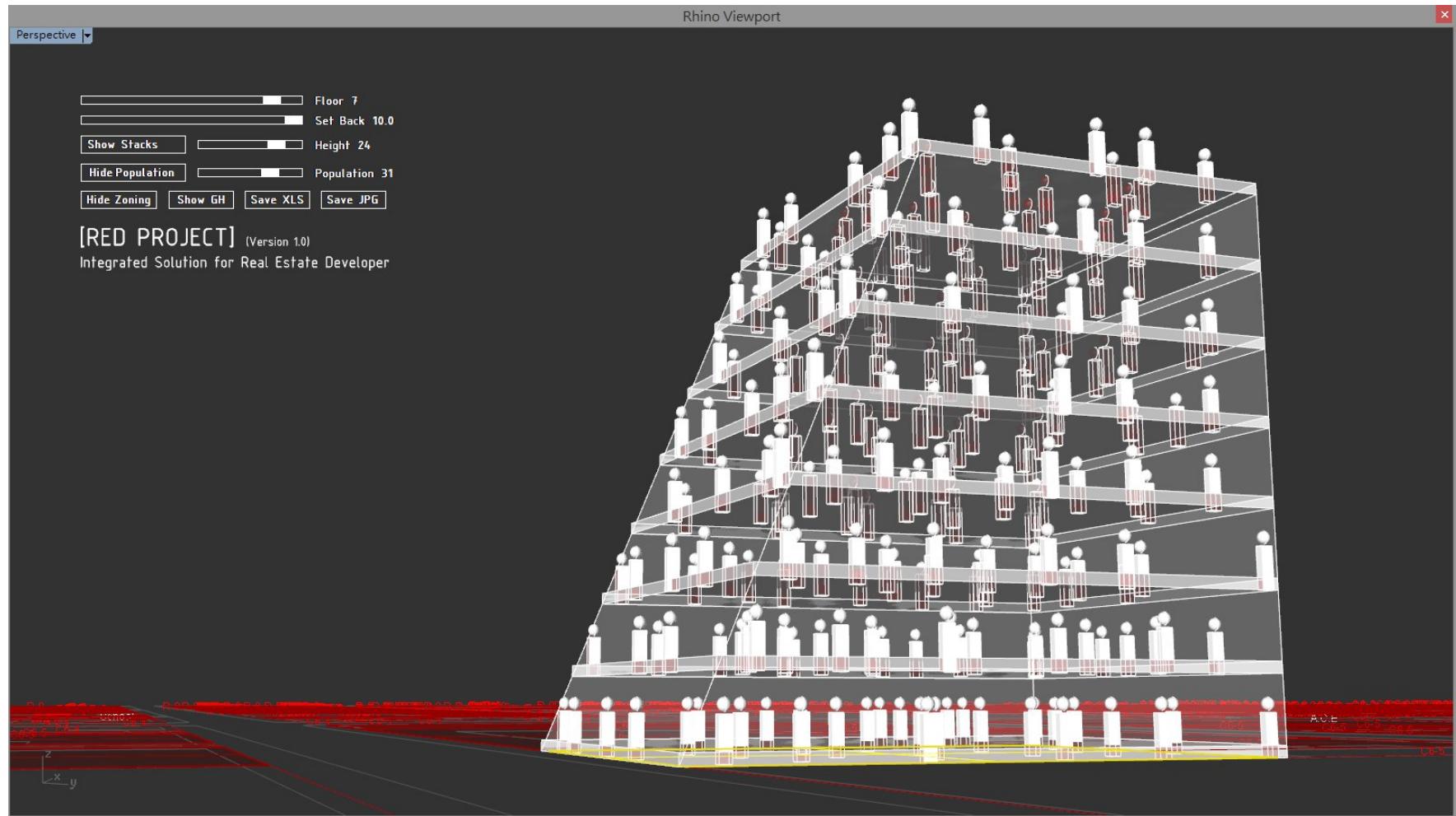
Build it!



