



# HtwoOexpo + the Water Pavilion

LARS SPUYBROEK + NOX

brett osness

# SPACE

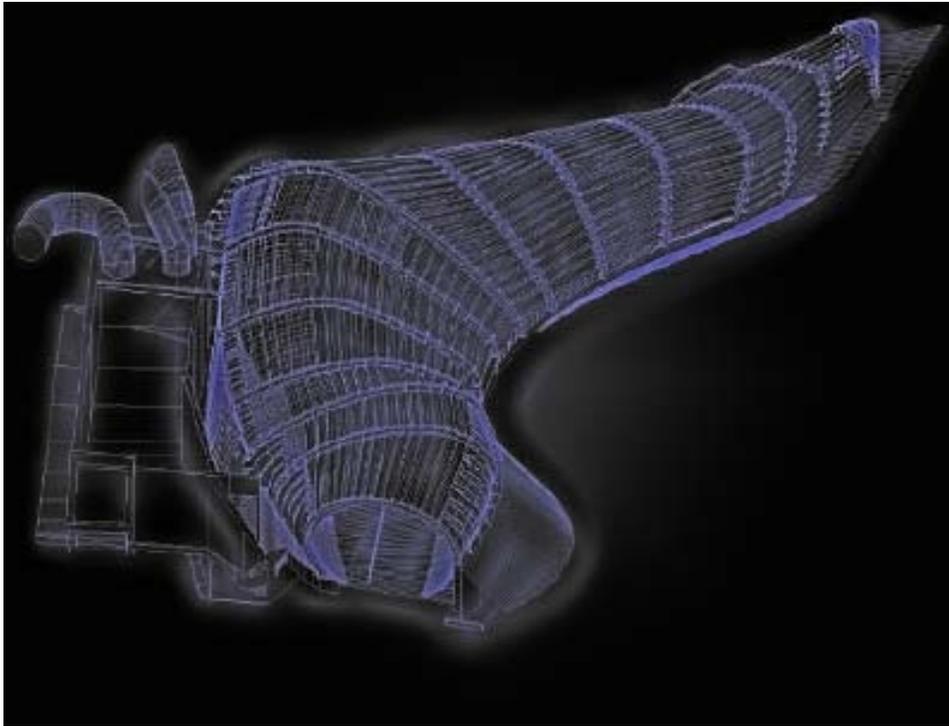
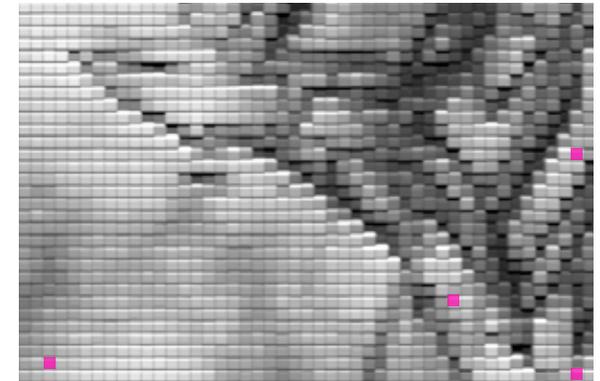


FIGURE 1 ◀

*“Liquid” architecture* - Spatial qualities are dictated through a series of motor geometric connections between objects and events. Space is a result of the continual process of transformation between interconnected parts.

FIGURE 2 ▶

*The structure of space* - Revealed as a product of varying iterations of patterning events which are manipulated through time. Space is never static, it is in continuous fluctuation operating at a smooth chaotic rate. Natural ordering of time sequenced user interactions create internally generated rules of pattern. The structure of space is this manifold patterning.



without the actual interaction between space and subject? For Spuybroek, it is these concepts of time and subject interaction that formulate his theories.

The idea of “space” for Spuybroek is not necessarily the air between walls but rather the *structure* of space. This *structure* of space should be viewed as a product of time with varying iterations and movements. It is congruent with matter because like matter, space is a product of pattern and order (Spuybroek, 2008, p. 53). It is the shared relationships between real-time molecular interactions that decide spatial qualities and experiences. Therefore the concept of space reveals itself, exists, and changes all in accordance to time. For Spuybroek, space is never static and can never be experienced in two separate moments of time in the same way.

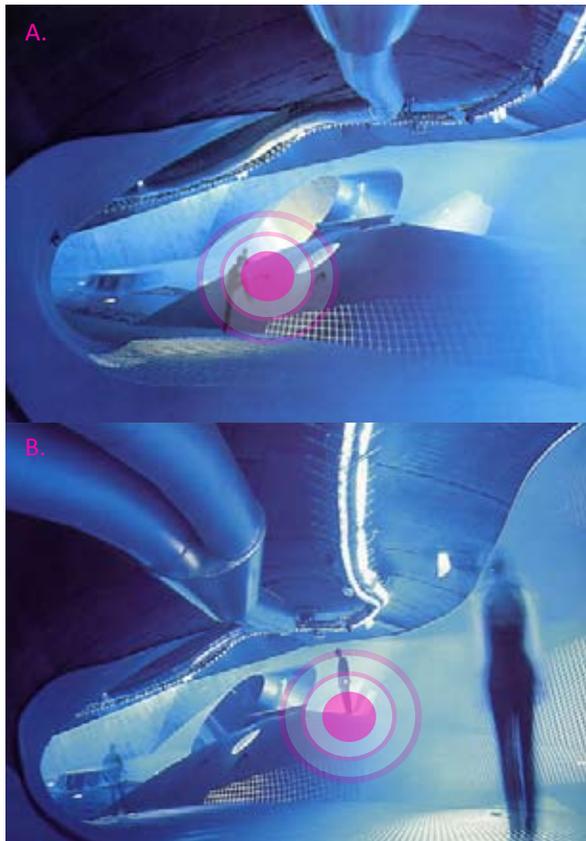
The Water Pavilion project can be described as a form of “liquid” architecture, where spatial qualities are dictated through a series of motor geometric connections between objects and events. The result is unforeseen where “everything is involved in a continual process of transformation into the other – everything is necessarily opened up and leaking away” (Giannachi, 2004, p. 102). It is similar to the real-time, fast-paced digital world of today, where information is distributed in an economy organized and monitored by the virtual. The Pavilion is an interactive journey through this notion of the unforeseen.

For every project, Spuybroek conceptualizes the experiential, living, vital body. He explains that the body is a manifold patterning which tries to gain stability through action. Bodies transgress in time through action, entering time and connecting to other bodies and other actions. After considering the experiential body of timing actions, there can only be space in this sense. He writes, “there can be space in time, but not the other way around” (Spuybroek, 2008, p. 52).

Spuybroek’s concept of space is derived from radical constructivism, where space does not exist per se but rather everything around us is unstructured information that becomes structured only once we interact with it. Therefore, body and architecture merge into one synthetic action space (Spuybroek, 2008, p. 53). Space is only revealed as a result of this interaction. Architecture is the interface between body and space.

