

**PARAMETRIC RANDOMNESS, ITS AESTHETIC REVOLUTION OF
ARCHITECTURAL DISCIPLINE, WHICH CAME FROM THE TECTONIC
SEMANTICS OF OBJECT ARCHITECTURE INTO ANIMATED-DIGITAL,
ATECTONIC, NON-OBJECTIVE DESIGN OF THE SPATIAL ENVIRONMENT
AND ITS OBJECT, DIFFERENTIATED BY ONE OR SEVERAL SYSTEMS**

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Abstract: *this article examines the historical paradox of the flow of architecture and art into different forms and directions, dependence on one another, synthesis and parallels between the past and the future of architectural practice and research. Analyzing and synthesizing the accompanying masters who have made a certain contribution to the development of modern Art and Architecture combining with sustainable technologies, keeping up with the latest history.*

Keywords: *Style, Parametricism, Criticism, Design, Environment, Adaptation, Dichotomy, Differentiation, Morphology, Typology, Space, Zaha Hadid, Malevich.*

Zaha Hadid about Parametricism, "...I was interested in repeating the same building in three dimensions, but I don't think this is the final chapter, and we can still make discoveries..."

Modern history of Architecture has evolved and mutated into a critical flowing business symbiosis of the climate age and organic space, which came after Constructivism, Minimalism, Deconstructivism, and ending with Parametricism. In a short period of time, the space of a modern building has turned into a technological experiment – the climatically comfortable space, in turn, changes every second, according to the tremendous speed of development and changes in consumer, climatic, technological, economic, and geographical conditions, mixing into an illusory *chaos of the modernistic dream*. Going parallel with the acceleration of the structure of communicative relations in the digital space, industrialization, enormous expenditures of the planet's resources, and climate imbalances, this gave impetus to the formation of the Parametricism evolution through animated culture [1-5].

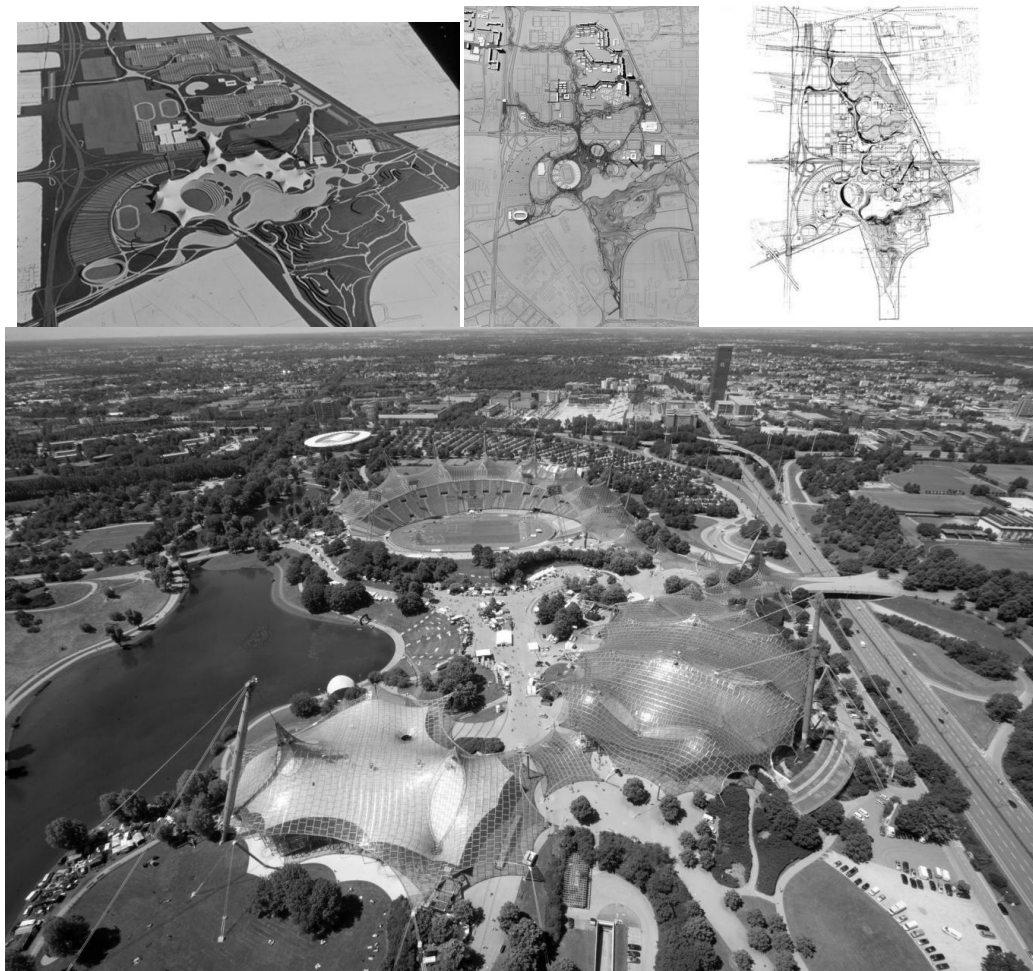


Fig. 1. Munich Olympic Stadium (Frei Otto and Günther Behnisch, 1972)

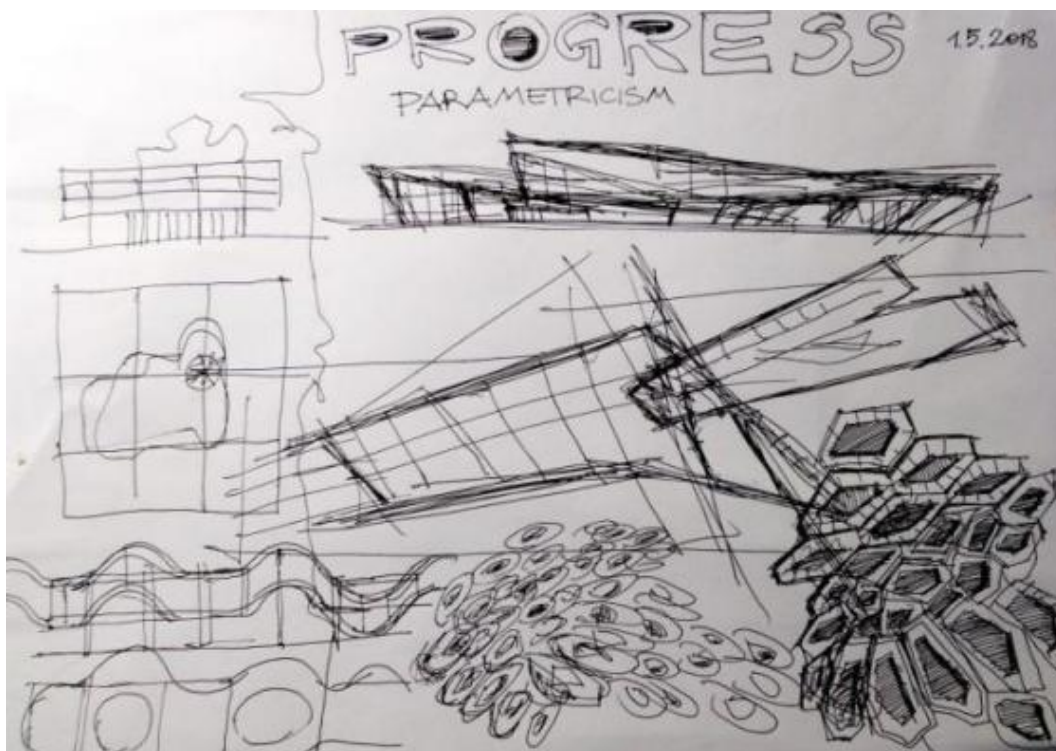


Fig. 2. Studies of Parametricism, Valeriy Myronenko (2018)

