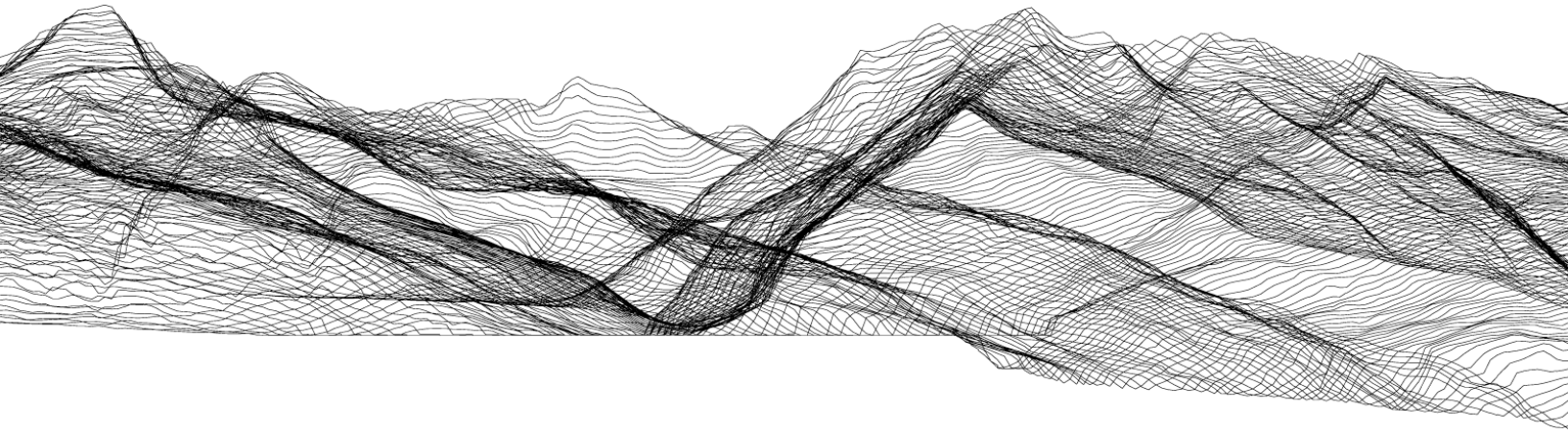
COMPUTATIONAL DESIGN TOWARDS AN ADAPTIVE LANDSCAPE

by Remy Konings



EXAMPLE

In a regular building, humans are the initiator of change. Meaning that if something needs to be adjusted, a person has to take action to do so. Now imagine a building in which a system will determine if a change is necessary. Products like air-conditioning and heaters already exist and it decides through measurements of data, if action needs to be taken. But products are add-ons to a building, they are not really a part of it.

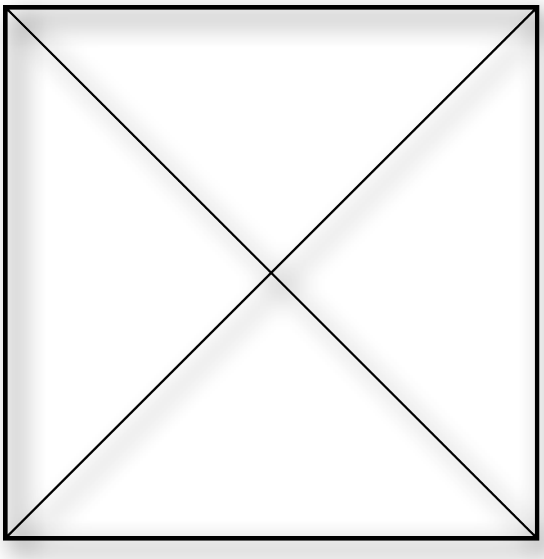
Imagine a building, which is designed through data (e.g. a building that can adjust it's construction according to weather-data). If heavy snow is predicted, that the roof of the building is able to bulge itself, so snow does not remain on the roof. These changes can be performed by computers withouth human intervention by making use of computational design. The computer understands that bad weather is coming at a certain point of time and could adjust the roof so if will retain it self in a more efficient way against the weather. There are many more examples in which computational design could benefit us as humans in ways we couldn't do ourselves.