I assert that Spuybroek’s theory of space is derived from related concepts put forth by both Siegfried Giedion and Bruno Zevi. Giedion was a theoretical advocate for the idea that space is based on the notion of time. However, his concepts were never able to move beyond the opposition of a static space and a mobile viewer. Giedion put space at the center of history with three distinct concepts in the development of space: volumes conceived without the presence of viewers, interiors as paramount over all space, and the unity of interior-exterior dichotomy (Lefebvre, 1998, p. 180). His theory lacked Spuybroek’s concept of the transfer of movement from the viewer onto the space. On the other hand, Bruno Zevi saw spatial qualities animated by the gestures and actions of those who inhabit it” (Lefebvre, 1998, p. 181). He brings about the question of how can a space be adjudged “beautiful” or “ugly”

To enter the space, the subject moves through the outwardly opened double partition of metallic mass. Here, the space is narrow and tight, reminiscent of a glacier crevasse with no particular distinction between horizontal and vertical, between floor, wall, and ceiling. Describing these spatial conditions, Spuybroek adds: “since the connection between wall and floor is now continuous, it implies that the floor slopes and bends, and because of its variation, slopes do not stay within the same gradient” (Spuybroek, 2008, p. 41). Space in the Water Pavilion is fundamentally defined by the notion of instability, which is achieved through the hyper-dimensional idea that the ground is all around.



The space does not change topographically or in dimension but instead it is programmable to a certain degree. The freshwater of the interior responds to real-time movement of subjects within the space. Sensor activated processors produce interference in the continuous processing of a virtual time-based model of water. Sensed changes to the space activate changes to the virtual water system, images from which are projected throughout the interior of the pavilion (Weinstock, 2005, p. 49).

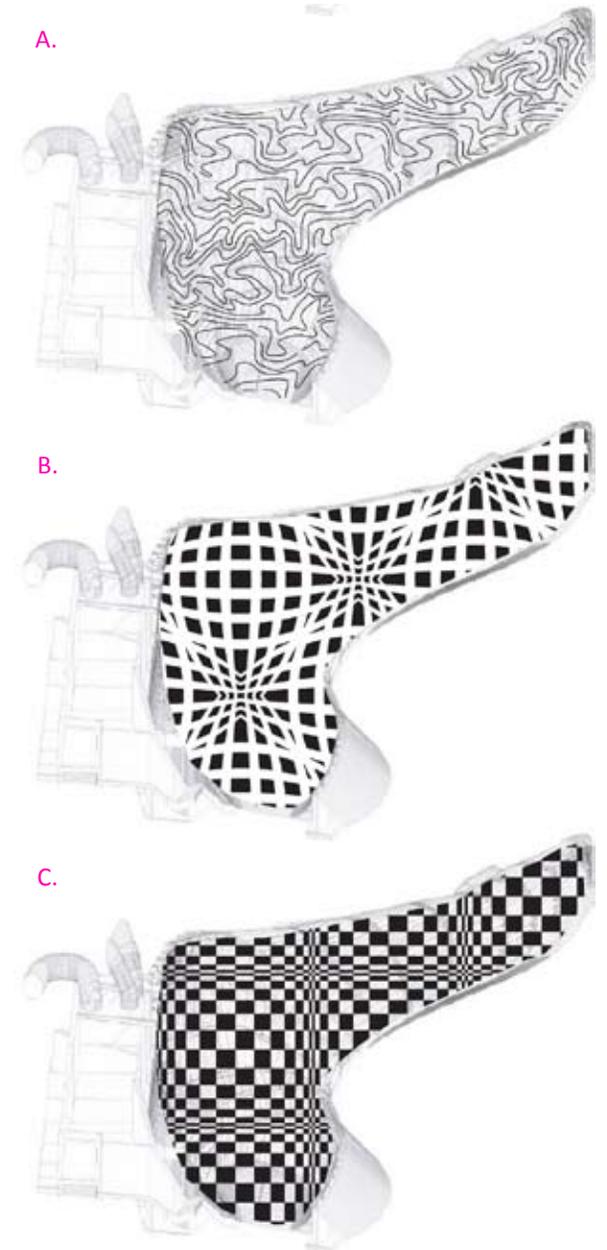
Three sensor systems exist: light sensors are activated whenever walked through, touch sensors are pushed by hand or stepped on by foot, and stick-shaped sensors are pulled. Each group of sensors operates on three different levels of interaction within the space. The first being a topological deformation of wire-frame grids that resemble a liquid, water-like substance projected in the form of longitudinal waves, circular ripples, and blob-like drops. The second level of interaction is the visual manipulation of lighting throughout the interior. Hundreds of blue light bulbs run from the beginning to end of the spine-like linear interior creating waves of complex patterns. The last level of interaction is audio based, where distortion, pitch, and volume levels change in real-time depending on the number of subjects occupying the space (Spuybroek, 2008, p. 44).

FIGURE 3 ◀

*Hyper-dimensional space* - With the absence of any pure horizontality or verticality, a uni-surface begins to engulf the space. The result is a new horizon - the horizon of vertigo.  
**A. Pulley-based system** - stick shaped sensors which are pulled by the user.  
**B. Touch-activated system** - placed sensor pads which are stepped on or pushed by hand.  
 Result -Htwo0 projections.

FIGURE 4 ▶

*Spatial sensory* - Three independently systematized sensory intakes.  
**A. Wave-like projections** - visually controls artificially enhanced vertigo horizon.  
**B. Complex patterning** - visually controls sense of spatial perspectives and enhances the notion of the infinite.  
**C. Audio manipulation** - acoustically controls sense of depth in space.



One can gain additional understanding into the Water Pavilion's activated spatial shifts by analyzing Gilles Deleuze and Felix Guattari's complex theories in the balanced relationship between smooth and striated space. In smooth space, there is a sense of continuous movement towards the infinite with no rules governing top, bottom, or centre. This occurs in the project when the Pavilion is unoccupied and in a state of rest. For Spuybroek, it is a period in time where space does not exist. Striated space on the other hand is space defined by order, divisions, and certain complexities which are resulted from event (Deleuze, 1987 p.474). In the Water Pavilion, the event is user activated through the systems of sensors. There is a continuous reversibility between smooth to striated spatial qualities that are dependent on user action. Smooth space is converted to striated space while striated space is reversing back into smooth.

The Interactions between subject and space are not only between the system responding to the user; but the user, in turn, responding to a response, creating a process where space is unpredictably determined by time and event. The space created inside the Water Pavilion is therefore never static and is constantly in-flux. As a subject walks into the space, multiple light sensors are activated one after another, causing wave motion through the projected virtual. The subject now begins to chase the waves causing a new series of interactions and shifts in projection. As the subject steps on a touch sensor, ripples span out from his or her feet colliding with a second subject's projected ripple. Subsequently, resulting in a deformation of both sets of projections behaving in the same way as physical water. Here, perspectival depth in space is constantly becoming manipulated by system to user responses, user-to-user responses, and in both cases, responding to responses.

Without x-,y-, or z-axis perspectives, a feeling of falling or vertigo is experienced. One's conceptualization of stability is lost in space and in-turn replaced with a multi-sensory override.



