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# **“VIRTUAL REALITY AND THE WHITE CUBE”**

K O R I N A   K A S S I A N O U

EUROPEAN  
GREEK / FRENCH  
MASTER



"The ideal form of the gallery as a white cube is inseparable from the artworks exhibited inside it."

[Brian O'Doherty, Inside the white cube, Artforum Magazine series, 1976]

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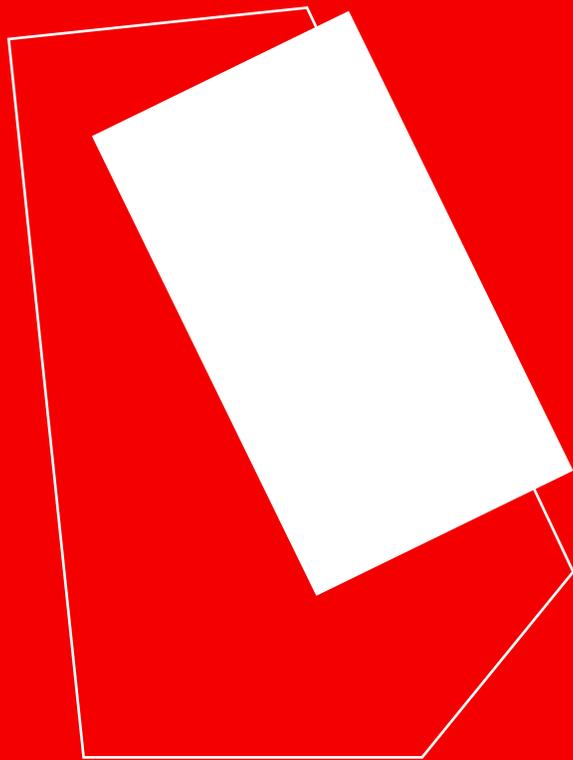
## SUMMARY

This research investigates the effect of the White Cube on the exhibited artworks as well as the possibilities of the implementation of Virtual Reality and CAD technologies on the artistic practice. Through a thorough investigation in the history of art and curatorial practice, it examines how new technologies reshaped the artistic product transforming the notion of art and creating the necessary conditions that gave birth to the concept of the White Cube. Through the examples of influential exhibitions, it presents how artists and curators treated the gallery space as well as their attempts to break the rules of the White Cube inventing new ways of exhibiting. Through the creation of a Virtual version of an existing gallery, the designing of several artworks and the making of five more digital exhibitions, this study provides experimental results that present the advantages of the implementation of new technologies in both the artistic and curatorial practice.

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## RESUME

Dans cet étude on a examiner l'effet du Cube Blanc sur les œuvres exposées ainsi que les possibilités de mise en œuvre des technologies de réalité virtuelle et de CAO sur la pratique artistique. À travers une enquête approfondie dans l'histoire de l'art et de la pratique curatoriale on va analyser comment les nouvelles technologies ont changé le produit artistique en transformant la notion d'art et en créant les conditions nécessaires qui ont donné naissance au concept du Cube Blanc. À travers les exemples d'expositions influentes, on présente comment les artistes et les curateurs ont traité l'espace de la galerie ainsi que leurs tentatives de briser les règles du White Cube en inventant de nouvelles façons d'exposer. A travers l'installation d'une version virtuelle d'une galerie existante, de la création plusieurs œuvres et de la réalisation de cinq autres expositions numériques, cette étude fournit des résultats expérimentaux qui présentent les avantages de la mise en œuvre des nouvelles technologies dans la pratique artistique et curatoriale.



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## 1 - INTRODUCTION

Brian O'Doherty, in his three article series of essays in 1976, sets the milestones of an ongoing debate in the field of arts regarding the correlation between content and context in art exhibitions. The notion of the gallery as a transforming force still puzzles today's art-world especially in an era where technological innovation takes the lead. Being reshaped dramatically throughout the years, the exhibition space is now moving towards a mutation into an unreal - immaterial place.

By tracing the relationship between art and technology, I will attempt to revisit the concept of the "white cube" in the framework of digitization and Virtual Reality. I will examine the way both artists and curators incorporate emerging technologies in order to expand their practices and redefine the way we perceive art.



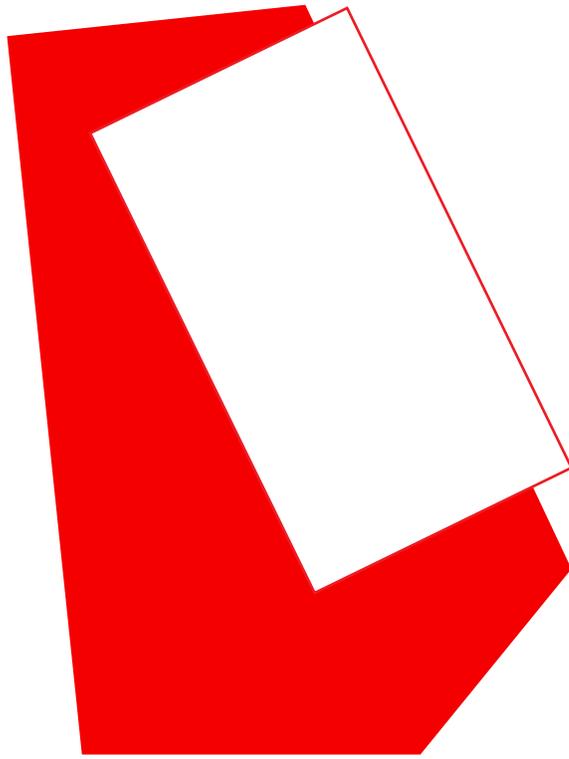
## 1.1 SCOPE OF MY THESIS

This study will be restricted into three domains :

1. The catalytic interference between technology and artistic practice
2. The concept of the White Cube and the curatorial quests for the optimal presentation
3. The way digitization and Virtual Reality transforms the arena of art circulation and dealing.