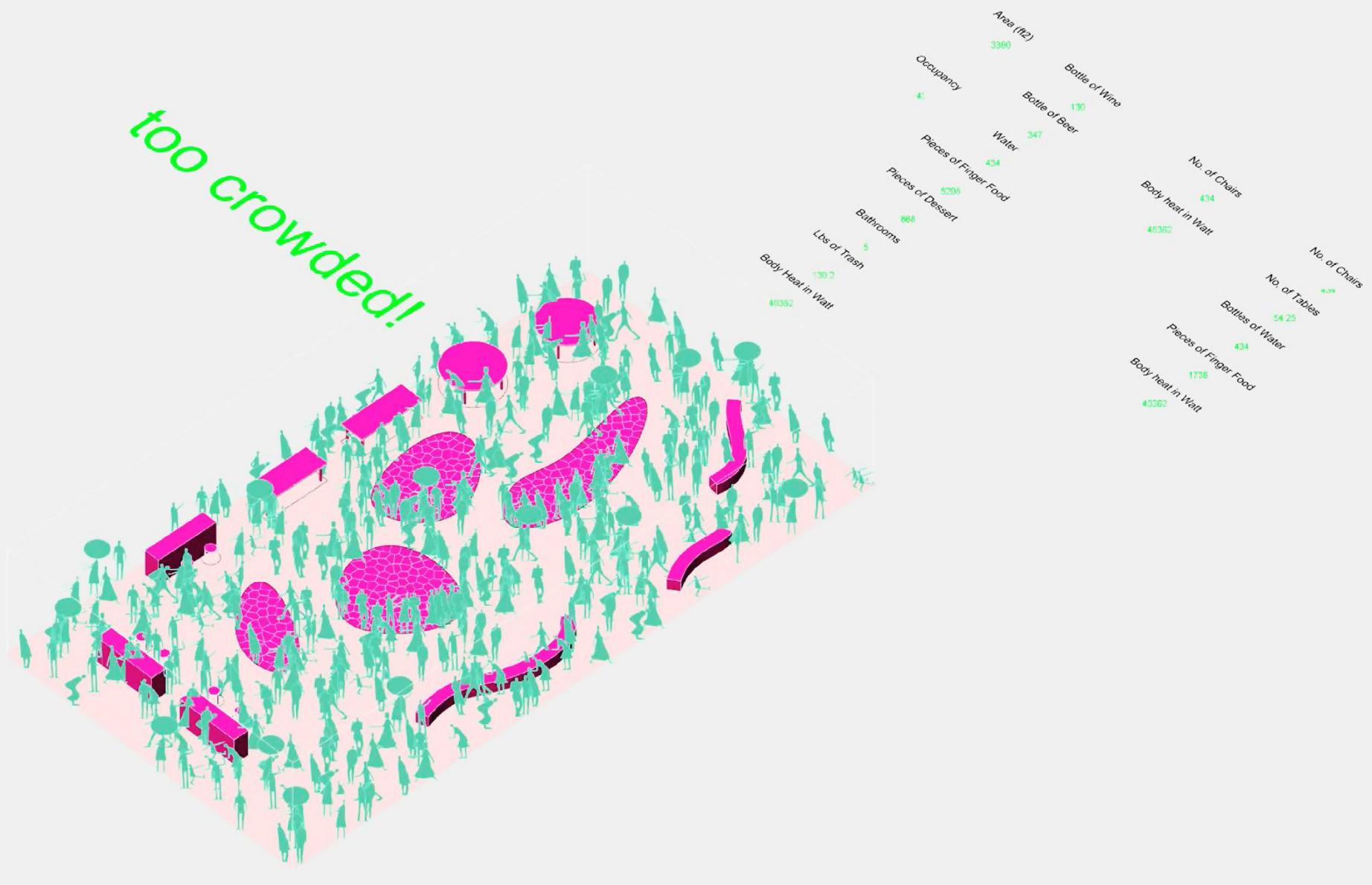


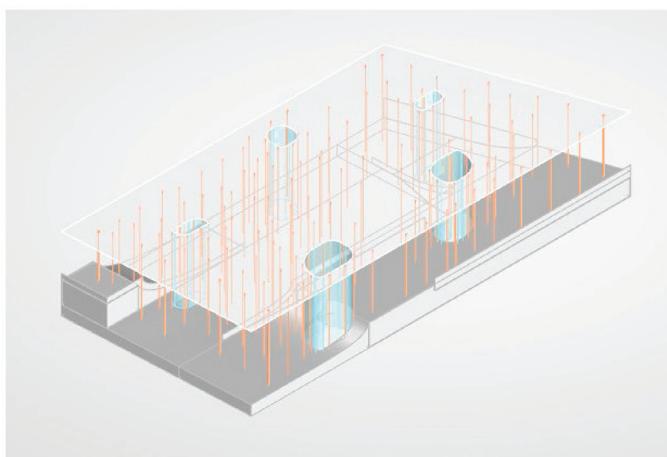
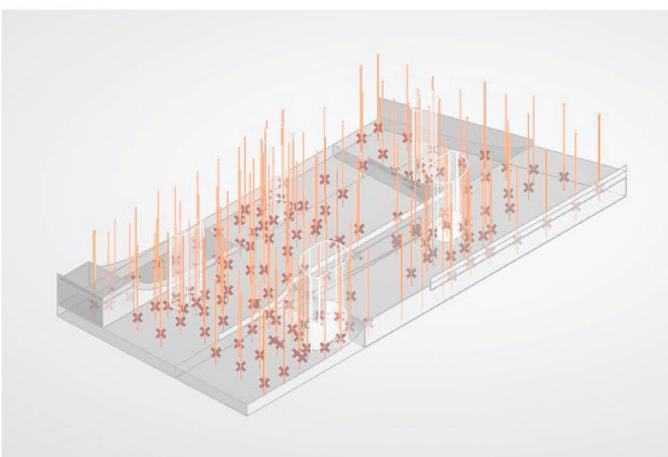