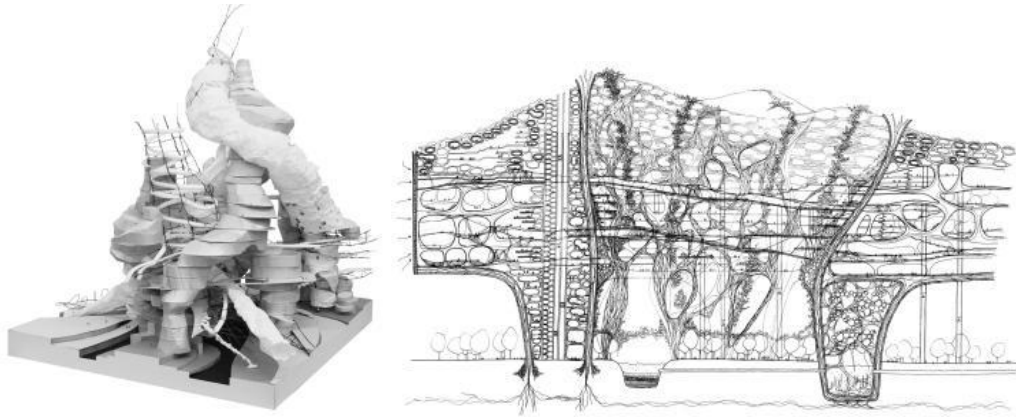


Fig. 3. Karina Ashrapova, *Symbiotic Architecture: Space of Emotional Saturation* [25]

On the one hand, *Parametricism* is *chaoticism* in relation to *Deconstructivism* as a relic of the past; on the other hand, there is a strict order and rhythm in the *parametric chaos* itself.



Fig. 4. University of Applied Arts Vienna, *Design project, example of parametric contextual adaptation*

Today, the architecture has turned its attention to *adaptive chaoticism*, leading to a new age of style with hopes of a futuristic future, a climate bomb, and the intellectual starvation of the architectural community, increasingly acquiring the character of *an architectural age of chaos*. Due to the fact that the design of a style system has begun to differentiate itself, today several different systems depending on semantics can be combined in one project. These divisions, fragmentation, and their defunctional heterogeneity put together a parametric dichotomy in the differential spirit of *chaotic Parametricism* [8-12].

The abilities of computer technologies: *Grasshopper*, *Rhino*, *Melt* and so on, have made it possible to create impossible, namely, the production of ultramodern spatial-organic structures not subject to manual sketching, curved to such an extent that even the human mind could not imagine a virtual object model in real time. Now it remains only for 3-dimensional printers on the threshold of a 4-dimensional printer and its implications for architecture as a whole, like the Vitruvian triple doctrine, so that any architect can *print* out his/her model immediately as a real object. Then the next step will be the space with artificial intelligence, self-made and self-organizing in space and in time, but today, we will only touch on the initial perturbations of the Vitruvian canons and their rationales in the age of consumption with the only informative poetics and information boom [8-10].

Differential dichotomy of the object and its environment has made it possible to create an environmental design at the junction of ages as a prerogative of choosing directions of modern aesthetics absorption and

technology. At this stage of its development, as we see today, the style itself is differentiated into a *chaotic structure*, that is, *differentiation is differentiated* – *Parametricism is parameterized* into an anti-whole shell.

In order to create flexibility and plasticity of the image, having immediately transferred from Deconstructivism to Parametricism, we needed 30 years of development of ideas on how to break up the shape of a parallelepiped, differentiate it into parts so that it was sufficiently plastic to repeat organic matter. These ideas would remain projects if the climate and consumer bombs did not threaten society. These conditions imposed certain obligations on the architectural discipline of the technological and aesthetic revolution of dinosaur deconstructivism [1-24].

2. The history of genesis.

In order to understand the emergence of non-objective Parametricism and chaoticism, let's go back to the past and analyze the origins of the movement.

Malevich about Suprematism, "Under Suprematism I understand the primacy of pure feeling in creative art. To the Suprematist, the visual phenomena of the objective world are, in themselves, meaningless; the significant thing is feeling, as such, quite apart from the environment in which it is called forth" [5, 6, 7].

Non-objective composition, created by Kazimir Malevich, has perfectly adapted to the *environment-object* system, the main techniques of which were: differentiation and deformation of integrity, indivisibility, and the gravitational weightlessness of an object, shifting the dominant role of a homogeneous object, transformation of the central composition, explosion and displacement of the central object axes, deformation of symmetry, deformation of the gravitational tectonics of the building, rethinking of the typical building plan, pronounced in the *Peak Leisure Club (Hong Kong)* or *Vitra Fire Station* by Zaha Hadid. This is a rethinking of the meaning of the central composition and the addition of the environment to the plane of the object plan, the long-awaited adaptation of the environment to the object [5, 6, 7, 8].

Adaptation of Suprematism to Deconstructivism, and then into technocratic Parametricism and further into *organic chaoticism* became the architectural method of Zaha Hadid and the initial practical example of Parametricism in architecture. If we take a look at the Malevich's *architectons*, we will notice examples of non-objective composition that ignores gravity and tectonics. Hadid, however, has amended it with semantic poetics and content, the tonal adaptation of the suprematic composition to the real project, the fluidity of the image, the subject analysis, design and topological aesthetics, design search and analysis, after which the visual-aesthetic and constructive-tectonic aspects of the object and the work of the *object-environment* system have earned in real form [6, 7, 8].

Kazimir Malevich – a nonrepresentationalist, architect, and innovator, a pioneer who created Suprematism, destroyed a dogma that for centuries defined the "*man-function-form-structure-object-space*" system, in which the components depended on each other, brought confusion and chaos in thoughts and rationales of the architecture of the Vitruvian laws. How is it so that each member of the system is independent and uncontrolled? The misunderstood and forgotten ideas of Malevich's social society at the beginning of the 20th century about non-objective composition gave impetus to the development of the capitalist, digital, self-creating stylistic direction today, in the 21st century, based on suprematic laws and spatial paradigms. Hadid, in turn, was able to move them into a new practical combination of spatial atectonicity and function, spatiality and relief of an architectural object, its sensuality and intimacy of the space, its modernism and diversity in the context of the existing urban structure [8, 9, 10].

The revolutionary phenomenon in the Hadid's work is that the object has ceased to be uniform, as stated in the Vitruvian treatises and even to the static spaces of Mies van der Rohe. The object was supposed to be and was a homogeneous mass. The architectural methods of mass destruction are the following:

1. *Atectonicity* (we see that in tectonic terms, the internal and external space of the building is not visually stable, that is, it has become atectonic one), Vitra 1993, Zaha Hadid.

2. *Scaling* (stability, the building is disproportionately huge in relation to the size of a person) Vitra 1993, Zaha Hadid.

3. *Differentiation* of form and space (fragmentation, we cannot immediately grasp the essence of the object, since it is divided into non-whole parts), Vitra 1993, Zaha Hadid.

4. *Dynamics or aerodynamics* (fugitivity and lightness of the space, turning into the aerodynamic component of conventional structures), Vitra 1993, Zaha Hadid.

5. *Typological chaos* and non-functionality in favor of design (the inability of a function to carry an appropriate load; the function follows the form; violation and opposition to the laws of Vitruvius and Sullivan).

6. *Connection of the object with the environment* (the object is connected to the environment; the role of the landscape has reached the same level as the architectural design itself, and even contrasted its meaning), *Peak Leisure Club*, Hong Kong, 1983, Zaha Hadid.

