

# The Pulsating Rhythm of Digital Perception

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**Abstract:** This paper highlights the role of digital design as catalyst for a new spatial sensibility related to rhythmic perception. It proposes a novel understanding of computational architecture based on the ability of digital design to supersede its commonly accepted instrumental role, demonstrating the potential to engage in deeper issues of the discipline and to invigorate a discourse of part-to-whole relationships through the lens of rhythmic affect. Pulsation introduces the fundamental animate capacity of spatial organizations and critically reshapes our perception of architectural space across multiple scales of a project, from digital inception to fabrication.

**Palabras clave:** Rhythm; perception; repetition; difference; ornament

## The Singularities of Rhythmic Affect

*“According to Lyotard in any given rhythm, the condition for repetition – formal identity and regularity – must somehow be vested in a matrix object whose aim is to collapse such regularities and smash such identities in its own drive toward “bad form”. The beat itself, composed of both extinction and repetition, is the form of this “bad form”. It is the violence lying in wait for form, as it is the form of violence. Within “high art”, form is constructed so as to ward off the violence of this beat, to achieve the permanence of the configuration, its imperviousness to assault. It is, on the contrary, through the lowest and most vulgar cultural forms that the visual is daily invaded by the pulsatile: the blinking lights of neon signs; the “flip books” through which the visual inert is propelled into the suggestive obscene; the strobe effects of pinball machines and video games –and all of this undergirded by the insistent beat of rock music surging through the car stereos or leaking voicelessly through portable headsets.”*

—Krauss, R.E. 1997. Pulse. In *Formless: A User's Guide*. Pulsation situates the discussion of architecture practices that make extensive use of the fundamental animate capacity of digital design to unveil affective-perceptual qualities of space by means of rhythmic articulation. There is a paradigm shift in spatial perception due to the intense use of computational techniques in architecture and the capacity to process and manipulate massive amounts of data, whereby rhythm is now perceived as playing an active role in the formation of space and the tectonic articulation, claiming the foreground figural

field and not just merely embedded or indexed in the structure. Digital tools have the capacity to renew the range and complexity of sensations in constructing rhythmic, ornamental membranes. The pulsating activity that results from intense digital design is not just revealed through structural or programmatic constraints but is now taking a much more important presence in the articulation of the topology of buildings, creating patterns that operate to transition the diverse scales of representation, reinvigorating the capacity of ornament to provide character and induce moods, ambiance and atmosphere through the modified, re-tuned lens of spatial perception and affective alliances.

A close reading of digitally-driven, contemporary design reveals sensations oozing from pulsating rhythms in the articulation of surfaces in architecture, energized by the beat surging from an increased awareness of detail within a sensibility of topological tectonics; rhythmic effects accentuate the afterimage of detailed ornament as a trace, an index of activity registered upon architectural membranes which denote spatial transformation and difference. The development of advanced three-dimensional digital tools and the subsequent, ever increasing sophistication of design skills have contributed to bring to the fore, liberate and elicit a sensibility of curvilinear, rhythmical design in contemporary architecture.

Baroque architecture and Art Nouveau are only part of an extensive lineage of a sensible knowledge infused by sensual overtones and spatial innuendo, requiring a cyclical

readjustment to situate a drifting paradigm of perception. The moment of transformation we currently find ourselves in leads to an understanding of a new paradigm of motion under which architecture changes its formal conditions and becomes a new structural entity expressed digitally and technologically from the rendered animation to construction and fabrication.

It is no accident that the prime example of an art that is purported to move the spirit, it is also an art which seems to possess motion. In his seminal study, *Renaissance and Baroque*, Heinrich Wölfflin proposed “movement” as the principal characteristic of the Baroque architectural style. In the time and motion of the person observing the building, one imagines the columns moving forward and back, the walls thrusting outward. Thus the motion lent to the building by the peripatetic observer is more than a simple psychological identification. Another aspect of the Baroque described by Wölfflin was the importance of the sense of “weightlessness” that in spite of its tectonics and materiality, architecture could produce the effect of elements levitating; defying gravity. The transition from the Renaissance to the Baroque via Mannerism produces a kind of liberation from the former architectural indexes; when Michelangelo integrates figuration into the steps of the Laurentian Library it becomes a crucial moment according to Wölfflin. I would venture to say that we are in a similar moment; the transition between indexical architecture to a new condition by the exacerbation of the surface conditions to produce new effects; something called hyper-indexical.

## **An Emergent Paradigm of Sensual Perception**

Given its lineage of motion-based spatial paradigms, “Pulsation” creates an awareness of sensual perception related to movement, an enigmatic relationship between space and eroticism, not unlike the obscure relationship between philosophy and sex.

Concerning this architecture, philosophy can only gloss, interpret, wonder why rhythm is present as soon as there is thought. Rhythm (that is, architecture) inhabits thought like a matrix prerequisite to all thought. Locked within all architecture there is a cry, there is speech extracted by force from silence or from screams. But architecture cannot accede directly to this speech either through meaning or through language; it can more effectively do it spatially, viscerally. Philosophy, for its

part, has taken up a position in the vicinity of this muted music. It can neither join in the music nor stifle the sound, since philosophy, too, as language, has its origins in that same music. What philosophy envies in sex is precisely the fact that sex inhabits this rhythm.