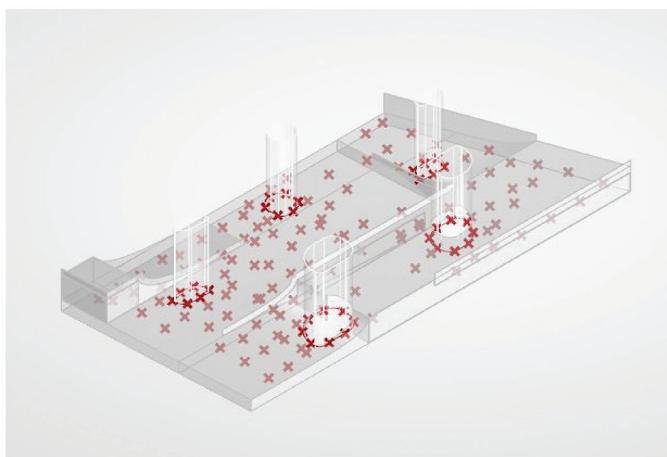
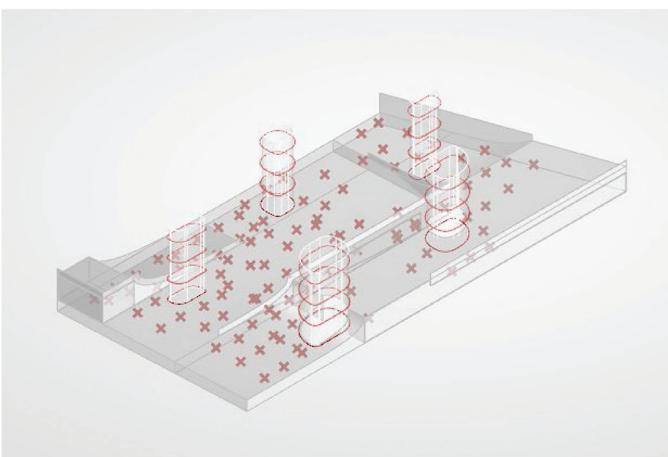
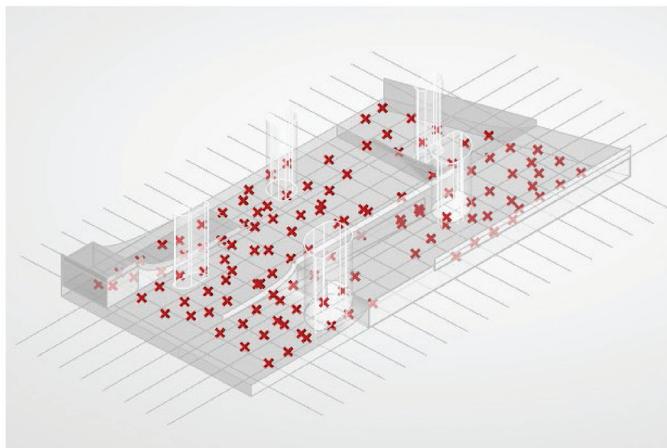
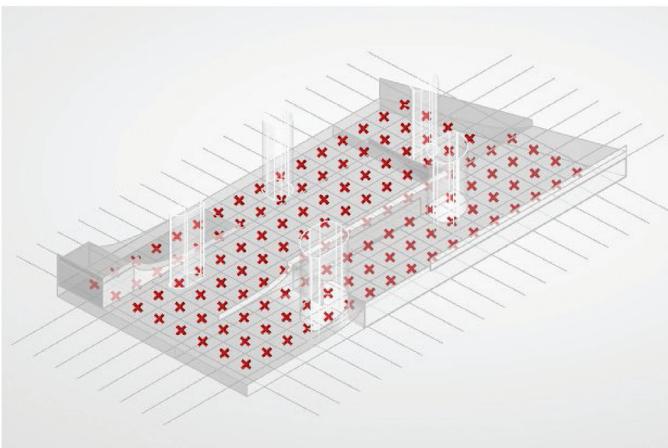