These 6 principles of Hadid have influenced architecture in equal measure, as at the time 5 principles of Corbusier. This is what made possible the creation of such a flow as *Parametricism and its chaotic derivative* [5-11].

Still on the subject, Parametricism, which combined the aesthetics of avant-garde and the technological flexibility of constructivism, was the most digestible in modern aesthetics and business environment. The main segments of architectural design have become such previously unexplored directions, such as: *environmental design, landscape and urban design, industrial design, animation art*, which also played a certain role in creating more animated plasticity of space and time, as well as animated computer arcade simulators with animation plastics of space. All of these areas have influenced in many ways the perception of the modern task of consuming and *improving the design environment of architectural, spatial, and communication boundaries* by architects and designers [1, 2, 7, 9, 10-24].

One of the main moral and ethical tasks of the style is to revive the usual rules and norms of the Vitruvian architecture due to the enormous speed of consumption and function, technology and climate threat. Today, architectural practice cannot stand aside as a political component of society. Another task is to reassign and return the architecture to architects. Due to the fact that architecture has become an authentic engineering, technical, and business-development subject, more and more dreamers decide to leave the profession in favor of design and teaching due to lack of financial soundness, business lawlessness and authoritarianism, self-proclaimed architectural expertise and conformity, after which architecture turned into a profession, leaving a *lifestyle*. Parametricism is designed to bring justice to the perturbation of discipline between rationalists and dreamers, return art to architecture, perhaps, using technology to return architects-innovators to architecture, to destroy the architectural dynamics of conformist parity. All this made modern architecture a dying swan of depressive style, energy-saving and functionally suitable for business consumption.

In architectural practice today, the replacement of the entire structure of space to create a climatic micro-space free of pollution and economy of consumption has become an obsession. The incompatibility of the minimalist approach and modern climatic conditions and animated trends led to minimalism for living spaces. Today, Urbanism has become a conceptual model in the battle between conformist planning and daring design, that is, the city remains a Gestalt connection, while Parametricism provides for differentiation and fragmentation, resulting in a spatial, a three-fold differential structure that absorbs minimalist inclusions of the city's matter. And so it will always be – evolution from simple to complex, *from Baroque to Classicism and from Minimalism to Parametricism*. We need such a historical analysis for the analysis, synthesis, and probation of behavioral mutations of a discipline in time and space in order to create an adaptive model of a mutating type for climatic, consumer, and technological speculations of the 21st century.

3. Technical Aspects of Suprematism and its Impact on Parametricism

Suprematism also represented fragmentation, lightness, fluidity, relativity, randomness, tectonicity, non-gravity, non-repeatability, and non-intersectability of spatial elements, as well as *Parametricism* derived from it. Combining Suprematism and Parametricism is a laborious, colossal task of transferring history into the present and future. During these searches, it is necessary to achieve a dynamic, rapidly changing space and function of the object and its environment. The environment as a whole with architecture is a critical moment of evolution. We have long been accustomed to consider building a shelter, and the environment – a park. Today, the consumption rate has tripled, so the architecture invented semi-function, plus the climate threat, warming, solar panels and wind energy, high-speed trains, business centers and malls have merged together. All of this is today's consumption architecture, which requires a combination of the object and the environment. *Suprematism* would never have been recognized as a style, if it wasn't for the divisions of the society of the 20th and 21st centuries, which gave rise to animation, cinema, photography, and computer design. Currently, *Suprematism* has showed us a way out of this situation using the example of *Parametricism* and differential adaptation and animation [10, 11].

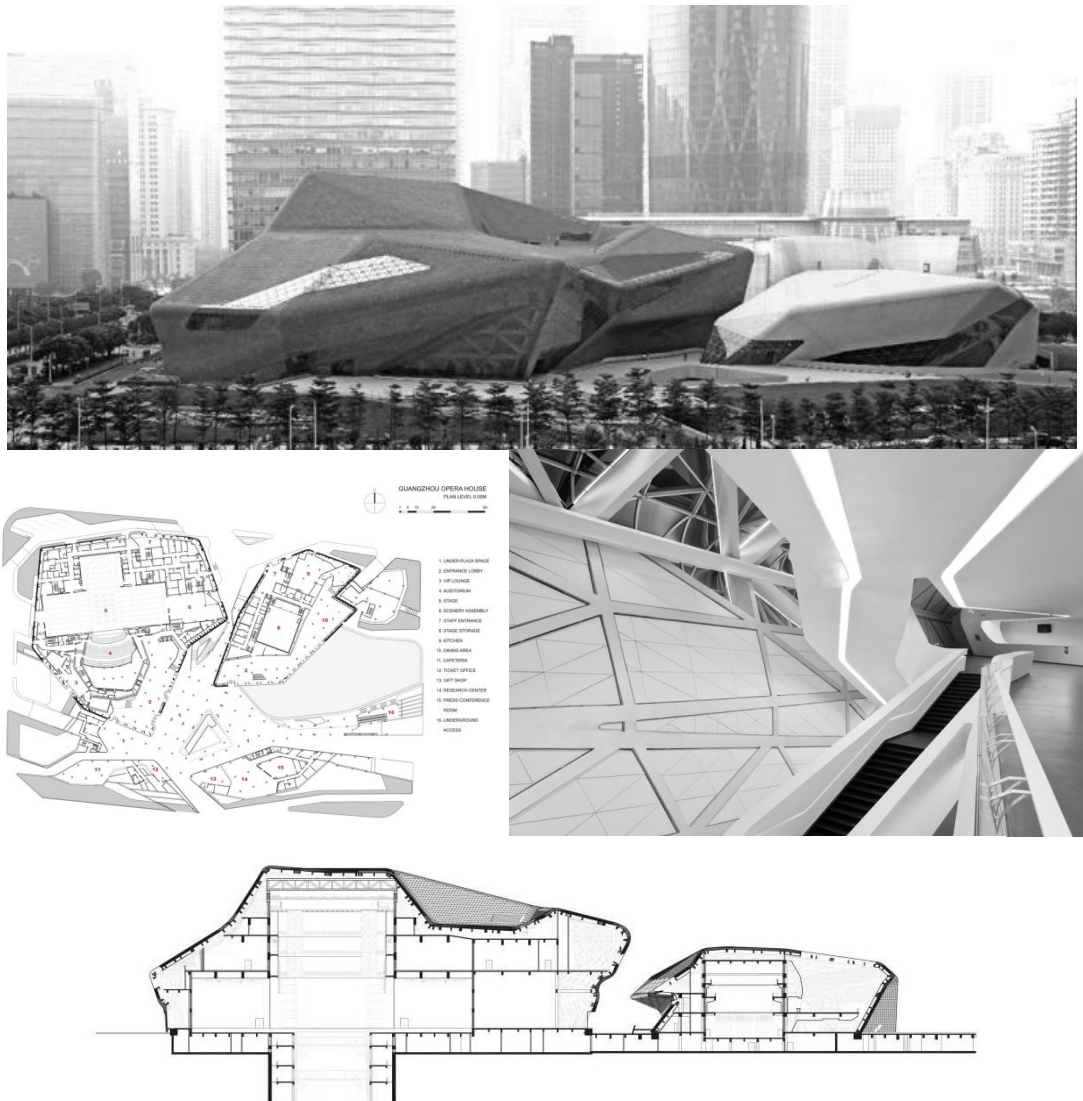
Parametric design and Urbanism that have just begun to adjust the stages of the design discipline adaptation to the needs of the socioeconomic age of consumption and business, so far only in the educational process of visualization, have become not only the genome of the future paradigm of creating a three-dimensional model of buildings, performing both shelter and modern emotional education functions, but also a new generation of consumption rates and communication frameworks in the same society, breaking the rules and principles of architectural controversy, breaking down and dethroning the concept of *Architecture* in terms of constructive, without elemental essence based on the principles of physics and mathematical analysis in favor of graphic design, that is, the non-objective being, deprived of the object's authoritarianism. Hadid's unwritten principle "an object meets a field" became a common noun, so the "object and its field" system has turned into a homogeneous system.