The core objective of my research is to approach the concept of contextualism in the field of arts looking through the eyes of the artist, the curator and the viewer respectively as well as examine how Virtual Reality and CAD Technologies could alter the way we create, exhibit and distribute artwork.

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## 2 - ART AND TECHNOLOGY - A UTILITARIAN DEPENDENCE

### 2.1 LEAPS AND BOUNDS : THE ARTISTIC PERSPECTIVE

At all stages in the evolution of artistic creativity, changes in the form of the artistic product have always been

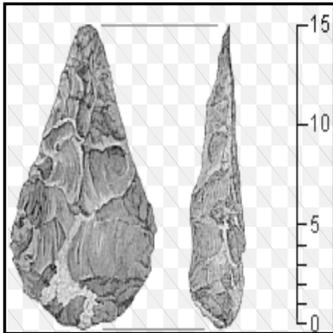


Fig.1\_Sketch of a typical Acheulean handaxe

strongly related with crucial leaps in the cognitive ability of the human mind directly reflected in the progression of tool making. From as early as the Upper Paleolithic Era, we observe the influence of the Acheulean tool-making (Fig.1) on the detailed silhouettes of the early engravements like the one of Venus of Laussel c. 27,000 B.P. (Fig.2). The stylistic alterations of Venus figurines over the years (Fig.2-4), gives us only an elemental example of how shape is being defined by the sophistication of the engraving tools.

While stone and wood carving was dominating the artistic practice, the development of metal casting changed the landscape. The Mesopotamian copper frog from 3200 B.C. (Fig.6) is the oldest known example of that groundbreaking technique. Years later, in 645 B.C. in China, we find the earliest known sand molding and soon enough, we marvel at the Greek achievements. We observe, side by side, the elaborated body of the Antikythera Youth (Fig.7) and the precise structure of the Antikythera Mechanism (Fig.8-9), a complicated device capable of indicating the future positions of celestial objects.

The rebirth of the Greek spirit during the Renaissance provided us not only with equivalent art and engineering masterpieces but also with the liberating notion of the artist as an inventive polymath. After Brunelleschi's discovery of linear perspective, Leonardo da Vinci, with the construction of his Perspectograph (Fig.10-12), gives us the first concrete example of how technology shapes the arts. He invented a machine that helped painters drawing the illusion of perspective, a pursuit that marked the artistic heritage of the entire period of the Renaissance. (Illustrations of similar perspective machines are included in the Albrecht Dürer's publication "The Artist's Manual" in 1525 A.D.).

With Vincent van Gogh using a similar machine almost 300 years later, we are running into the early history of modern art, a period of artistic innovation deeply influenced by scientific discoveries. The invention of daguerreotypy in 1839 (Fig.13) and the three-dimensional movie (Fig.14) by Auguste and Louis Lumière, left indelible marks on the way artists dialogue with the world. In painting, the experiments of the chemist Michel Eugène Chevreul (1786 - 1889) on color dyes, his law of simultaneous contrast and the publication of "Modern Chromatics with Applications to Art and Industry" by Ogden Rood (1879) (Fig.15-16) are the least examples of how science and technology began inspiring the revolutionary artistic movements that will follow.

Humankind has continued translating its inventions into cultural progress and as we dive into the era of machine manufacturing, the implications of scientific knowledge and engineering on the objects of art shine through the artistic boom of the inter-war Avant-Garde. In the next chapter, I will discuss significant artworks of the period and their references to technology. I will present artists who had deliberately shaken the ground of the established art scene of their time and raised ongoing questions about the objectives of art.



Fig.02\_ Venus of Laussel c. 27,000 B.P.



Fig.03\_ Venus of Hohle Fels, wood, Germany, 38,000-33,000 B.C



Fig.04\_ Venus of Willendorf, stone, Austria, 28,000-25,000 B.C.



Fig.05\_ Venus of Dolní Věstonice, ceramics, Czech Republic, 29,000-25,000 BC



Fig.06\_ Coper frog, Mesopotamia, 3200 B.C.



Fig.07\_ The Antikythera Youth, Greece, 70 - 60 B.C



Fig.08\_ The Antikythera mechanism, Greece, 150 - 100 B.C.

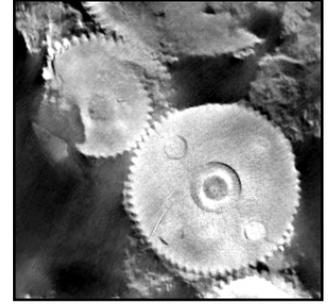


Fig.09\_ X-Ray 3D slice through the Antikythera relic

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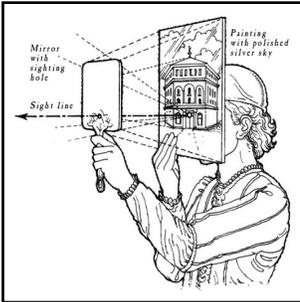