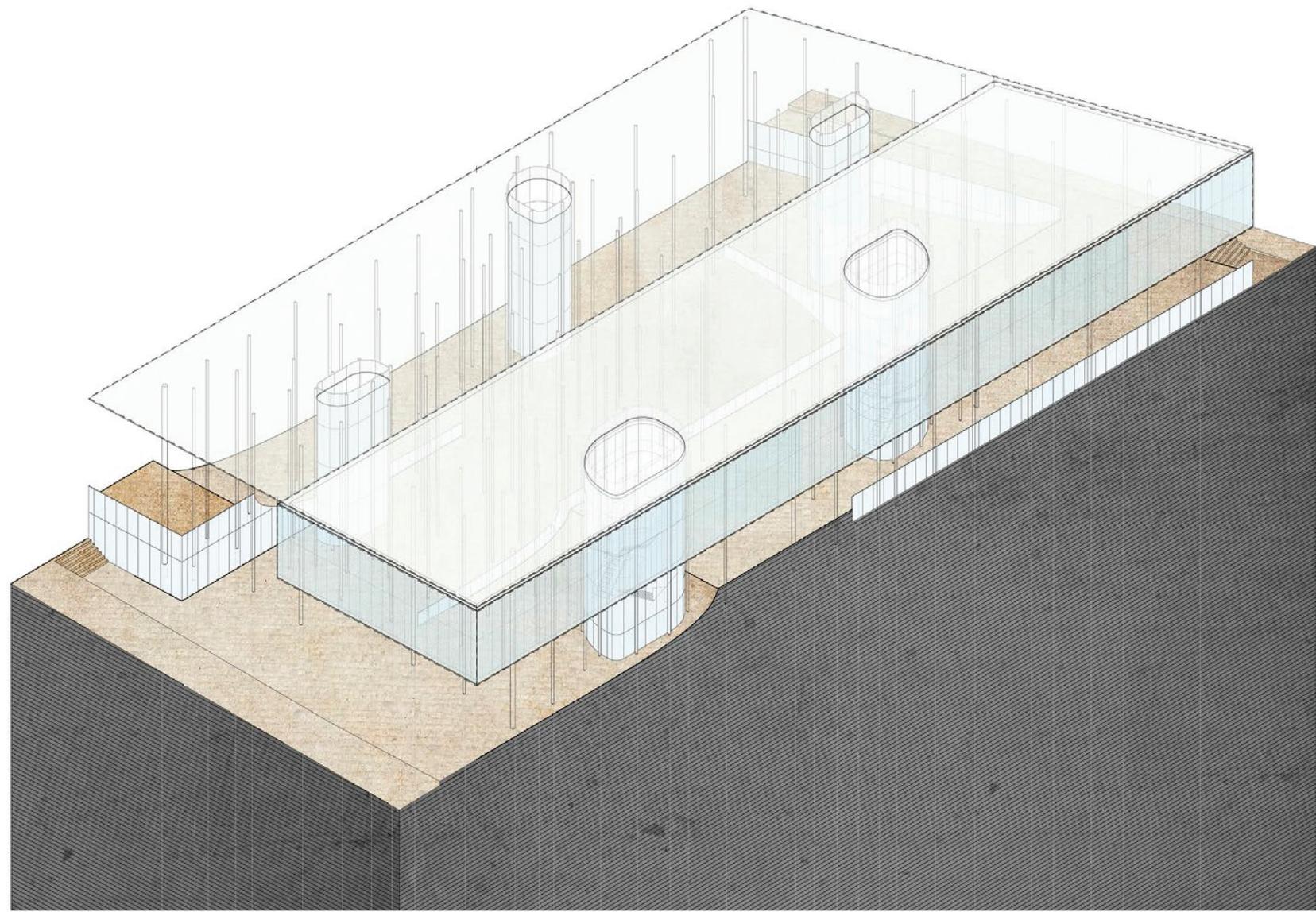




too crowded!









THESIS:

Architects should not only be able to **use** tools,
but should have the ability
to **design** new critical / experimental design tools.

METATOOL

IS A CRITICAL + TECHNOLOGICAL PROJECT
ABOUT CREATING EXPERIMENTAL DESIGN TOOLS
USING GRASSHOPPER AS A METATOOL:
A TOOL THAT ENABLES THE FORGING OF OTHER TOOLS.

DISCUSS THE PHILOSOPHY/THEORY OF PROSTHESES/BODIES/TOOLS.
DISCARD THE SPLIT BETWEEN ANALYSIS AND DESIGN.
ASSEMBLE YOUR OWN CRITICAL TOOLKIT.