Modern design, which does not accept the systematic aggressive mood of *Parametricism*, its impersonality and recognizability of metric primitivity, combined with technocracy, consistently tries to apply classical canons. Mass square production of the age of consumption, which was characterized by the standards of consumption, has become a one-person society, characterizing the growing catastrophic scale. *Parametricism* came late, but on time, and today, it aims to save *architecture and Urbanism* from decadent style and global recession. Only it can restructure the complex and rapidly changing structure of society, moving on to the next stage of technological and moral development. Design, animation, computer design inspired to create such a polymorphic flow, which

can reproduce itself, taking into account local geolocation and terrain. The unacceptability of such anti-conformism by the architectural system does not allow Parametricism to develop, which is so necessary for the modern young generation and also expressed in related subjects – in music and in design [11-15].

Landscape design was rephrased in environmental design, and the design environment was not enough 2-dimensional input space directly in the object. These are the creation of 3-D and 4-D spaces, retreat from gravity, reflection of atectons over the weight of an object in the environment, its dissimulation and adaptation to the modern requirements of business and modern cosmopolitan communication frameworks.

This is the functional adaptability of space to all continents and countries, time and space, the adaptability of an object to changes in function over time. The uniqueness of the deformations and the intuitive structural thinking have allowed Hadid to, at the time, reach a compromise between the environment and the object and their joint adaptation [15-18].



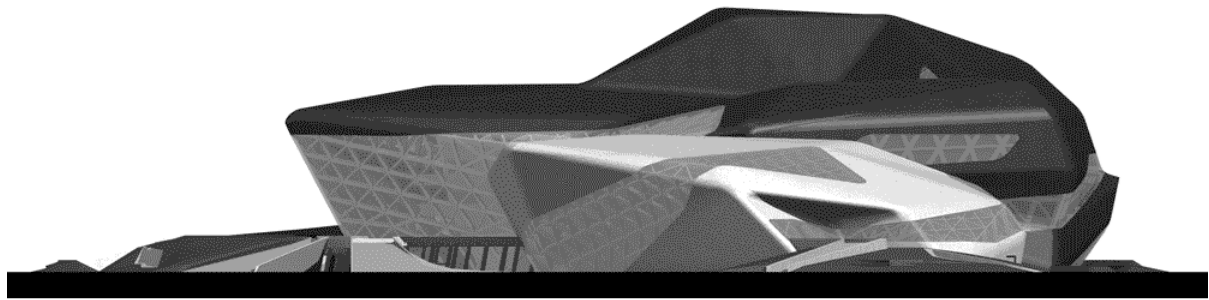
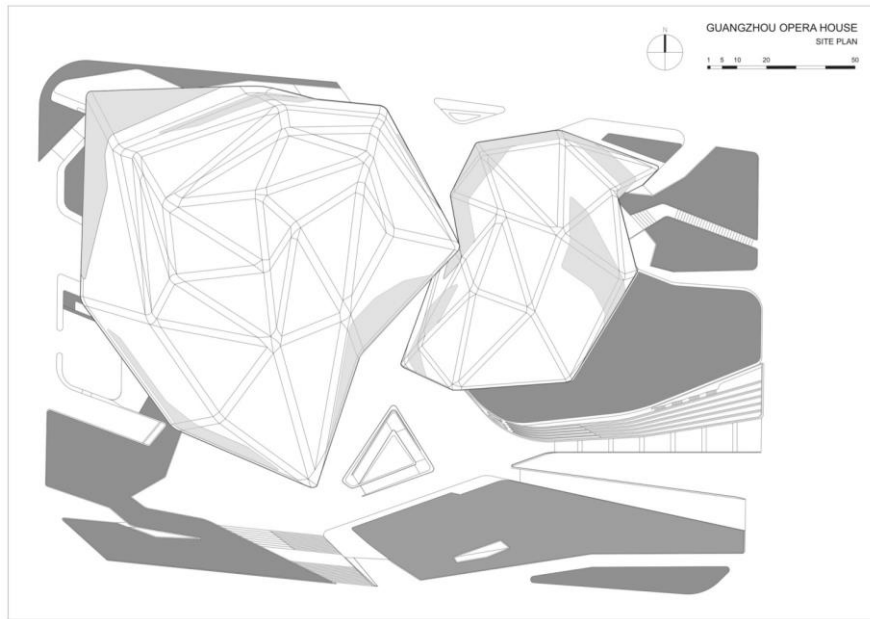
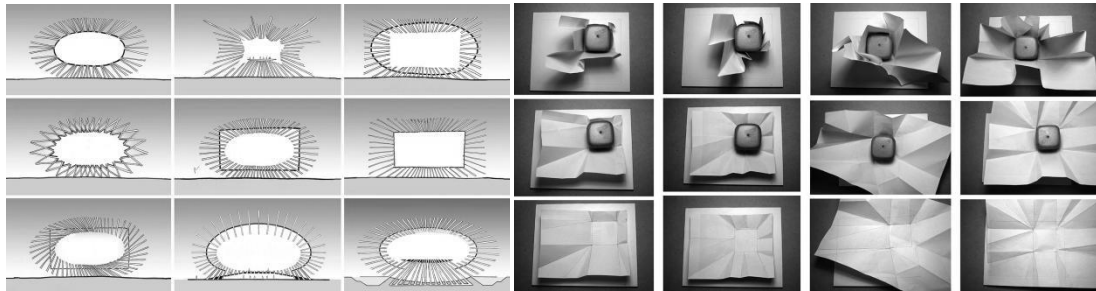