FIGURE 5 ▲

*Smooth to striated space - Revealed through the transformations of patterning order activated through event.*

It is the complex interactive system activated by the user that is the main determinate behind the spatial qualities and experience of the Water pavilion. Space is never a given but rather a result of an experiential body timing its actions. It is manifested, manipulated, and controlled by the subject and therefore does not necessarily exist without engagement.

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# FORM

In order to understand the concepts behind the process of generating architectural form, one must revert back to the basics of elementarism. Architects tend to think in an elementarist way, where elements are the simplest state of being, defined by internal complexities of organizational properties that in the end determine purpose.

Architectural styles such as classicism and modernism generally worked with predefined elements to generate form. Columns and beams are seen as a form of determinism where each object is considered to be a *finality*. If we were to visualize *finality* on one side of the spectrum, which we consider a determinism, then

on the other side of the spectrum we have *generality*, considered to be an indeterminism. An example of generality would be work from any minimalist architect who strives to reduce all formal components into one single form; Mies van der Rohe.

With *finality* and *generality* at each opposing end of the spectrum, we can more clearly articulate the remaining two modalities that lie in between. Interior to *finality* we have *ambiguity* which consists of two or more independent states overlapping one another. This overlap is working together to create a third condition; an example being Adolf Loos' entrance of Haus Muller where an inhibitor can see either a large space between two columns or a wall with an opening in it (Spuybroek, 2008, p. 25).

The last mode of elementary existence, between *ambiguity* and *generality*, is *continuity* where all is materialized, where both object and inter-connected relations can be seen. Things tend to be generalized but can still be independently articulated and expressed. The Gothic is seen as an architecture of *continuity* "where all elements are in a constant state of transition, column becoming vault, vault becoming window, window tracery becoming wall, and on and on: all movement is passed on, without ever dissipating" (Spuybroek, 2008, p. 26).

Architectural form is made up of parts, of elements; the Water Pavilion is an example of an elementarist state of *continuity* where smooth with striated, movement with staticity, virtual with physical, and matter with expressivity are independently expressed while simultaneously being synthesized together as one. The Pavilion's form is determined through information analysis of individual subject action. "Animate form" is continuously being resisted by the vagueness and flexibility in the systematic design. The structuralization of form is shifting, meaning that the form is adapting to the continuity of relation occurrence within the space.



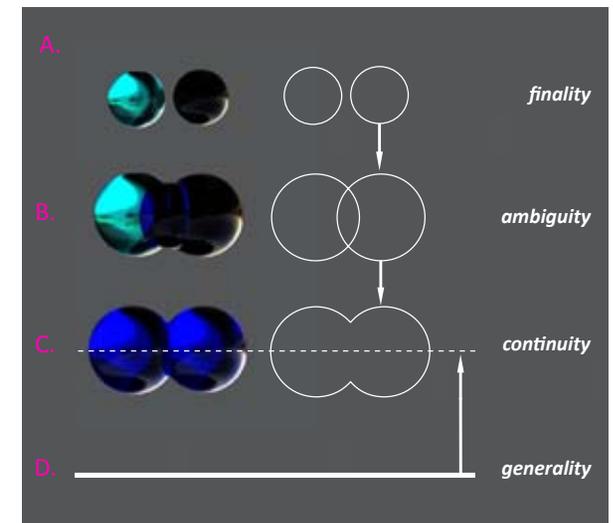
FIGURE 6 ◀

*Continuity of form* - Continuous form expresses both object singularities and object relationships. All movement is passed on, without ever dissipating. It is the relations that create the whole, not the parts.

FIGURE 7 ▶

*Modalities of form* - The four elementarist modalities of form. They are the most basic states of being, which are defined by an internal logic.

- A. *Finality* - each object is regarded by-itself.
- B. *Ambiguity* - dual state of being, two determined states overlap but still work independently.
- C. *Continuity* - objects articulate themselves while expressing the whole.
- D. *Generality* - generalizing object differences into a single state of being; a neutral average.



Similar to Lebbeus Woods' concept of *freespace*, the Pavilion is never interpreted with a predetermined function or programme, but only through an individual set of actions, purposes, and meanings, form is truly revealed (Woods, 1992, p. 15). Although there is vagueness to the Pavilion's form, *freespace* still possesses a precision to spatial, dimensional, and material qualities. The precision "lies between one surface, texture, colour, degree of newness or decay, degree of lightness or darkness resulting from shifting conditions of illumination" (Woods, 1992, p. 16). The Water Pavilion's form is generated through individual user action occurring in *freespace*. In this project there is a certain interference of form and action. There is a multiplicity of complex twisted splitting, stretched twisting, and rotational merging of both optical and acoustical projections. These types of descriptors are not typically used to describe form but due to the continuous "liquid" nature of this project, action and movement, in an abstracted way, are form.

If action and movement are form then the Water Pavilion is a time object. Every detail in the generation of form is directly related to the time in space that it is experienced. It's the formation of the radically new, described by Henri Bergson that is resulted from the inter-mingling of matter and consciousness in the *in-between*. The *in-between* is the "locus of futurity, movement, speed: it is thoroughly spatial and temporal, the very essence of space and time and their intrication" (Grosz, 2001, p. 94). The *in-between* is not about the repetition of the past but because of its futurist approach, there is no one particular duration or patterning of rhythmic occurrence. The Pavilion's form is generated as a qualitative multiplicity through time rather than in time, thus creating an un-timely dimension to the project. This un-timely dimension does not emphasize timelessness but rather a time of continuity. Each moment of time is expressed and is crucial to the development of the whole, while as one moves through time, the whole is articulated (un-timely dimension). It is movement that generates continuity.

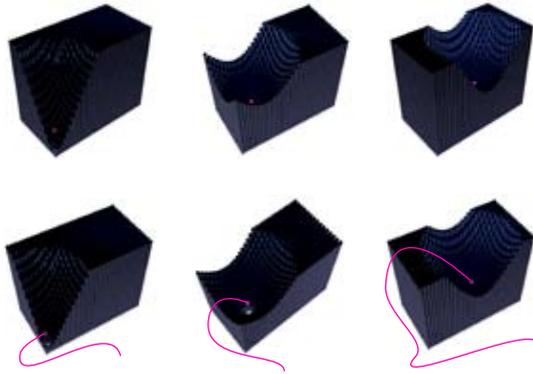
FIGURE 8 ▼

"Freespace" - The lack of a predetermined form while maintaining precise spatial, dimensional, and material qualities. Form is revealed through a set of individual actions, purposes, and meanings.

A. *Single user* - parametric form transformations through a single user's set of actions.

B. *Multiple users* - form transformations through multiple user's actions.

A.



B.