COMPUTATIONAL DESIGN

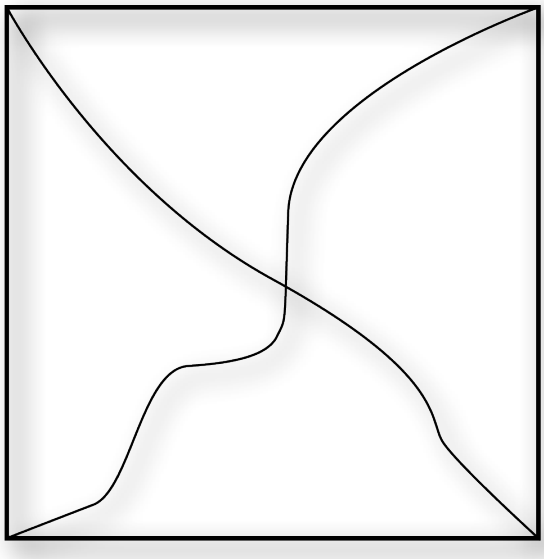
I would define computational design as my main interest these days. I love to use the power of a computer to make interactive connections between online services and my designs through coding. By writing this code, it allows me to tap into different sorts of online data and use that data to make connections between a physical design and virtual data. By making use of multimedia and other publicly available services through api's, I try to create spatial experiences and products that interact with the user instead of only being a thing on it's own.

By creating the 'outlines' of a design, you can tell the computer to take over the 'fill" of the design. This partly manual and partly automatic approach could create problematic results. Humans are not used to giving up control when they are designing, we tend to think about every possible way to take matters in our own hands. So we don't have to rely on unexpected outcomes. So by giving up control in certain parts of the design could create very interesting results that benefit us in ways we could not have seen before.

(pic. 1)



FULL CONTROL



PARTLY CONTROLED

Because computational design can save a lot of time, it can be used to experiment with. The code is able to handle a lot of different inputs which makes experimenting more interesting. In comparison to handcrafted work where it often takes a lot more time to show an end-result, you are actually making many small changes every time you touch it. You could argue that both methods aim for the same result. The tools that we use in order to create that particular design differs, therefor the tools are actually the reason of change.

TOOLS

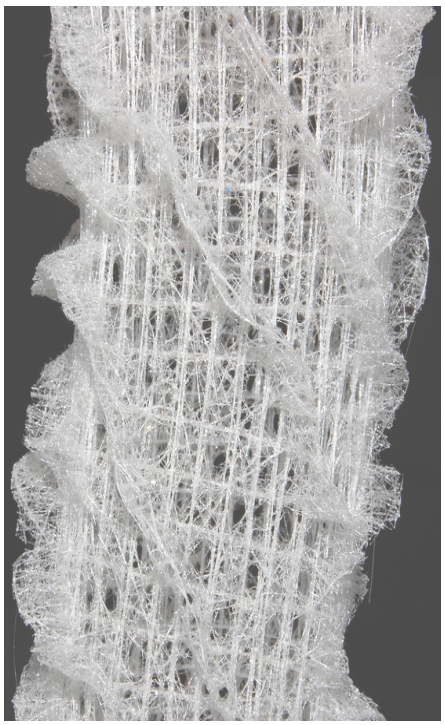
My main software-tool for developing an idea is Rhinoceros in combination with Grasshopper. Rhinoceros is a 3D-design and visualization software-program that allows the user to build up there designs using points, lines and surfaces. Grasshopper is a plugin for Rhinoceros. It allows the user to pick an object in Rhinoceros and define a certain behavior for that object (scripting). Personally, this combination works great for me. It allows me to freely design in Rhinoceros if I feel that is more appropriate towards the idea. Then when I feel that connecting a certain behavior to the design makes sense, I incorporate that as well. Of course, this method works vice versa as well. By starting a design through scripting, you are actually designing the overall shape. Then by freely designing on top of that shape, you can add details of such if necessary. I favor the first approach because designing freely more based on senses and that feels more right.

Physical tools which I prefer are lasercutters, cnc-milling machines and lately the use of an Arduino in combination with processing. The lasercutting and cnc-milling machine are obvious choices in my field regarding the creation of accurate environments and spaces. Never the less, after joining Digital Craft, more and more I began to realize that motion, interactivity and media should play a part in my field. We as Spatial designers should look beyond our own field and realize that connecting people via (interior)architecture not ends there.

BIOMIMICRY

Biomimicry is an approach to innovation that searches for sustainable solutions to human challenges by emulating nature's time-tested patterns. Biomimicry could therefor very well be a key component in designing future constructions. Natures experience is far more advanced in adapting itself through time. Sea spongesbaskets have adapted themselves on a cellular level. These creatures/plants use the least amount of material to create there skin/ construction. Through time, these sponges have adapted themselves to survive in the most efficient way possible.

(pic. 2)



By creating buildings that adapt based on biomimicry standards, we can develop a landscape in which the border between nature and construction fades away. We could enjoy our environment is a far more meaning full way then ever before. For decades, humans have tried to bend nature to fit there needs. We are not working together with nature, but most of the time we are working against it. Nature should be a collaborator instead of the enemy. Now, through computational design, we can create connections between our dynamic environment and our constructions. It would push humans again to adapt.