Fig. 5. Zaha Hadid, Guangzhou Opera House, China, 2010



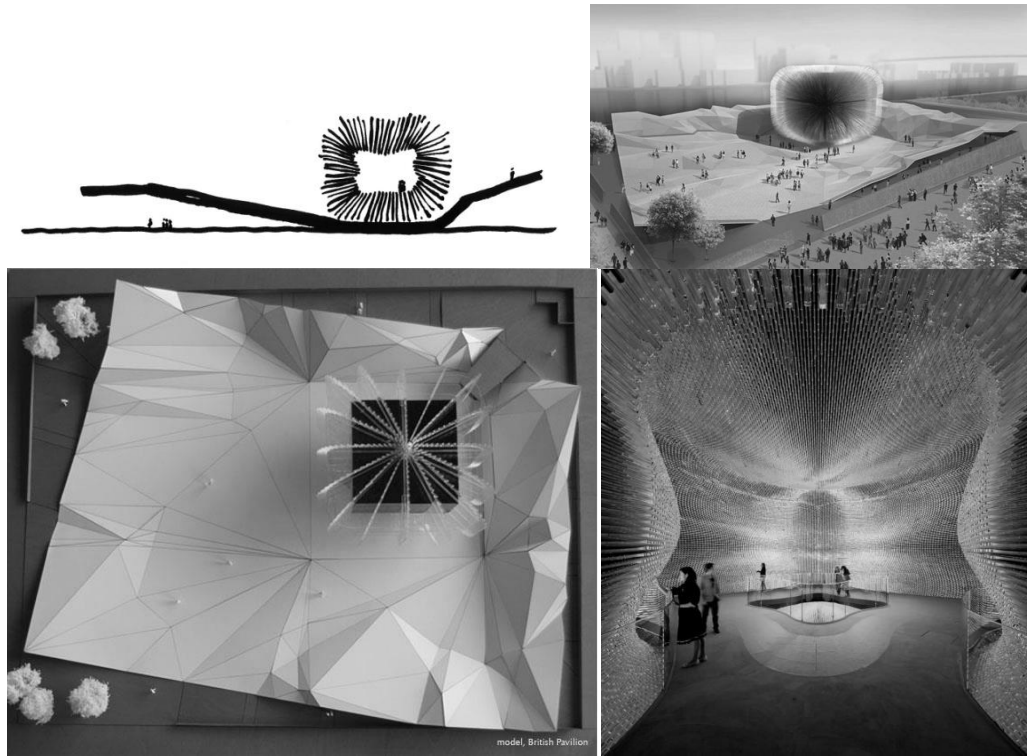


Fig. 6. An example of a parametric environment of landscape design. Thomas Heatherwick, Pavilion of Britain, Expo 2010, China Open plan—transformation of typology

The intersecting spaces of Parametricism have changed the dogma of the minimalist approach – the right angle with its spatial-functional meaning, the deformation of space and the explosion of corners – and made it possible to free up spatial-pedestrian flows and communication messages on the terrain note. The projected space was deformed not only in 2-dimensional, but also 3- and even in 4-dimensional space. Exploring any Hadid's architectural object, it is impossible to find spatial repetitions, that is, passing through the object, we find ourselves in completely different spaces, divided by morphology and not similar to each other. The same applies to the stylistic diversity: every project built in one or another part of the globe has no dogmatic attachment with the previous and the next ones, but at the same time, the systemic nature of all projects is easily recognizable. Intuitive jumps of imagination, invested in the creation of space, at first glance, it is impossible to comprehend the analytical consciousness [1, 8, 20-24].

4. Deficiencies

The outdoor spaces of the Hadid's projects became fluid in modern history, but the surface of the terrain note remained flat, that is, the terrain notes inside and outside the object's environment remained flat, not embossed, static, which was a misunderstanding due to the fact that the whole structure was divided, and the medium itself the terrain note remained flat and fissile only in 2D space.

If we look critically at the inner space, its deliquescence ends at zero level. When the space frame or the shell finishes its action, a simple, flat, long space of the earth begins under the entire floating spatial parametric dome. The diversity of the static of the earth mass and the dynamism of the dome pulls out of space the ideology of similarity and homogeneity of space in the same style, that is, the domed space was modernized and revolutionized, and the plane of the earth and landscape remained spatially flat, convenient for human flows and consumer needs. Attempts to equalize the masses of colour scale or diverse stairways were inconclusive in terms of balancing spatial masses. A two-dimensional typology remained on the flat plan of the building. We see a space with several flights of stairs, which are designed to break the already uniqueness of the earth and space [15, 16-24].

The morphology and topology of the dome spaces have evolved, and the earth static has remained, that is, the “morphology-typology” revolution did not happen completely, possibly due to the inapplicability of the distortion of the earth's space in the public function. Evolution did not stop on Deconstructivism of the end of the 90s, having gone beyond its edges to Parametricism and symbiotic chaoticism, further delving into the topological landscape structure of the object and the environment [17, 18, 19].

It is very difficult to give a technical name to this direction. Today, it is Parametricism, but tomorrow – who knows? Since it is still native and mostly academic, I would call this current a *chaotic adaptation to the present*, allegorically – the object has become an organic symbiosis. Now the most important task of the architect is to move away from the tectonic interpretation of the structure, including natural forms in the “architecture-

structure-design” system approach. Also, all modern poetics have come to be called “green design” or “sustainable design”, but it is paradoxical that sustainable design has completely entered and dissolved within the style of Parametricism, that is, now designers have the number one task – to bring common technologies to a common denominator in order to create on their basis a whole, indivisible, differentiated object according to the “non-objective” Parametricism system [20, 21, 22].

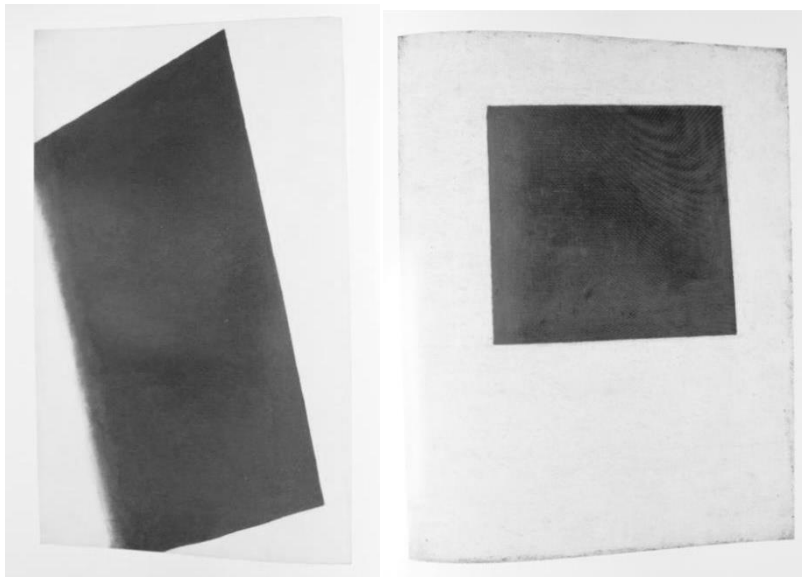


Fig. 7. Kazimir Malevich, “Dissolution of a plane”, 1917 (LEFT) , Kazimir Malevich, “Red Square”, 1915 (RIGHT)