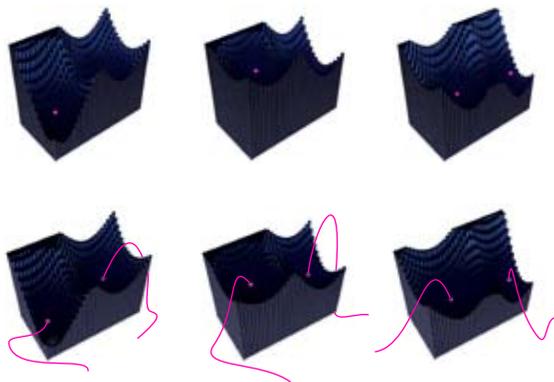
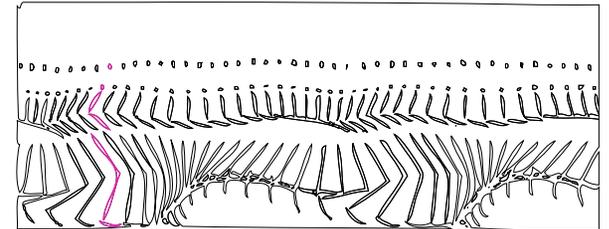
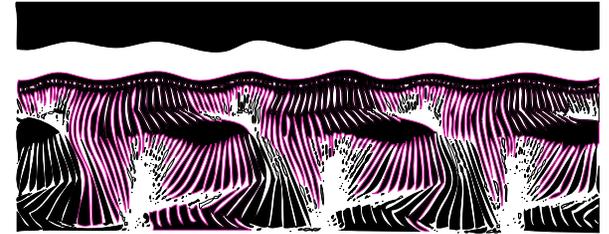


FIGURE 9 ►

Kinetograms - Where bodily transformations, through time, generate various forms of geometry and structure. Form is generated by the activity of living, occurring through time, action, and movement.

Etienne-Jules Marey's diagram, through the use of chronophotographs, traces the transforming structural formation of the human body through iterations of time.



Spuybroek's project is an architecture of continuity or vagueness, which directly translates to an architecture of transformation and change. The Water Pavilion is an example of structuralizing change where transformation has form and geometry. A documented description of this can be seen in Etienne-Jules Marey's kinetograms and chronophotographs where bodily transformations, through time, find various forms of geometry and structure. Both Marey's diagrams and the Pavilion, share a corresponding idea that form is generated by the activity of living which occurs through time, action, and movement. Living matter is continuously transforming, achieving permanence of form through every moment of time. Susanne Langer in her writing on *Feeling and Form*, says that "living itself is a process, a continuous change; if it stands still the form disintegrates – for the permanence is a pattern of changes" (Spuybroek, 2008, p. 174).

The Water Pavilion can be seen as a reenactment of Frei Otto's concept of *Formfindung*. Directly opposing the idea of "giving form", Otto's parametric machines "find form" through numerous interactions among elements over a period of time. The Wool-thread machine is an example that finds form by generating an optimized path system between targets. Also known as a wet grid, or an aggregation grid, intensive and extensive movement is absorbed into the system where geometry does not follow event but rather coevolves with materiality (Spuybroek, 2008, p. 139). As the machine is dipped into water, the wool structure reacts in the form of bending, splitting, curving, nesting, aligning, and merging.

Form is a product of the patterned rhythms of one's bodily interactions with space. It's being constantly transformed through each moment in time, always searching for a state of consistent equilibrium. Equilibrium is both never and always reached, much like the operative state of the human body; reacting to every action, event, movement, and interaction through time. In order to keep the form from completely disappearing, the machined system of the Pavilion operates in a parametric logic.

Parameters allow the form to be manipulated but yet still controlled. Patrick Schumacher in his *Parametricist Manifesto*, writes, "We propose that urban and architectural (interior) environments can be designed with an inbuilt kinetic capacity that allows those environments to reconfigure and adapt themselves in response to the prevalent patterns of use and occupation" (Schumacher, 2008, p.1).

The Pavilion is clearly a parametric machine. Like space, form is never predetermined, instead, it is inserted into the environment as a component of the whole; constantly reacting, adapting, and influencing the continuous flows that surround it. Rather than designing form, organized parameters are implemented into the project, which allows a certain level of controlled vagueness to be reached. It is the user that generates form, where as the architect generates parameters.

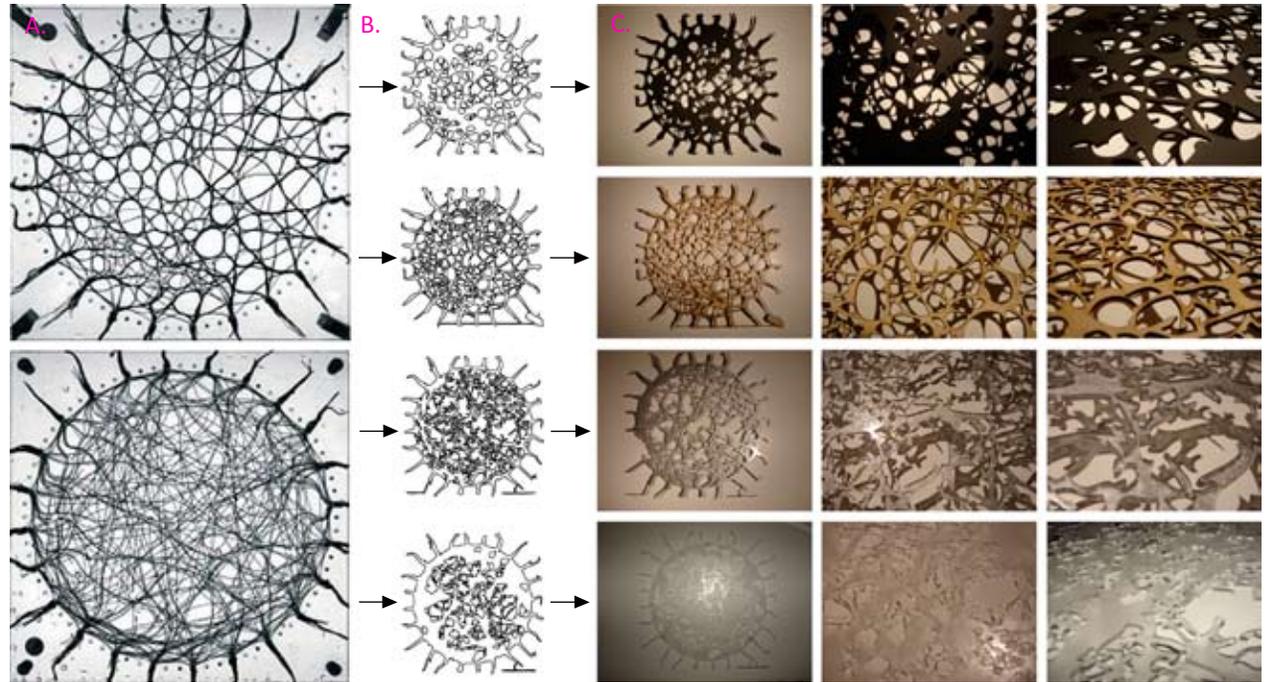


FIGURE 10 ▲

"Formfindung" -

Using Frei Otto's wool-thread model, I digitally manipulated the model by placing threshold and pixel parameters in an illustrated simulation.

A. *Frei Otto's machine* - form finding original images.

B. *Digital manipulations* - parametrically traced iterations of original.

C. *Physical models* - laser-cut material formations.



FIGURE 11 ▼

Layered whole -

I introduced the concept of continuity into my form finding experiments by layering individual material formations on top of one another in order to create a fluid whole.

Individual parts are seen in the field of depth while relational qualities of the whole are depicted through voids, overlaps, intersections, and conglomerations.