Nothing structures sex but the primordial relation to rhythm—body, skin, blood, mixtures, saliva, suffering, pleasure—that contains the initial pulsation of the living—in the place where space is born, in the place where the earliest stammering mingles with the body and with the world, with the soul and with matter.

If philosophy has conceived of itself as prolegomenon to discourse about the world and reality as a whole, prior to all other discourse, this is because it seeks to situate itself at the origin of human questioning at the place where one interrogates the very first things: I-you-world-being-value-beauty, and so on. Yet in the beginning there is rhythm, there is a pulsation that inscribes difference in unity. The earliest scansion —empty/full, silence/noise, light/darkness, I/you—preside over every genesis. This primordial notion of rhythm is harnessed by contemporary design practices concerned with the singularities of beat as a fundamental condition to spatial perception, an agency for the production of synthetic part-to-whole relations in architecture.

## **Rhythm and Noise: Situating a Gradient of Rhythmic Singularities**

Within the gamut of architecture, design, and art practices of pulsation there exists a range of distinctions that differentiate them, according to the specific spatial effects being pursued, originated in unique generative design techniques such as cellular aggregation, single-surface, smooth modularity, adaptive behavior, etc. To the untrained eye, all digitally driven practices look alike. And yet the combinatory logic of each one of these techniques and methodologies produces a unique range of spatial and material effects, driven by seemingly subtle methodological and technical differences but producing radical diversity in the architectural outcome. Even though it has been abused as metaphor, a valid comparison can be made with the field of music and the—sometimes—polemical differentiation between sound and noise. Pulsating practices often times stretch this differentiation, exploring the full range of potential that resides in the gradient, straddling that line and risking, as it were, the assumption that “it is just noise.”

Musicians and musicologists often employ a very narrow technical notion, under which a sound is a noise only if its originating frequency is non-periodic and thus of no determinate pitch, or at least random relative to human perception. In such cases the sound wave appears as irregular, seeming to offer a determinate pitch in relation to other sounds. Sounds are normally distinguished from noises according to the richness of timbre:

*“The real and fundamental difference between sound and noise can be reduced to this alone: noise is generally much richer in harmonics than sound. And the harmonics of noise are usually more intense than those that accompany sound. We want to give pitches to these diverse noises, regulating them harmonically and rhythmically. Giving pitch to noises does not mean depriving them of all irregular movements and vibrations...there may be imparted to a given noise not only a single pitch but even a variety of pitches without sacrificing its character, the timbre that distinguishes it. When one is interested in exploring texture, timbre, and rhythmic values—hallmarks of rock music—amplification and the electronic mixing of sounds allow for more ‘noise’ into the mix. The result is not noise in the sense of unpitched sound, indeterminate pitch, or disruptive sound.”*

— Russolo, L. 1986. *The Art of Noises*.

Selective electronic amplification is the best means of bringing about enriched overtones while preserving determinate pitch. The resulting music can thus conform to expectations of melody and harmony while expanding in another dimension. Rock musicians exploit technology for new and richer timbres while still maintaining recognizable melodic contours.

Similarly, digitally savvy designers are able to control complex operations of calculus that drive surprising architectural conditions far beyond the limits of representation, and into the realm of direct 1:1 material explorations facilitated by processes of digital fabrication. Rhythm is involved in the genesis as well as the ultimate materialization of atmospheres that affect our sensual perception and our experience of space.

Pulsation seeks to examine and bring forth the practices that participate in such primal, rich, and intensive discourse of rhythmic perception, a subject as old and fundamental to the field as the relevance of part-to-whole relationships, now coming back with a vengeance!

## **Affects of Decay: A Provisional Recipe for Atmospheres of Pulsation**

A special case of pulsation, the affect of “decay”—which can be understood as systemic, atmospheric aggregation—propagates the deployment of generative modules indexing duration but more importantly, inducing a telegraphed dissipation of discrete qualities in order to gain a collective perception of multiplicities distributed throughout a milieu. Part-to-whole relationships form the basis of such synthetic exploration, potentially mediating natural and artificial systems as productive feedback loops.

What is at stake is rhythmic transmission, a type of requalified notion of decay understood as a positive mechanism of communication between volumes, a type of vibrational pulsation capable of supreme engagement between parts, subsuming any preconceived top-down hierarchies.

Three main categories of rhythms substantiate the notion of Pulsation:

### **1- Anastomosis Rhythms:**

A proliferating web, it results from the smooth aggregation of parts or branches of tubular structures that make or become continuous.

It produces robust tectonics, multiplicities of seamless scalar transitions operating in synchronic fashion, connecting separate parts of a branching system to form a network. It refers also to the connection of any two structures, organs or spaces.