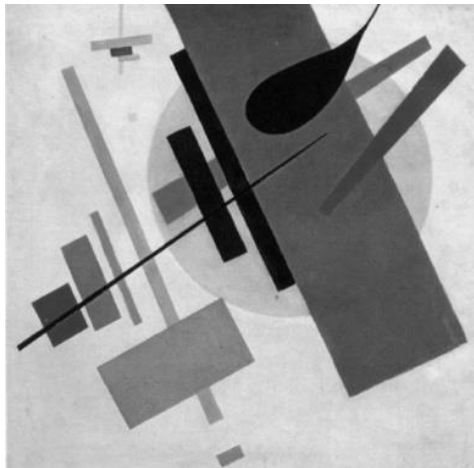


Fig. 8. Kazimir Malevich, “Suprematism”, 1916-17, Krasnodar Museum of Art

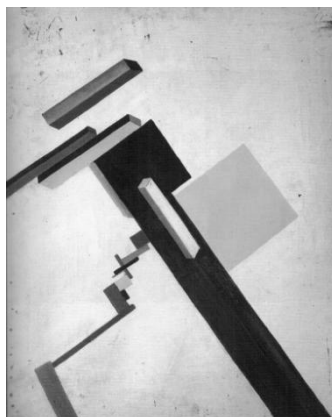


Fig. 9. Sergey Senkin: Abstract composition 1920

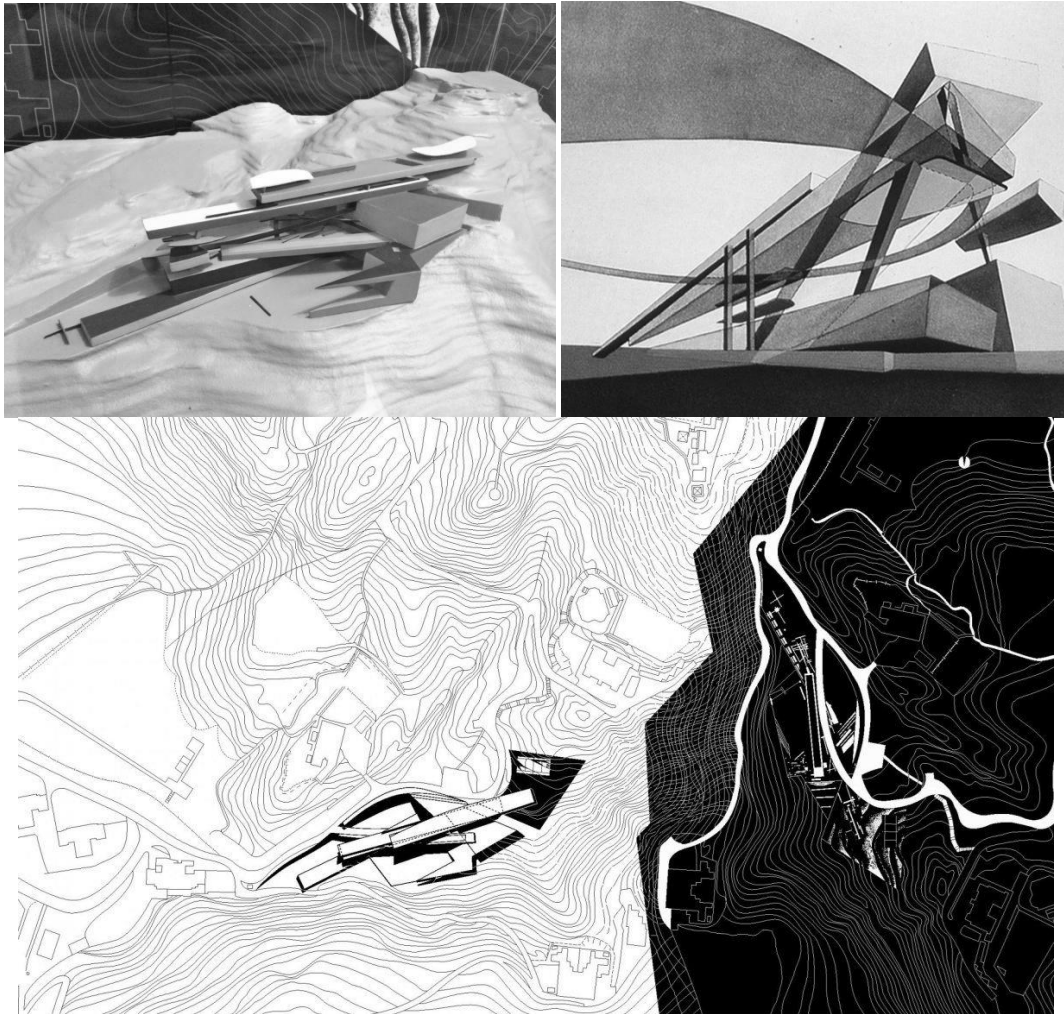


Fig. 10. Zaha Hadid, The Peak Leisure Club, Hong Kong, China, 1982-83, Competition

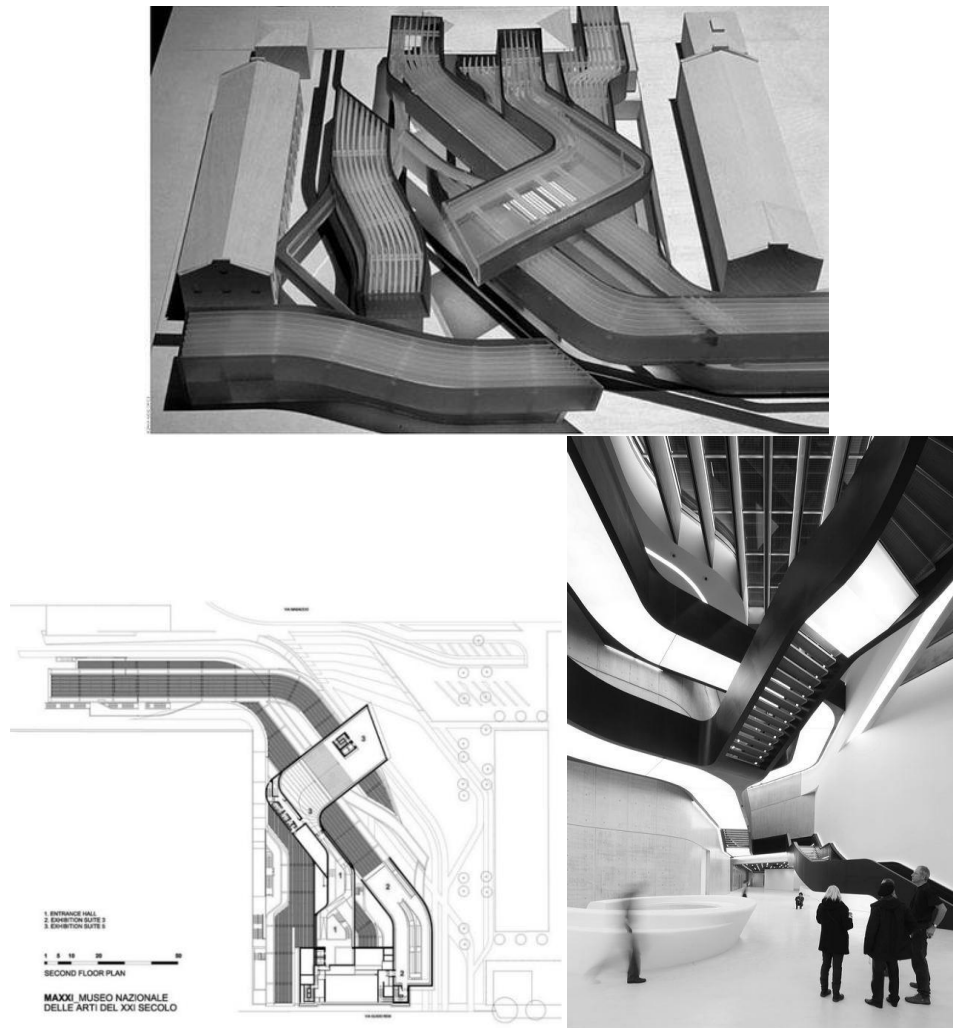
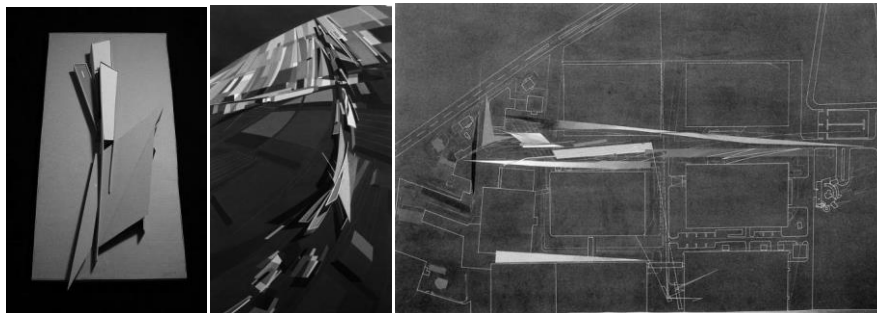


Fig. 11. Zaha Hadid, MAXXI – National Museum of the 21st Century Arts (1998–2010), Rome, Italy.^[24] Stirling Prize 2010 winner