Fig.10 Sketch of Brunelleschi's experiment on linear perspective

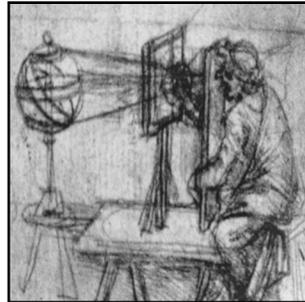


Fig.11 The Perspectograph of Leonardo da Vinci

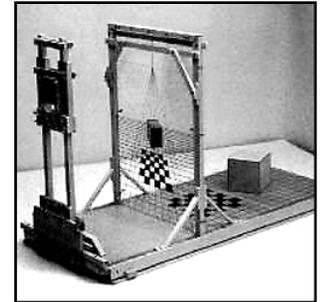


Fig.12\_ The Perspectograph of Albrecht Dürer



Fig.13\_ Daguerrotypy Machine, Louis-Jacques-Mandé Daguerre, 1839

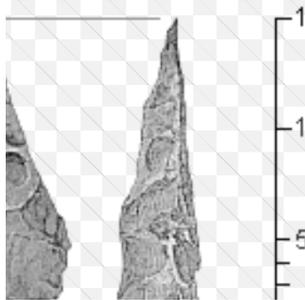


Fig.14\_ Still image of "The Arrival of The Train", Auguste and Louis Lumière, 1903



Fig.15\_ First chromatic circle containing pure hues, Cercles Chromatiques, Michel-Eugène Chevreul, 1861

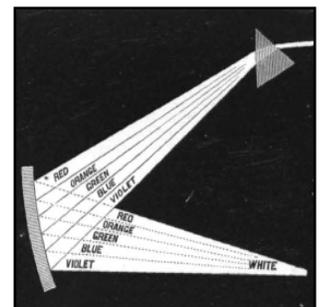


Fig.16\_ Recomposition of White Light, Modern Chromatics with Applications to Art and Industry, Ogden N. Rood, 1879

### 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

At the turn of the twentieth century and while Max Planck was formulating the law of black body radiation, the British photographer Eadweard Muybridge was publishing his first book on animal movement. The book, under the full title: "Animal Locomotion; an electro-photographic investigation of consecutive phases of animal locomotion", proved to be one of the most valuable sources for figure and motion study in the modern world.

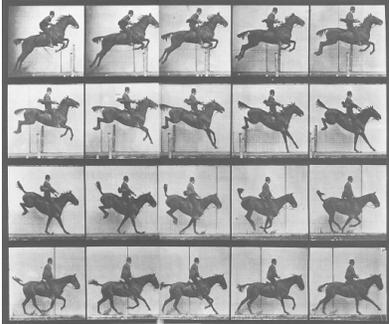


Fig.17\_ Daisy jumping a hurdle, Muybridge, 1907

Attempts of visualizing consecutive motion have been made before by the Belgian physicist Joseph Plateau who, in 1832, invented the phenakistiscope, a spinning cardboard with hand-made illustrations which became the first widespread animation device (Fig. 22). With this simple mechanism, Plateau paved the way for a series of experimentations that gradually led to numerous inventions of more complicated capturing machines.

By the year 1879, and while the radial animations of Joseph Plateau were in use in the everyday life, Eadweard Muybridge was improving his own device for displaying real-time motion pictures: the zoopraxiscope. During the decade, he gave numerous lectures on human and animal movement in the United States and Europe. Under the title "The Science of Animal Locomotion and Its Relation to Art and Design", those revolutionary lectures were given at nearly all the principal Institutions of Art, Science, and Education and were illustrated by projections of photo-lithographic prints of human and animal poses in motion that no one had ever seen before (Fig.17 and 20). For the first time, the audience was able to see sequences of rapid movement projected on a screen.

Inspired by the investigations of Muybridge, at the same period, the French engineer and physiologist Étienne-Jules Marey was also interested in the deconstruction of movement. During his research on the locomotion of birds in flight, he invented the chronophotographic gun (1882) the first device that could record twelve consecutive frames per second. During the last years of his life,

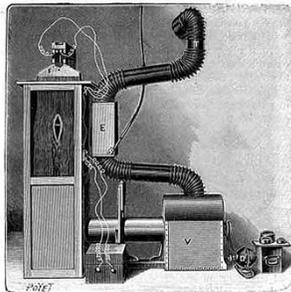


Fig.19\_ Étienne-Jules Marey, Smoke Machine No.2, 1901

Marey was interested in capturing air movements. With his famous Smoke Machine (Fig.19) and the series of pictures that followed, he provided incomparable insights on the way smokeflows are formulated and react with the air (Fig.18). Both Muybridge and Marey were interested in capturing movements that are impossible to be perceived by the naked eye. They produced a huge lifework and they inherited to the artists of the first half of the twentieth-century the inspiration to experiment furthermore with the notion of movement and produce radical works of art.



Fig.18\_ Etienne-Jules Marey, Smoke-Machine, 1901

### 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

The impact of chronophotography in the Futurist movement was enormous. The rhythmic deconstruction of speed that this method revealed seemed to correspond with the general Futurist aspiration of illustrating the beauty of the fierce, energetic and mechanized Modern world. Marinetti and Tato, in April 1930, published "the manifesto of Futurist photography" in which declared photography as one of the most powerful tools for the contemporary artist.

In December of 1911, the Futurist artist and early cinematographer Anton Giulio Bragaglia published "Futurist Photodynamism" a Futurist theory of photography greatly influenced by the earlier work of Étienne-Jules Marey. In his theory, Bragaglia highlights an interesting point. He proposes that he is not interested in the precise reconstruction of the movement through its fragmentation but rather in the importance of its uncaptured intervals. He notes that the method of chronophotography results in a division of the movement that excludes something absolutely crucial.