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## IMAGES

Continuity of form original -

<http://www.iaacblog.com/2008-2009/term02/s5/?cat=32>

Kintegram original -

[www.romansk.ku.dk/bib/hb/spec/marey-bev.gif](http://www.romansk.ku.dk/bib/hb/spec/marey-bev.gif)

Wool-thread original -

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# BODY



The Water Pavilion is a responsive, inter-active architecture where conventional boundaries are disintegrating and being replaced by emergent blends of cybernetics. It is an architecture where action between body and world merge into one continuous experiential system. A system that doesn't passively wait for reality but instead activates the present by becoming an integral part of the body. In this case, inhabitants no longer occupy space because space is in the body (Spuybroek, 2008, p. 85). It is an architecture of experience more than habit where haptic perception dominates the subjects sensory intake, in turn dissolving the disconnect between the body in its surroundings.

Today's world is driven by highly complex virtual patterns of information flow, which are becoming more and more accessible through our advancement in machined technologies.

The Pavilion is designed to be a cybernetic system by organizing information from both body and its surroundings into one continuous patterning. Norbert Wiener describes a cybernetic organism, machine or human, as a system that "responds flexibly to changing situations, learning from the past, freely adapting its behavior to meet new circumstances, and succeeding in preserving homeostatic stability in the midst of even radically altered environments" (Hayles, 1999, p. 104).

FIGURE 12 ◀

#### *Cybernetic System-*

The Water Pavilion is designed to organize information flows from both body and its surroundings. It is a highly complex, flexible system that is constantly responding to the action and event changes in the environment. New information enters the system and is patterned into a continuous feedback loop of energy transformations. Machine and body synthesize into a single whole.

As previously discussed in the space section of this essay, I mentioned how the Pavilion responds to sensed changes activated by the inhabitant. Through pulling, pushing and stepping, the virtual water system flexibly responds by adaptively re-organizing information flows. New circumstances are constantly being introduced and responded to as each body activates a separate sensory system within the structure. Spuybroek's cybernetic system synthesizes body and environment into a single continuous feedback loop.

Entering the Water Pavilion can also be interpreted as a removal devise from one's real world into an augmented merged reality between the physical and the virtual. A new dimension is created where physical actions dictate virtual responses within the environment. The body becomes completely submerged into the system primarily due to its role as activator. Andre Breton, who led the Surrealist Movement in the 1920's, described his efforts to find a deeper, more passionate consciousness of the sensory world (Balakian, 1970, p. 125). I believe Spuybroek's project has addressed Breton's efforts and through architecture, has come up with a solution. The Pavilion not only activates the physical body but the Freudian mind as well, displacing the senses of time and space in the vision (Balakian, 1970, p. 130). It is an architecture of transmutation or merging of two contradictory states, virtual and reality.

Vision, traditionally defines a relationship between subject and object. It is a particular characteristic of sight that attaches seeing to thinking and the eye to the mind (Nesbitt, 1996, p. 557). The Pavilion goes beyond just providing a visual relationship between subject and object; it actually merges the two into one continuum. It is similar to the Baroque visual experience, which has a strong haptic quality that prevents it from turning into the ocular centrism of its Cartesian perspectivalist rival (Nesbitt, 1996, p. 558). Haptic perception relies on the forces experienced through touch in what J.J. Gibson describes as, “the sensibility of the individual to the world adjacent to his body by use of his body” (Gibson, 1966). The haptic body is a fluid, open system where everything is networked to its motor geometry. In the Pavilion, the body, without being forced, cannot resist reacting to the environment that surrounds it. The architecture provokes the body because its geometry is one in which points become vectors. Geometry becomes a vehicle, initiating the interactive blend between subject and object. Spuybroek adds, “part of the action lies in the object, and when the object is animated, the body is too” (Spuybroek, 2008, p. 43).

Because of their plasticity, subject and world co-emerge by locking into one another’s trajectories. Merleau-Ponty writes, “to be a body, is to be tied to a certain world, as we have seen; our body is not primarily in space: it is of it” (Merleau-Ponty, 1962, p. 148). In Phenomenology of Perception, he goes on to describe that continuity of action and perception can only exist in a body where perception is not followed by movement but where both form a system which varies as a whole (Merleau-Ponty, 1962, p. 152). This kind of system takes movements and actions and organizes them into a whole. Similar to the system of the Water Pavilion, it must be plastic enough to recognize and incorporate new movements and actions. The system is in constant re-organization as these new inputs are flooding into the internal information flows. Within the Water Pavilion, bodily energy is gathered and responded to.