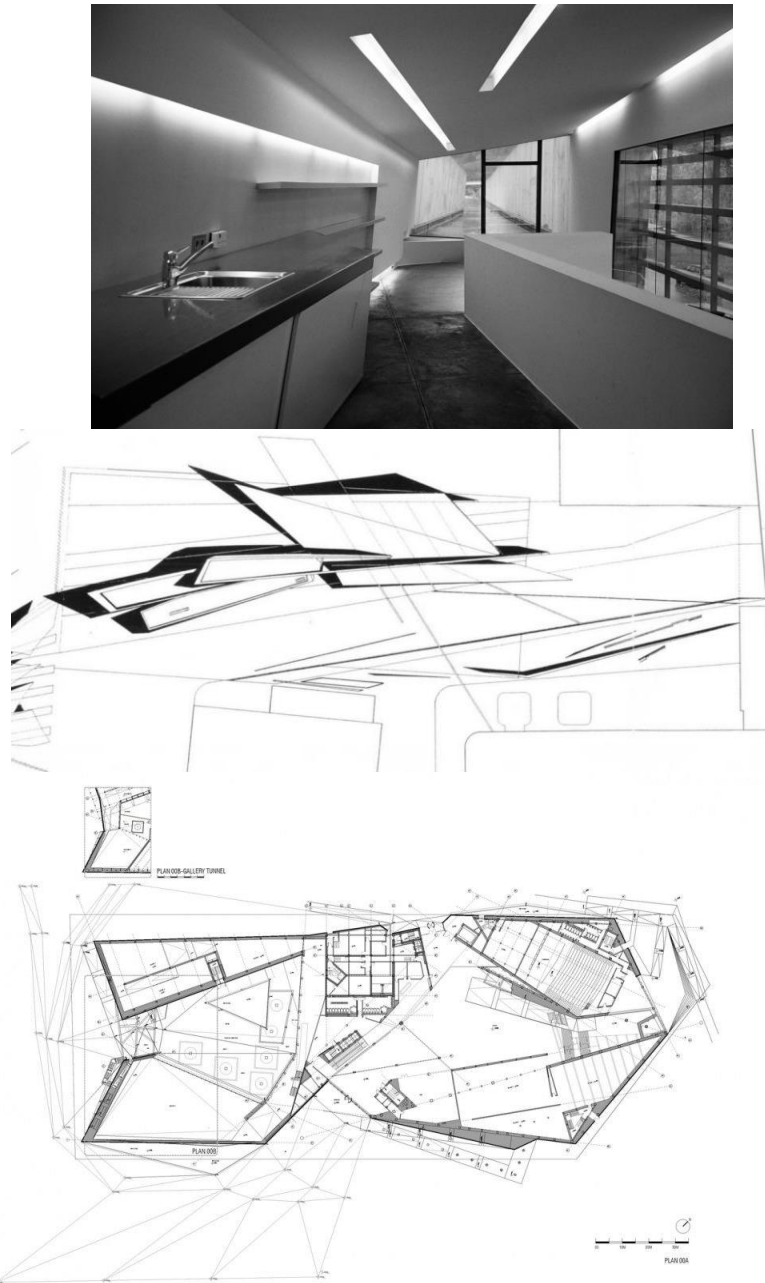


Fig. 12. Zaha Hadid, Vitra Fire Station (1994), Weil am Rhein, Germany

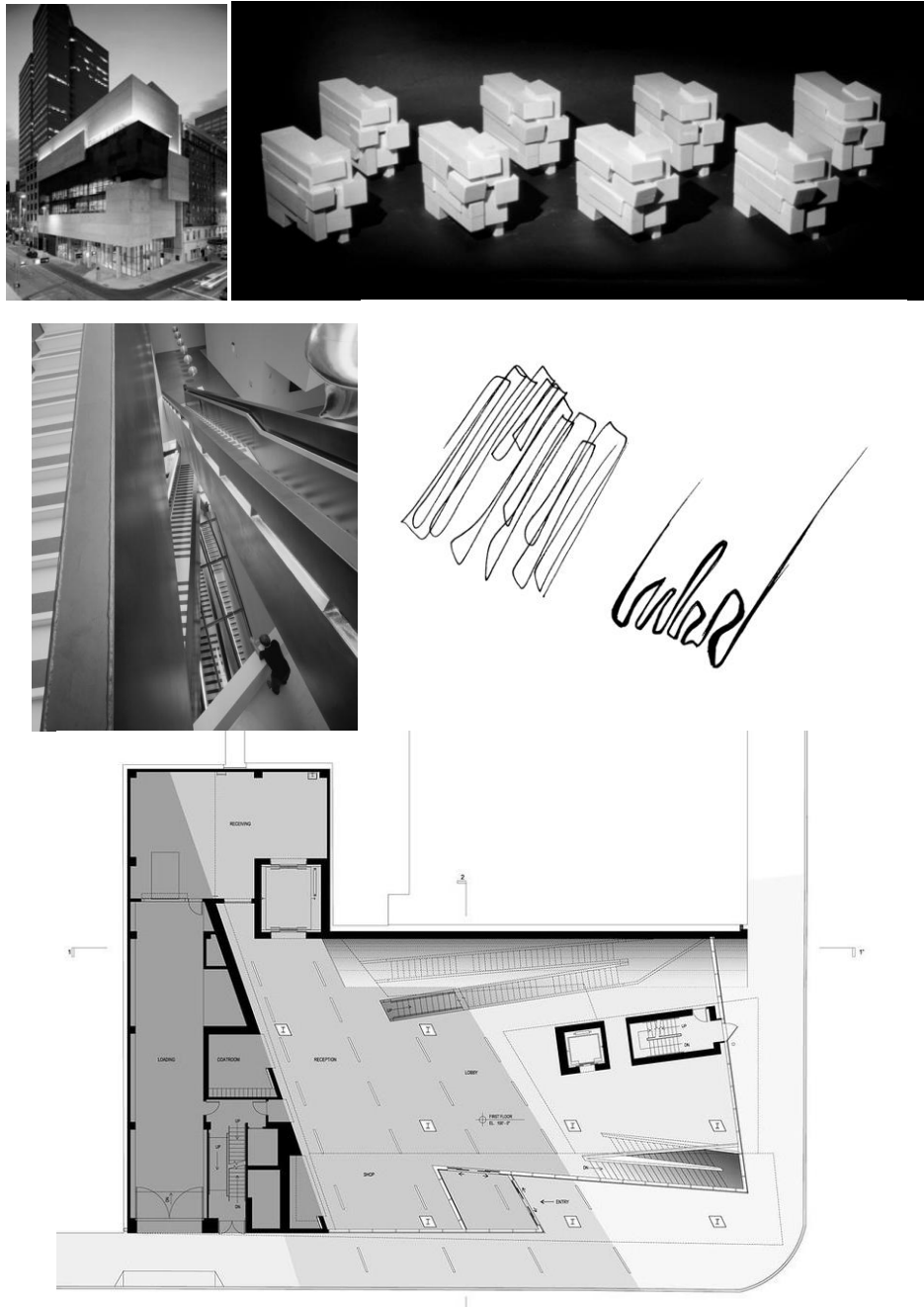


Fig. 13. Zaha Hadid, Rosenthal Center for Contemporary Art (2003), Cincinnati, Ohio, United States





Fig. 14. Zaha Hadid, Heydar Aliyev Center, Baku, Azerbaijan, 2015 [5]

5. Prototype

Currently, the Architecture is in a transitional and somewhat depressive state due to the lack of economic and consumer needs. Nowadays, Parametricism exists only in academic projects, contributing to the further development of the whole movement of animated and adaptive architecture. In practice, this is still not expressed due to the economic groundlessness, non-functionality of the premises and dissonance in local urban contexts. The future of Parametricism lies in chaoticism and compounds of different styles and systems into one adaptive chaotic whole, as was shown in Malevich's Suprematist treatises, put together by one system of Parametricism, in the struggle for adaptation in different climatic, economic, and consumer conditions [14, 15, 16].