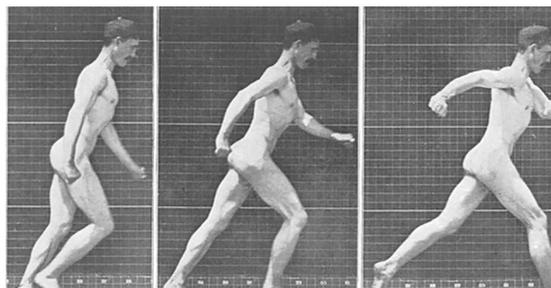


Fig.20\_ Some Phases in the Walk Of An Athlete, Muybridge, 1907

Bragaglia understands the notion of motion as a totality and tries to capture its distortion and continuity (Fig. 21). In his 1911 publication, he writes: "Given the transcendental nature of the phenomenon of movement, it is only by means of Photodynamism that the painter can know what happens in the intermovemental states, and become acquainted with the volumes of individual motions. [...] Only with Photodynamism can the artist be in possession of the elements necessary for the construction of a work of art embodying the desired-for synthesis [...] For Photodynamism, it is desirable and correct to record the images in a distorted state, since images themselves are inevitably transformed in movement. Besides this, our aim is to make a determined move away from reality, since cinematography, photography and chronophotography already exist to deal with mechanically precise and cold reproduction.. [...] We will endeavour to extract not only the aesthetic expression of the motives, but also the inner, sensorial, cerebral and psychic emotions that we feel when an action leaves its superb, unbroken trace."



Fig.21\_ The Bow, Anton Giulio Bragaglia, 1911

Futurists were dedicated to promoting the technological and cultural progress of the Modern world and while the work "The city Rises" by Uberto Boccioni, in 1910, is considered to be the first Futurist painting, his sculpture "Synthesis of Human Dynamism" (Fig. 24) illustrates the most, the influence of the technology of chronophotography in the way Futurists were trying to express the sense of movement. Although the resemblance to the painting of Marcel Duchamp "Nude descending a Staircase" (Fig.23) is stunning, Duchamp denies any correlation with the Futurist movement. His painting was inspired by Muybridge's Woman Walking Downstairs from his 1887 book "The Human Figure in Motion", and he was trying to depict the fragmentation of the movement rather than its continuity as Bragaglia proposed.

**2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE**

In 1913, Bragaglia was excluded from the Futurist group by request of Umberto Boccioni and one year later he shifted his interest to the film. In 1918, Bragaglia opened an art gallery, the "Casa d'Arte Bragaglia", which became a meeting point of avant-garde artists such as Balla, Depero, Boccioni, Klimt, and Kandinsky where they exhibited their work and exchanged their ideas about art.

Giacomo Balla, who was a son of a photographer, adopted from early on the revolutionary ideas of Futurism and, in 1912, he painted the "Dog on a Leash" (Fig.25), one of the most prominent art pieces of the period. The painting deals with the common, among the intellectuals of his time, issue of movement and acceleration. Balla depicted the dynamic movement of a woman marching with her dog in an empty background. The way Balla rendered the motion of those figures is so successful that the viewer senses the vibrant pulse of the city even though the city remains invisible.

Bragaglia, Boccioni, and Balla, although strongly influenced by the early works of Muybridge and Marey, handled the notion of movement in a completely different way. Even though they adopted many of the visual elements of the former experiments, they proposed an organic, more sensory-accurate interpretation of motion. They dealt with the sense of movement not from a scientific point of view, but rather by adopting

the perspective of someone who lives, breathes, and senses the actual energized motion of the noisy and in a constant change Modern world - as Filippo Tommaso Marinetti writes in "The Futurist Manifesto" of 1908, "we want to sing the love of danger, the habit of energy and rashness [...] We declare the splendor of the world has been enriched by a new beauty: the beauty of speed".



Fig.22\_ Joseph Plateau, Phenakistiscope, 1832

The beginning of the first World War in 1914, interrupted the natural course of both art and life but at the same time took the form of an abundant demonstration of power and technological achievement. Many of the futurists were friendly to the idea of war as they approached it through the concept of change. In the Futurist Manifesto, Marinetti writes:

"We want to glorify war the only cure for the world, militarism, patriotism, the destructive gesture of the anarchists, the beautiful ideas which kill, and contempt for woman. We want to demolish museums and libraries, fight morality, feminism and all opportunist and utilitarian cowardice".

In the 11th of November of 1918, the First World War finishes and humanity struggles to conceive the extent of the disaster. However, despite the frustration of the war and its devastating consequences, we witness a remarkable growth in the field of cinematography.



Fig.23\_ Marcel Duchamp, Nude Descending a Staircase, No. 2, 1912



Fig.24\_ Umberto Boccioni, Synthesis of Human Dynamism, 1913



Fig.25\_ Giacomo Balla, Dynamism of a Dog on a Leash, 1912

### 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE



Fig.26\_ Umberto Boccioni, Head, House and Light, 1912

Anton Giulio Bragaglia one year before the end of the war, releases his silent film "Thais" (Fig.27) which, despite its conventional plot, could be considered as the first film to incorporate artistic elements from the avant-garde to the filmmaking practice. The futurist painter Enrico Prampolini made most of the scenography. Prampolini used strong geometric shapes and colors in high contrast in order to enhance the narrative and create a powerful visual experience to the viewer. The triangle patterns that we see in Thais remind as the patterns created by the Wiener Werkstätte movement in 1903 which we will examine later on as the one that preceded Bauhaus and influenced greatly the history of art and design. As the film reaches the end, the abstract shapes and structures prevail, the actors seem to be part of a surrealistic play three years before the official dawning of Surrealism in 1920. The power of cinema spread Bragaglia's captive imagery to the people planting the seed of both abstraction and surrealism that will burst soon after.