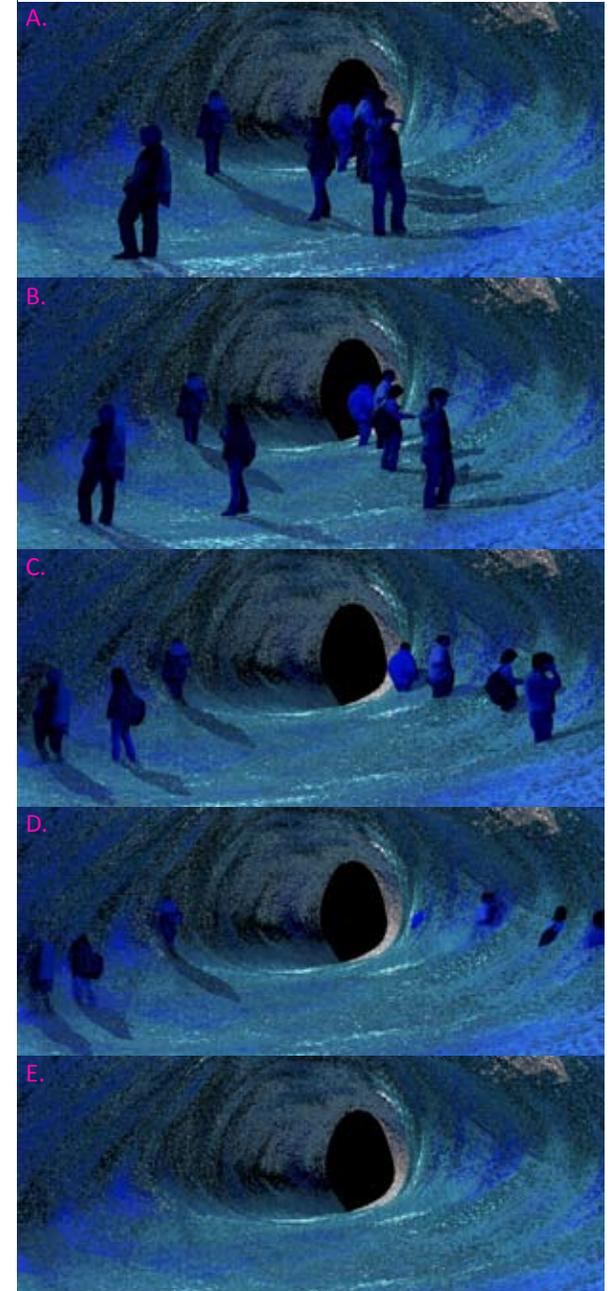
FIGURE 13 ▼

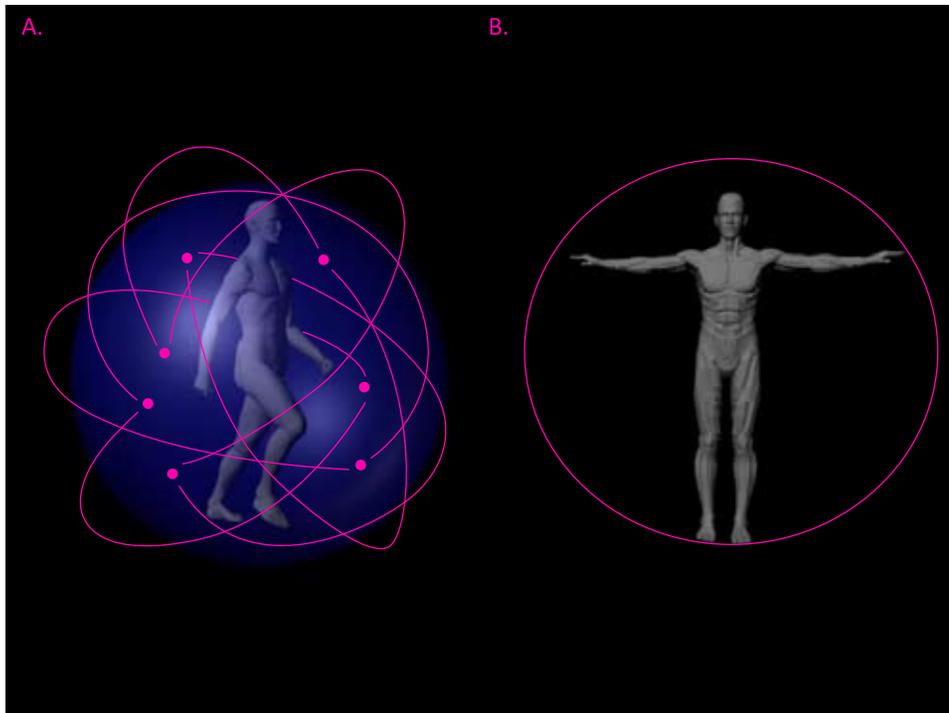
*Baroque Architecture -*  
This architectural style seen in the 17th Century, appeals to one’s physical sense of touch. It takes on this haptic quality due to the layered curvatures found patterning themselves throughout the structure. The below image is a doorway of the Jesuit college in Heiligenstadt, Germany. The emphasis on continuity is seen as a single curve can be traced from floor to column, column to arch, arch to ceiling, and back down to floor. An example of a structure perceived more than visually.



FIGURE 14 ►

*The Haptic Body -*  
The geometry of the architecture provokes inhabitants to use haptic perception in order to experience the environment. This geometry becomes a vehicle that initiates the merging of subject and object. This system engulfs both the space within the body and within the surrounding environment. Spaces are blended into one, with each still being able to vary independently. A. - D. - Represents the merging of subject and object through haptic perception.





**FIGURE 15** ◀

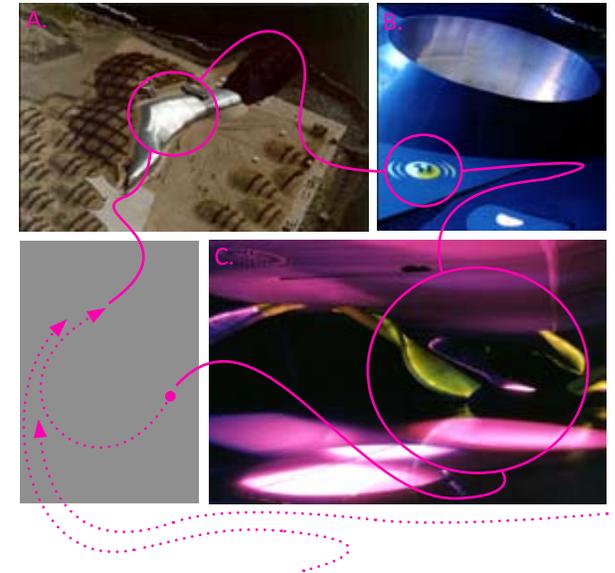
*3-Dimensional Movement* - The Water Pavilion activates the movements of the body in 3-dimensions. The system internalizes and reacts through activation of touch, pull, and step sensors.

- A. Vectors surrounding a dancer's body** - Rudolf von Laban's spherical diagram allows for movement in 3-D.
- B. Vitruvian Man** - Da Vinci's circular diagram allows for movement in 2-D only.

**FIGURE 16** ▶

*Experiential Continuum* -

- A. The Water Pavilion** - Routine visit to the Site.
- B. Step Sensor** - By habit, user activates step sensor within architecture.
- C. Visual Affects** - Experiential results of actions.



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## IMAGES

- Cybernetics-**  
<http://www.thedreamenclosure.com/USERIMAGES/cybernetics%282%29.jpeg>
- Baroque Architecture** -  
[http://en.wikipedia.org/wiki/File:Portal\\_Jesuitenkolleg\\_Heiligenstadt.JPG](http://en.wikipedia.org/wiki/File:Portal_Jesuitenkolleg_Heiligenstadt.JPG)
- Routine, Habit, Experience** -  
[http://www.evdh.net/water\\_pavilion/index.html](http://www.evdh.net/water_pavilion/index.html)

The Water Pavilion is an architecture of experience opposed to one of habit. However, habit is still present, it only means that experience comes before habit. The Pavilion complicates habit to implicate action in routines. There is a variability or plasticity to habit, which allows for the relationship between routine, habit and experience to become continuous. For instance, a subject enters the Pavilion on a routine visit and pushes a particular sensor by habit; both of which are a result from the subject's initial experience of the structure. Only this time, a second subject activated a separate sensor causing the two virtual water system inputs to collide and re-organize around each other. The result is in the two systems merging together to become one pattern revealing a new experience to both subjects. This encourages habits to be broken and yields to further experimentation within the architecture.

The body of experience is the moment or shift between acquired habit and free action. It is in this moment of discover, of learning, that allows us to break free of tradition and enables a smooth transition into future actions. The Pavilion allows the body to manipulate traditional boundaries of traditional ways of inhabiting a structure. In Rudolf von Laban's diagram of the vectors surrounding a dancer's body, one notices the circular convention of the Vitruvian Man being broken. Laban turns the body into a three-dimensional sphere, which allows for movement everywhere rather than just horizontal rolling over a two-dimensional plane (Spuybroek, 2008, p. 55). Discovering that the body is more than just the two-dimensional diagram of the Vitruvian Man, Spuybroek merged the actions of the body into the architecture of the Water Pavilion resulting in a complex experiential continuum.