**Performance/Robustness:** A fundamental feature of evolvable complex systems. Robustness is often misunderstood to mean staying unchanged regardless of stimuli or mutations, so that the structure and components of the system, and therefore the mode of operation, is unaffected. In fact, robustness is the maintenance of specific functionalities of the system against perturbations, and it often requires the system to change its mode of operation in a flexible way. In other words, robustness allows changes in the structure and components of the system owing to perturbations, but specific functions and elasticity thresholds of joints are maintained.

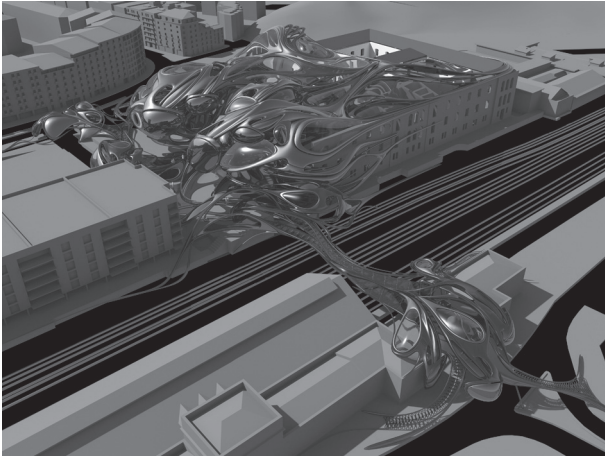


Fig. 1. *Anastomosis Rhythms* example: *Tabakalera New Media Arts Museum, Spain (2008)* By *Xefirotarch/ Hernan Diaz Alonso*

## 2- Striation Rhythms:

Smooth and striated geometries articulate topological surfaces, alternating the constraining effects of compression and expansion along curvilinear trajectories. Striation operates at different scales, diversifying and organizing program and circulation by means of grafting functionalities along interconnected swaths. Surface aperture is regulated along ‘unzipping seams’ that bifurcate fold lines and synchronize vector gradients across the geometric field.

*Performance/Weak Form:* Disparate systems become activated by tenuous, remote and yet robust sets of affiliations by the discipline of surgically articulating edges between parts. A strategy of seaming borders at times provides and subverts hierarchies of architectural systems, giving way to sensation + geometric affect.

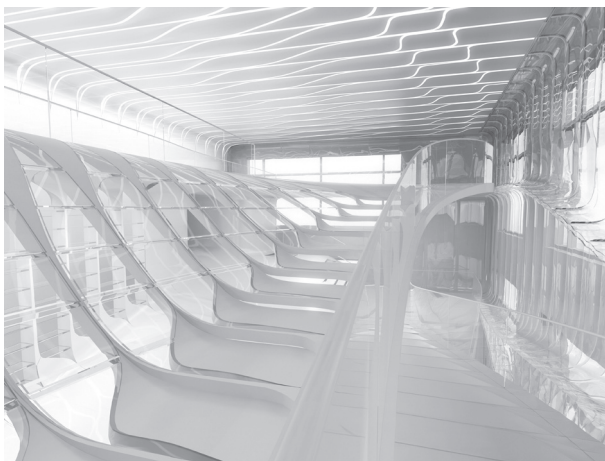


Fig. 2. *Striation Rhythms* example: *Reebok flagship store, China (2005)* By *Contemporary Architecture Practice / Ali Rahim + Hina Jamelle*

## 3- Flicker Rhythms:

Flicker refers to the notion of “persistence of vision” which is the ability of the eye to retain the impression of an image for a short time after the image has disappeared. The evidence of this effect is the afterimage generated by multiple components lined up along curvilinear trajectories, yielding an image that persists after the visual stimulus causing it has ceased to act. Such stimulus is the embodiment of the aggregation logic of the geometry.

*Performance/Gradient Modularity:* A system of breakdown of scales is established, in order to produce taxonomic relationships between parts as they effect a cosmology of continuous feedback across the components of the architectural assemblages and their strategic aggregation into surfaces, at different scales.

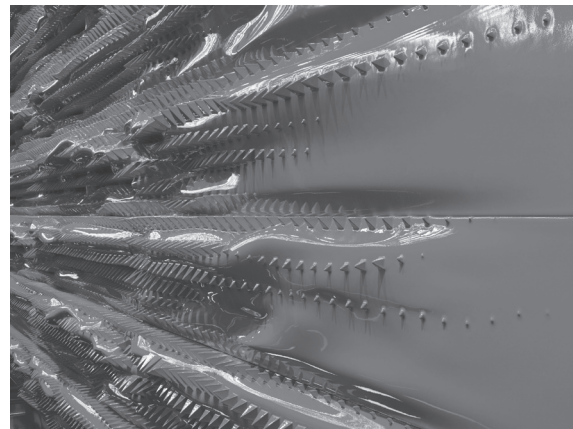


Fig. 3. *Flicker Rhythms* example: *Reptile, Haku Japanese Restaurant - New York, NY, USA (2009)* By *Evan Douglass Studio*

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