Fig.27\_ Anton Giulio Bragaglia, Thais, Italy,



Fig.28\_ Robert Wiene, Genuine, Weimar Republic, 1920

In the Weimar Republic, in 1920, another highly influential movie was reaching the public under the title "Genuine" (Fig.28). Robert Wiene, directed a horror film that after his famous "Doctor Caligari" in 1919 (Fig.30), became one of the most representative of the expressionist filmography. The film's sets were designed by the Expressionist painter César Klein who by using harsh black strokes and triangle structures, created sharp grotesque forms and distorted perspectives. A comparison with the destroyed futurist sculpture "Head, house and light" of 1912 by Umberto Boccioni (Fig. 26) reveals that despite the diverse conceptual background of the two movements, their visual language had very much in common.

The culture of Weimar Republic was vibrant. As a state, it existed between 1919 and 1933 and during those years it experienced a remarkable cultural renaissance that led to an explosion of creativity in every aspect of the artistic and intellectual field. In 1928, Hans Richter creates his fifth film "Ghosts before Breakfast" (Fig. 32) which is considered as the first film of surrealistic fantasy. In this film, Richter uses excessively the effect of disappearance and creates a mixture of irrational happenings. His experiments with the actual material of the film led him to the creation of innovative tricks that enhance greatly the dream-like rhythm of the movie. "Ghosts before Breakfast" is an early film that demonstrates the plasticity of the new medium in the creation of atypical aesthetics and its potentiality to establish new principles in the way we perceive art.

## 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

Two years after the creation of the influential "Battleship Potemkin" by Sergei Eisenstein in the Soviet Union, an Expressionist masterpiece which also indicates the thriving culture of the Weimar Period, was reaching the public. The film "Metropolis" (Fig.31), by Fritz Lang. While the influence of the movements of Futurism and Bauhaus is apparent in every single frame, Fritz Lang, who foreshadowed the future of capitalism, is utilizing pioneering visual effects and creates miniatures of the city in order to express his rather pessimistic view on the repercussions of technology in the Modern world. His film "Metropolis", which is considered to be the first science fiction film, became a vehicle for many other directors and influenced greatly the history of cinematography and art in many and diverse ways.

In the United States, the film industry was flourishing from early on. In 1916 and in the middle of the first World War, David W. Griffith released his controversial film "Intolerance: A Sun-Play of the Ages" (Fig.29) which, from a technical standpoint, became a landmark. Griffith utilizes the technology of his era to create monumental settings. He segments his plot into four epic parts of which the Babylonian segment (Fig.8) is the most glamorous. This film will be remembered as an impressive sample of a titanic early production and Griffith, despite his debatable views on racism, as the father of cinematography.

The crucial leaps that were made in the field of cinema, established the value of cinematic art as a medium of great power and creativity. Films - used either for education, entertainment or propaganda - created an unprecedented impact on the way humankind perceived reality. Their distributed moving images adhered to the minds of urban people creating common memories and new aesthetic values. The influence of cinematography on the everyday life, while not always detectable, it existed and reshaped both the intellectual and artistic products of the time.

In the next few pages, we are going to review the Dada movement and its relation to the industrial object. We are going to examine the birth of Constructivism in conjunction with the movements of de Still and Suprematism as well as the invention of Abstraction. A thorough investigation on these periods of the avant-garde is necessary in order to understand in depth the development of Bauhaus and its influence on the concept of the white cube.



Fig.29\_ Griffith, The Fall of Babylon - Intolerance, USA, 1916



Fig.30\_ Robert Wiene, The Cabinet of Dr. Caligari, Weimar Republic, 1920

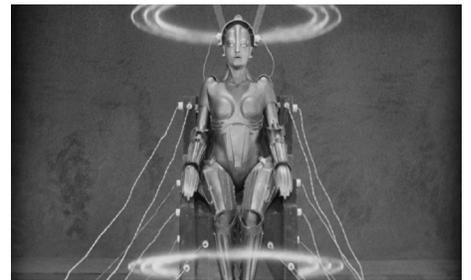


Fig.31\_ Metropolis, Fritz Lang, Germany, 1927



Fig.32\_ Hans Richter, 1928, Ghosts Before Breakfast, Weimar Republic

### 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

Dada emerged during the brutality of the First World War as a desperate form of reaction. On February of 1916, in Zürich, Hugo Ball and Emmy Heggings opened "Cabaret Voltaire" an unconventional community bar that became the meeting point of all the avant-garde. On a daily bases, groups of young artists and writers were giving musical performances, reciting poems and exchanging ideas. In July of the same year, Hugo Ball reads the first manifesto of Dada. In his phrase "Each thing has its word, but

the word has become a thing by itself" we detect the origins of what Marcel Duchamp was declared one year later when he proposed that the manufactured goods are ready-made art objects. Keeping intact the structure of Ball's phrase and replacing two words we get the very essence of Duchamp's idea: "Each artwork is an object, but the object has become an artwork by itself".

Nevertheless, Dada was both an artistic and a social movement. The artists in Zürich published Dada magazines that spread anti-war and anti-art messages. The Dadaists opposed any hierarchical form, condemned the old values and they often diminished their own

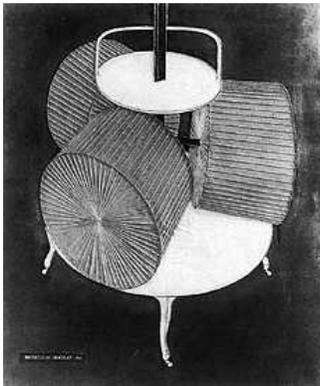


Fig.33\_ Marcel Duchamp, Chocolate Grinder, No. 2, 1914



Fig.34\_ Marcel Duchamp, Fountain, 1917

artwork. The influence of the philosophical principles of Nihilism, Existentialism, and Anarchism on the Dada movement is, in many aspects, more important than the superficial influences of the artistic movements of Expressionism, Futurism, and Cubism. Dada was in fact, a generalized alarm for liberation. It became a means of escaping from the traditional ways of thinking, ways that led humanity not only in the creation of sterilized, conventional artworks but also in the irrationality of the First World War.