# TECHNIQUE

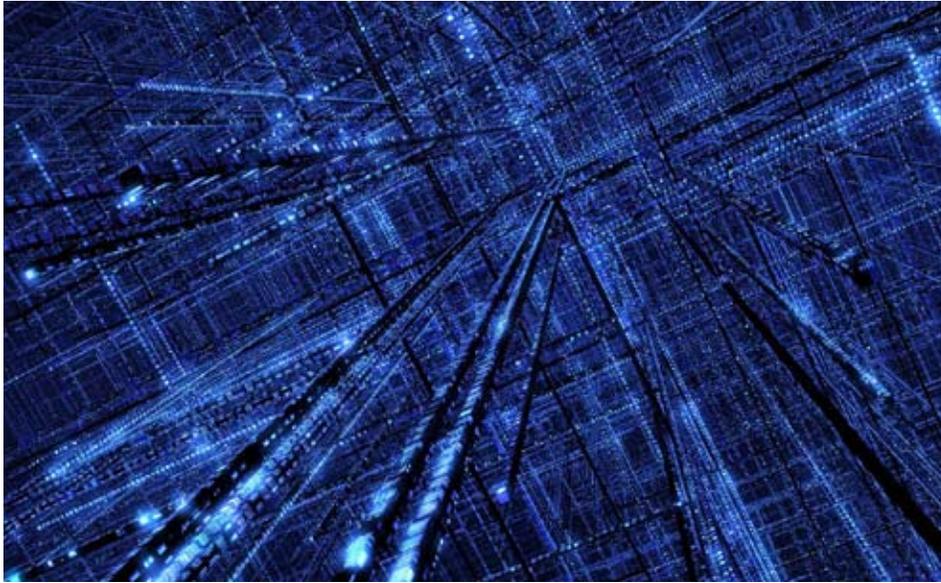


FIGURE 17 ◀

*Computing -*  
Creates a continuous system for processing and organizing flows of information. Space becomes an abstraction while time generated reality. Form becomes an ever-evolving process of emergence.

FIGURE 18 ▶

*Experiential level -*  
Digital techniques are implemented from start to finish in the Water Pavilion's design process. The result is the computed systematic responses of the system in reaction to user action. Both visual and audio effects are projected throughout the interior surfacing.

In the Water Pavilion, everything is involved in a continuous process of transformation. Fluidity and interactivity are accompanied by corporeality between the intertwining of body, movement, perception, and geometry. Digital design tools and techniques were chosen in order to synthesize all these components into one continuous system.

Computing techniques were implemented in the project both as a technology for viewing as well as a technology for making. This means that the responsive nature of the Pavilion's system as well as the video and audio feedback, were both developed through computation. Spuybroek writes, "with computing, we can at last perceive substance and accident, image and movement, form and time in a single continuum" (Spuybroek, 2008, p. 70). Form is no longer distinct from time but rather a product of time, seen as an ever-evolving process. Parametric computing techniques stabilize form through self-organized patterning, which can only be understood over time. In this sense, space is an abstraction and time is the generator of reality.

Computing is involved in all three levels of the Water Pavilion's design process. First, before it was built, in the design of the responsive informational feedback system. Second, while it was being built, in the manufacturing and construction of the architectural components. And lastly, after it was built, in the digitalized experiential projections spanning across the interior of the space (Spuybroek, 2008, p. 73).

The Water Pavilion is a responsive machine that utilizes computing techniques to personalize, stimulate, and amplify user's experiential reality. Because of these techniques, it is an architecture that is acting more like a machine, identifying and attaching itself to user action, movement, and rhythm. It is a real-time analogue computing model that is structured internally in order to process information, as well as externally to gather informational flows. This means that simple states of user interface hierarchically coexist with complex states of computation; both co-evolving within one single continuum (Spuybroek, 2004, p. 355).



The Pavilion and the user merge into one single system where both evolve toward and with one other. Comparing this system to similar biological systems, Biochemist James Lovelock writes, "The evolution of a species is inseparable from the evolution of its environment. The two processes are tightly coupled as a single indivisible process" (Kelly, 1995, p. 74). While merging into one holistic system, both architecture and the user adapt and create one another. Coevolution between architecture and user can be seen in this project, where mutual influences create stable instabilities within the system.

The system, as a whole, is also constantly interacting with its parts, sending information back and forth. In this way, the Pavilion is utilizing multiplicatory techniques to generate and enhance user experience. It is the multiplication of typologies within the Pavilion's volume that results in a projection of information on the interior surfaces. Since there are no corners within the structure, the system as a whole becomes loosened, which ends up smoothing the parts allowing for continuity in communication throughout the entire structure. Therefore, the Pavilion is an example of topotectonics, meaning it's a tectonics of continuity (Spuybroek, 2008, p. 242).

Multiplicity is also defined as a manyness created by variations that are nested into larger patterning's (Spuybroek, 2009, p. 36). The Water Pavilion uses projected curved variations generated through user action to create the interior experience. It is through this technique of variation and the study of curves that has created the experiential complexities of the Pavilion's system.

Historically, three types of curvilinear figures demonstrate variability within the curve. These are explored according to their capacity to deploy variation as well as their ability to connect to similar figures. The first figure, the S-curve, which was theorized by William Hogarth as serpentine lines, have two loose ends and variation progresses through the entire line. The curve is not a singular fixed figure but rather a set of curves within curves, multiplying one movement into another. To demonstrate this, Hogarth uses an example of the horn and the cornucopia, “which is bent but also twisted around its bending” (Spuybroek, 2009, p. 37).

The second figure, the J-curve, which is seen in many examples of images of plants and hair throughout the Art Nouveau period, have both a fixed end and a loose end allowing for free flow as well as rigid alignment. This central figure is often called a “whiplash” due to the way that it starts out quite straight and increasingly becomes curved until it suddenly twists and turns.

The final figure is the Gothic curve, which demonstrates variability in the middle areas of the line while being fixed at both ends. The ends of this figure can be aligned, parallel, or diagonal because curvability is only happening in the between. No part of the curve is ever left behind, instead “it thickens, bundles, and weaves itself into surfaces that eventually weave into volumes” (Spuybroek, 2009, p. 39).

All three curvilinear figures are seen within the Water Pavilion. It is an art of the many parts being digitally coordinated into self-similar proliferations. There is a varying of variations that produces entanglements, multiplying strands, mergences, and crossings. It is within these intertwining variations that effects emerge. Spuybroek remembers one particular subject, after experiencing the Pavilion, crying out “Robert Adam! At first startled by the comment, he later realized that the subject was comparing the rippling effects to Adam’s 18th century circular ceiling ornaments, which similarly were infusing the interior surfacing with life (Spuybroek, 2008, p. 252).