Chaotic and constant striving for the paradigm of parametric design, penetrating into all areas of design discipline, systematic, adaptive figuration, variation, continuous differentiation, animated art, and dynamic figure relate to all design tasks from Urbanism to industrial design [1, 2, 3, 10].

Examples of the non-gravitational method went down in history with Niemeyer and Hadid: organic topology and morphology, radical space deformations that added to a certain loophole for creating a new flow and significantly influenced the rephrasing and directional mutations of architectural design, a departure from the architectural and tectonic forms that affected us, which affected the improvement of 21st century architecture values [10, 11].

Think about it for a second: can a rectangle, a cube, a cone, or a ball be aerodynamic one? Answer: it cannot. In the transport age, we need objects that could be transportable, such as, for example, the Hyperloop vacuum train. Why not? Today, the building is located in Sydney, and tomorrow it is in San Francisco by a magnetic highway or by air, as an airship in the aerodynamic example. Why do we need trains and airplanes then? We can simply move objects depending on our needs, the needs of the economy, and consumption. Do you need an

office in Seattle? Then tomorrow it will be delivered by a magnetic line. Is it utopia? No, this is convenient Parametricism, without geolocation, spatial restrictions, and reproaches from local residents [14-18].

The environmental approach in the design of the object in practical terms – that is what is the main task to date. Combining modernity with the past, this dissonance makes the task of adaptation even more weighty and complex. We not only need to adapt color and texture to the existing semantics, but also to combine the unconnected things together, to combine technology and history which needs constant restoration and practical justification [19].

This concerns not only the design of the object space, but also the morphology of the whole environment. It is necessary to deform the environment, not the object, because the object has already become the environment. Do you remember: “an object meets a field”? So today, the object is fully compatible with the environment, and the environment has become not homogeneous, but constantly adapting, mutational, vegetative, climatic, which has no obstacles to establish its scale, function, and justification. Hadid just has opened the curtain and showed how it can look in practice in the future of the 21st century with simple examples of the technology of the past years. Nowadays, everything is very fast, the speed of life is constantly accelerating, the rate of consumption is tripled, the climate bomb is devoid of any justification, the problem exists, and it must be solved with the help of architectural technologies. The architecture will contribute very little here, but it can help the economy and consumption even more simplify the consumption process, combine all the functions together in a micro-city, or make transportable buildings, as mentioned above. Why do we need to spend time and money on traffic jams, fuel and half a day in order to get to the office or the supermarket? We need polyfunction in order to remove traffic jams and the colossal number of cars, significantly polluting the already disastrously polluted atmosphere with gases, clear the city, make it more functional [20].

Parametricism, the word itself, not understandable to anyone, can connect and satisfy the enormous needs of consumption. Apparently, this is simply “Adaptive Chaos”—this is the working title of the future of architecture. Today, Parametricism is the light at the end of the tunnel for the environment and transport, the age of consumption and the climate bomb, generated by computer simulators of the architecture, which became nano-image thanks to such programs as Rhinoceros, Maya who became pioneers, as the transition from paper production in animated one [21].

Currently, all scientific treatises investigate the Grasshopper algorithm scripts incessantly, how can we make this or that form or build a spatial algorithm. The age of machines is our destiny, along with the architectural design and the asymmetry of image enhancement. Parametricism today has become a common noun as a transition from the rhetorical consequences of Deconstructivism and Minimalism, covered in the dogma of research of the function of consumption, rationalism, political conformism, the division of the whole into pieces, assembled into one abstraction, plus rationalists tell us about adaptable materials for using them from outside in extreme conditions in any climate [22].

Durability due to the adaptability of nanomaterials in medicine or chemistry makes architecture so nano-dimensional now for dogmatic perturbations in an architectural society that we expound the policy of the differential-programmable space as a crime against the space and the dogma of opportunistic conformism in business, communication, workplace, the age of consumption in general, which, in turn, makes the style of Parametricism artificial, monovalent, too adjusting by direct to any economic and political penalty in the society [18-23].

Heterogeneity, fluidity, and non-objectivity of the entire nano-architectural image is a revolutionary rephrasing of the typology, scale, speed, justification of space, aesthetics, semantics, tectonics, strength, adaptation, semi-function of a building. Nano-abstract, digital and animated art, a depart from typological and functional analysis – all these transformations have touched the internal and external, intuitively constructed 4-dimensional space based on the adaptive concept and differentiation of 4-dimensional printing, became a new stage of the modern architectural future [12-24].

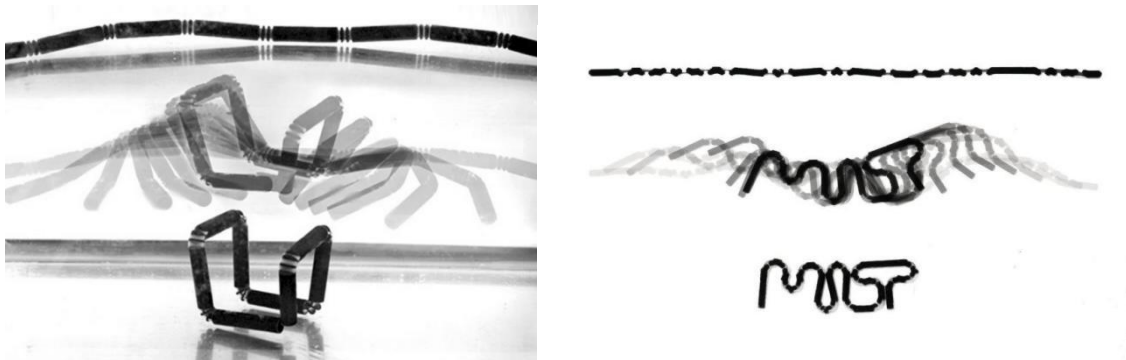


Fig. 15. Skylar Tibbis, nanomodel “4d print”, MIT, Self assembled lab

6. Conclusion.

Malevich's Suprematism, Zaha Hadid, and Parametricism have proved to the whole world, architects and designers, that there is something besides the square-rectangular functional architecture taught to all students, that there is something else beyond the function and architectural-engineering thinking, that modern architecture to date should be based on design, and not on engineering and function. It was a short but fruitful period of exhortation and revolutionary mutations in the field of architectural design, which outlined the very concept of architecture in the field of architectural design. Yes, these are not functional buildings. Yes, this is an expoarchitecture. Yes, this is a sculpture. But they have a soul that conquers sight; they have something magical, beyond comprehension. From this point of view, it is possible to work in the field of architectural design, to reform and transform, perhaps, not so deformationally, but at the same time, keeping up with the times and the solution of the created climatic and consumer tasks [1-15].

Politics and ethics, morality and function, conformism and aesthetics – the opposing movements that constitute of Parametricism – increasingly inhibit the practical development of style. The critical views of society on the non-adaptability of the image in the traditional context of the city, the liberality and spatial randomness of the image of the architecture capitalist model on the threshold of the beginning of the 21st century still cannot settle in the conformists' hearts. At the same time, the style has brought more excitement when choosing a future profession for young college students and threw a real challenge to the conformists.

Parametricism is an artistic passion that we have long lost in the race for office consumption products. This approach is original, heterogeneous for each object, the practical application of which is an animated model of architectural, landscape, and object design relations.

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