Born in Zurich, Dada rapidly spread to New York and from there to Berlin, Cologne, Hannover, and Paris. On 23 March 1918, Tristan Tzara, writes the second Manifesto of Dadaism and clarifies the aims of the movement: Dada is not art, Dada is against the bourgeois, Dada is spontaneous, Dada condemns any established value. Referring to the world that a painter creates on a canvas, he states: "This world is neither specified nor defined in the work, it belongs, in its innumerable variations, to the spectator. For its creator, it has neither case nor theory". The second manifesto of Dada is a stream of vibrant and unconventional ideas. Tristan Tzara defined the multifaceted strands of Dadaism and marked the making of the first conceptual movement in the history of art.

Although Dadaists critiqued modernity, they embraced new technologies and developed strong references to graphic art, photography, film, and industrial design. The early work of Marcel Duchamp "Chocolate Grinder" (Fig.33) indicates his fascination with the design of manufactured objects. He believed that the rotating drums of the chocolate grinder had a sexual connotation and this is the reason why this machine reappeared in his work several times. His famous "Fountain" (Fig.34), three years later became the symbol of Dada movement this time not because of its appealing design but on the contrary because of the absence of any aesthetic value. As Duchamp said, he intended to shift the focus of art from physical craft to intellectual interpretation.



Fig.35\_ Sophie Taeuber-Arp, Untitled (Dada Bowl), 1916

## 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

At a time when the boundaries between art and design were discrete, Sophie Taeuber-Arp, creates "the Dada Bowl" (Fig.35) one of the most radical pieces of art even for today. Taeuber-Arp made by hand a simplistic hybrid object that was both utilitarian and aesthetic. She imitated the clean forms of the industrially manufactured objects and made an item that is impossible to be categorized. The untitled dada bowl signifies the beginning of a new era in the field of arts which is still relevant today. She introduced the breaking of the division between art and design, a notion that three years later, will become one of the principal directions of Bauhaus.

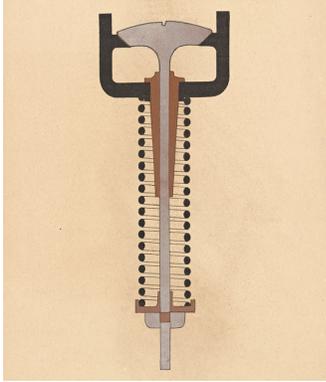


Fig.36\_ Francis Picabia, Flammenca, 1917

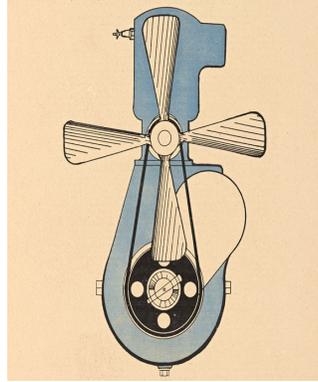


Fig.37\_ Francis Picabia, Marie, 1917

World War I, Picabia's interest shifted to the American machinery. He began painting machine-like structures to which he gave human names (Fig.36,37). In Picabia's view, those humanized machines were related to some sort of human function implying that machinery had become something more than a tool for human life but instead, the very soul of it.

The work of the Surrealist Max Ernst "The Anatomy as Bride" (Fig.38) four years later, indicates that the rapid development in the fields of engineering and manufacturing were so overwhelming, that became transformed into a common visual language among most of the Avant-garde movements of that period. The body of the Bride has obvious visual references to machinery and the photomontage with Collage by the Dadaist Hannah Hock (Fig. 39) is another evidence of the influence of the mechanical-like structure in the visual composition.



Fig.38\_ Max Ernst, The Anatomy as Bride, 1921



Fig.39\_ Hannah Hoch, High Finance, 1923

Dada introduced a period of great innovations in photomontage. The irrational associations that Surrealism proposed, the chaotic dada realm of thoughts and the ever-growing new world found their visual interpretation in that innovative technic which allowed artists to assemble their ideas with great freedom. The invention of photomontage is attributed to Raoul Hausmann and Hannah Hoch who through their work, made a concrete statement. The photograph was not anymore a seamless record of the reality but an instrument of fragmentation and reconnection that reinterprets reality and expresses a different and, in many cases, rebellious stance on it.

The artistic path of Raoul Hausmann is of particular interest because, throughout his career, he developed a strong relation with science and technology. His famous work "The spirit of our time" (Fig.40) reveals both authentic attraction and criticism to the new mechanized world. Hausmann created this artwork

### 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

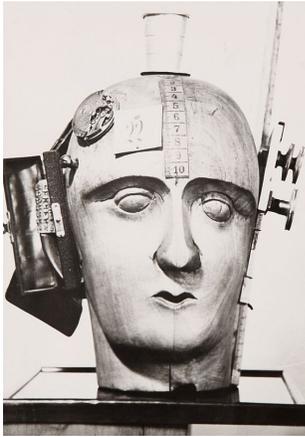


Fig.40\_ The Spirit of Our Time Raoul Hausmann, Mechanical Head, Berlin, 1919

eight years before Fritz Lang's "Metropolis" and he brought up similar matters.

Raoul Hausmann was interested in the emerging fields of radio, television and sound film. The connection between electricity and human perception is central to Hausmann's ideas about art. He believed that media technology is an extension of man and recognized immediately the need for a deep exploration in the technological field and its emerging potentiality. Marshall McLuhan takes Hausmann's ideas as a reference when he writes his thesis about the extension of man through the electric media.