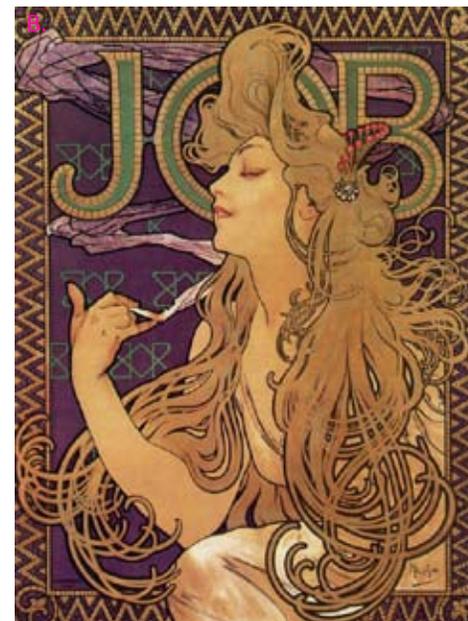
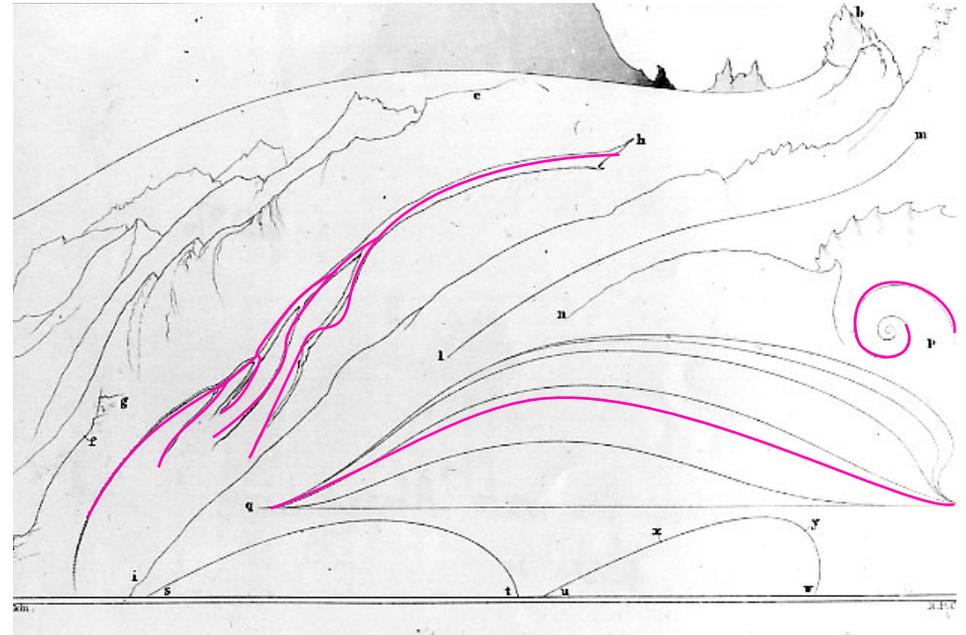
FIGURE 19 ▶

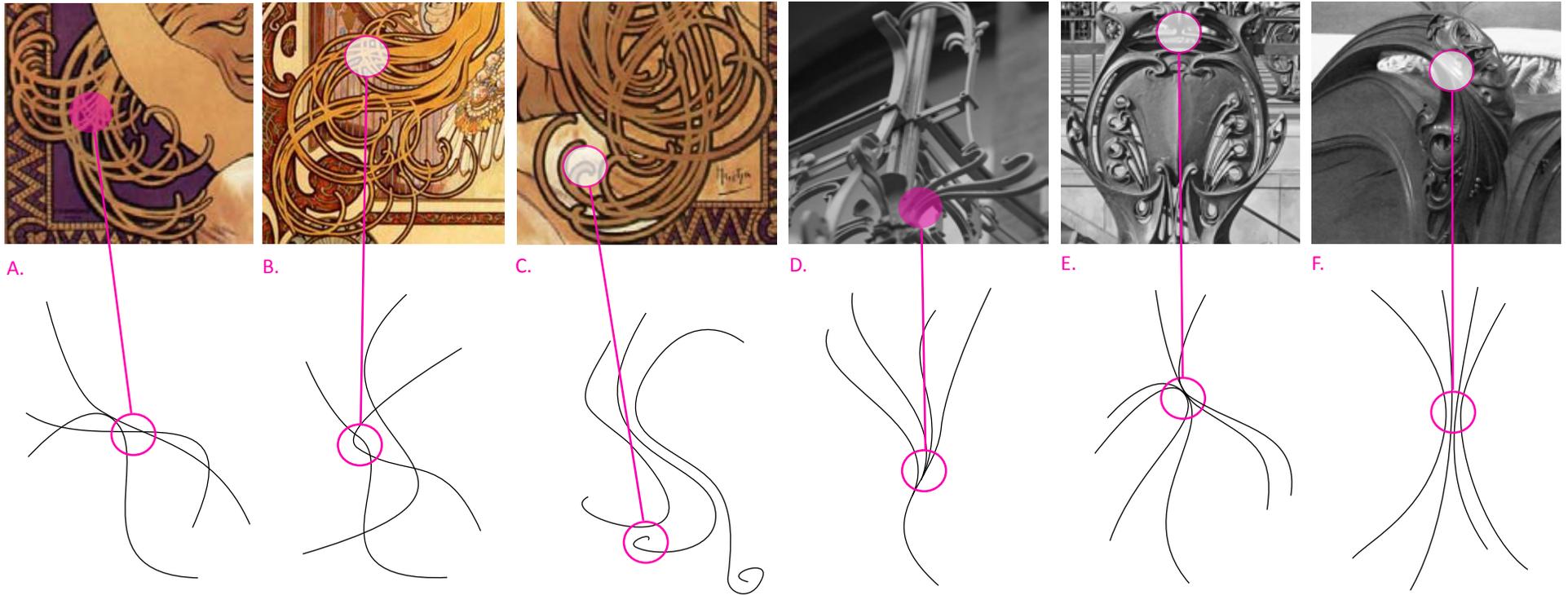
*Curvatures-*  
Variety of variation amongst curvatures was demonstrated in this Image from John Ruskin’s, *The Material of Ornament* (1851).

FIGURE 20 ▼

*Curvilinear figures -*  
Three types of figures deploying variability within the curve. Demonstrated through the capacity of variation as well as connectivity to other figures.

- A. *S-curve* - two loose ends.
- B. *J-curve* - one fixed end, one loose end.
- C. *Gothic curve* - two fixed ends.





In response to organizational concerns with variation, the technique of assemblage was implemented. The use of assemblage presents an emergent solution to thinking about synthesizing the complexities of human-technology relationships. The Pavilion is an assemblage of affects, speeds, and densities working through flows of agency rather than power, territorializing and expressing independent elements and their relationship to one another (Wise, 2005, p. 81). Input is never lost within the system but rather assembled into mutative transformations of informational flows. The techniques used in the Pavilion organize and pattern the complexities that surround us. The Water Pavilion can be described as a hierarchical model that systematizes independent components into a readable diagram of relationships.

#### FIGURE 21 ▲

**Aesthetic Assemblage** - A series of different effects generated from variation within the curve, seen here in Art Nouveau images of Alphonse Mucha's work. It is the art of the many, organized through multiple types of assemblages that create the patterning aesthetics.

- A. Crossing** - two or more curves overlapping one another.
- B. Entangling** - two or more curves becoming intertwined with one another.
- C. Tendril** - one curve curling in on itself.

#### FIGURE 22 ▲

**Structural Assemblage** - Variation found within the curvilinear figures of iron work from Hector Guimard and Victor Horta. In these cases, variation is demonstrating structural emergence through the assemblage of individual parts.

- D. Merging** - two or more curves synthesizing into one.
- E. Bouncing** - two or more curves deflecting off one another.
- F. Bundling** - two or more curves binding to one another.

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