Fig.41\_ Eric, the talking robot, 1928

In 1929, Hausmann received a patent for a device that was monitoring body cavities and tubes (similar to an endoscope). While researching light and electronics for his artworks,

Hausmann collaborated with the Russian engineer Daniel Broido in order to design a computer that used similar technology. The device was granted a patent by the British patent office in 1934.

Nine years after Hausmann's famous sculpture, Eric, "the talking robot" (Fig 41) embodied in reality "The spirit of our time". The robot was presented to the Society of Model Engineers in London. He was built by First World War veteran Captain William Richards and aircraft engineer Alan Reffell, to replace the Duke of York in opening the Exhibition. That day, Eric gave a four-minute speech at the Royal Horticultural Hall (Fig.41). His voice was produced by radio signals; he moved his arms and light was coming out of his teeth. The stunning performance of Eric was so successful that their creators decided to take him on a world tour around Europe.

New media technologies had an immense impact on the artworks of all the Modernist avant-garde, particularly to the movements of Dada and Futurism. Nevertheless, while we observe noticeable changes in the visual outcome of their works, artworks that implemented fully those kinds of technologies emerged much later with the establishment of new media art.

In parallel with Dada, another important movement was developing outside Europe. Born in Russia at the time of the October Revolution, Constructivism became the vehicle of many Russian artists to express their support to the revolution. Constructivists declared that a newly created society demanded a new artistic language and so they tried to invent it. They proposed an innovative way of creating art and shifted their concerns from the aesthetically pleasing object of art to the creation of artworks that would have a practical application to the modern world. They experimented vastly with technics, materials, and structures and they had been an inspiration for many artists in the West and especially the Bauhaus movement.



Fig.42\_ Eric, the talking robot, 1928

## 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

The Constructivist movement, led by Aleksandr Rodchenko, aimed to convert the prevailing notion of the art as an individualistic expression of emotion to a utilitarian form of contribution to the society. The constructivists joined great-heartedly the Bolsheviks in their strive for the creation of a new world.

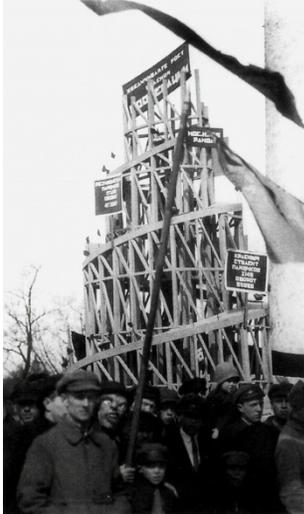


Fig.43\_ Vladimir Tatlin, Monument to the third international, 1920

In 1920, Vladimir Tatlin made his proposal for the Monument to the Third International (Fig.43). Tatlin's structure became a reference for the Constructivist movement even though never built. He created a structure using modern materials. Iron, steel, and glass replaced the traditional ones of stone or marble and he combined a futuristic esthetic with light technology and projection screens. Tatlin's proposal became a landmark for modern architecture and became a symbol of utopian thought.

In the same year, Naum Gabo and his brother Antoin Pevsner, wrote the Realistic Manifesto, a key text for the Constructivist movement. They narrowed down the Constructivist artistic practice into five fundamental principles that we see them applied in the works "Spatial Construction" by Gustav Klutis(-Fig.45) and Naum Gabo's "Column"(Fig.44).

In the Realistic Manifesto, they write:

1. In painting, we repudiate color as a pictorial element. Color is the idealized and optical face of the objects. The exterior impression is superficial. Color is accidental and has nothing in common with the internal content of bodies. We proclaim that the tone of bodies, that is, their material substance absorbing the light, is their sole pictorial reality.
2. We deny the line its graphic value. In the real life of the bodies, there is nothing graphic. The line is only an accidental trace that humans leave on objects. It has no connection to essential life and to the permanent structure of things. The line is a merely graphic, illustrative, decorative element. We acknowledge the line only as the direction of static forces that are hidden in the objects, and of their rhythms.

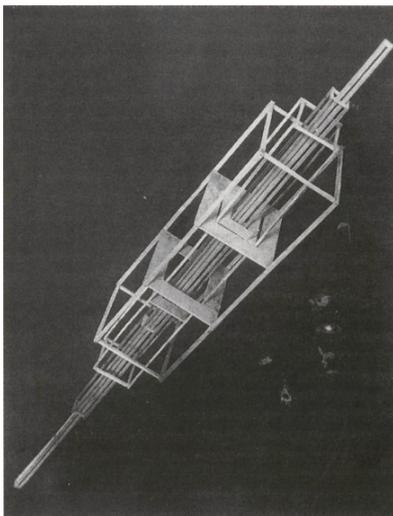


Fig.45\_ Gustav Klutis, Spatial Construction, 1920

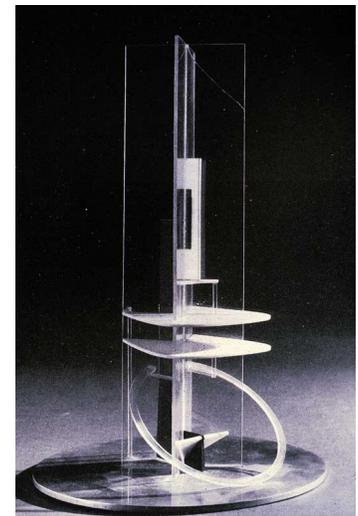


Fig.44\_ Naum Gabo, Column, 1921

3. We disown volume as a plastic form of space. One cannot measure a liquid in inches. Look at our real space: What is it if not a continuous depth? We proclaim depth as the unique plastic form of space.

4. We disown, in sculpture, mass as a sculptural element. Every engineer knows that the static forces of solids, their material resistance, are not a function of their mass. Example: the rail, the buttress, the beam . . . But you sculptors of any trend and any nuance, you always cling to the old prejudice according to which it is impossible to free volume from mass. Like this: We take four planes and we make of them the same volume that we would make with a mass of one hundred pounds.

2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE



Fig.46\_ Aleksandr Rodchenko Design for an advertisement for the Mossel' prom cafeteria, 1923

We thus restore to sculpture the line as direction, which prejudice had stolen from it. This way, we affirm in sculpture depth, the unique form of space.

5. We repudiate: the millennial error inherited from Egyptian art: static rhythms seem as the sole elements of plastic creation.

Constructivism had a great effect on modern art movements of the 20th century with major effects upon architecture, graphic, and industrial design. Constructivists showed a willingness to involve themselves in the industrial production and mass market. The poet-artist Vladimir Mayakovsky and Alexandr Rodchenko worked together and called themselves "advertising constructors". Together they designed stunning images of graphic design and Alexander Rodchenko became one of the most influential graphic designers of the century. His design for the advertisement for the agricultural industry in Moscow (Fig.46) is a small sample of his ingenious and innovative work.

Another influential figure of the Constructivist period, Lazar Markovich Lissitzky, left exceptional works in graphic design and architecture. A former student of the Suprematist Kazimir Malevich, El Lissitzky, joined with great enthusiasm the new explorations of the Russian avant-garde and, like Rodchenko, he got strongly involved with the marketplace. In 1923, Lissitzki designed the visual

book "The Voice" (Fig.47) using a collection of Vladimir Mayakovsky's poems. Both Rodchenko and Lissitzky, with their involvement in the graphics industry, spread to the public the principles of Constructivism and became the milestones of the contemporary graphic art in the fields of typography and design.

In 1923, the painter Liubov Popova began to create fabric designs (Fig.48) in order to be manufactured by the First State Textile Printing Works in Moscow. Popova's involvement with the industry was conclusive and resulted in the transformation of her paintings into abstract pieces of art. Like Popova, Many of the abstract artists in Russia became Constructivists and they started to learn about the new tools and materials of the modern production, believing that art was no longer something remote, but instead, something inseparable with life. This idea penetrating also the Bauhaus movement, which was running in parallel, became the hurt of Modernism and gave birth to contemporary questionings about the artistic product of our culture.

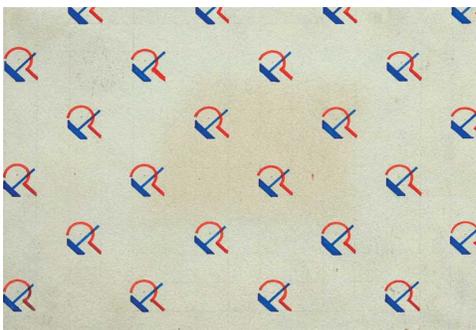


Fig.48\_ Liubov Popova, Textile design, 1923

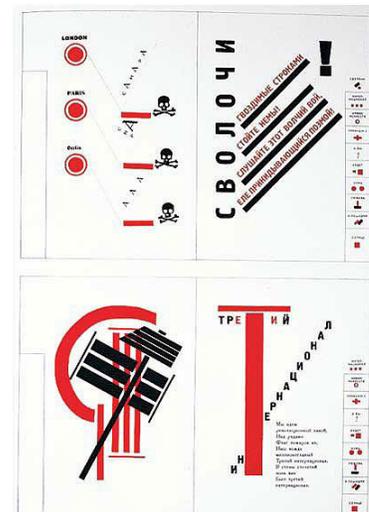


Fig.47\_ El Lissitzky created a visual book (The Voice) using a collection of Vladimir Mayakovsky's poems, 1923,

...the artistic product of our culture.

## 2.1.1 NEW TECHNOLOGIES AND THE AVANT GARDE

The rapid development of the new technologies of film and photography contributed greatly in a shift from representational art forms to abstract. Artists fascinated by the way these new mediums captured reality, began to seek new ways to redefine the role of art. The movements of Dada, Surrealism, Futurism, Suprematism, Constructivism, are aspects of a generalized effort to reestablish the function of art in the constantly developing world. The

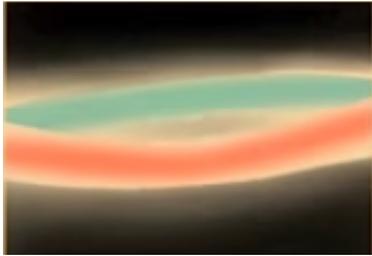


Fig.49\_ Leopold Survage, Colored Rhythm, 1913

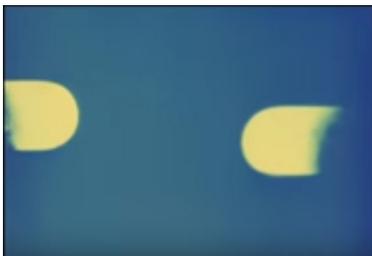


Fig.50\_ Walther Ruttmann, Lichtspiel Opus I, 1921

“Revolving Doors” (Fig.51) by the Dadaist Man Ray, “The Mohammedan Standpoint” (Fig.52) by the Swedish Hilma Af Klint and Kandinsky’s “Lithographie-Blau” (Fig.53) are all indications of that intention.



Fig.51\_ Man Ray, Revolving Doors, 1913

Abstraction developed between the years 1910-1925. Wassily Kandinsky’s first abstract watercolor in 1910 became the start-point of the Abstract movement.

With him, two years later, Francis Picabia, Robert Delaunay, and Frantisek Kupka presented the first abstract paintings to the public. In 1913 the Russian Leopold Survage created the series of paintings under the name “Colored Rhythm”(Fig.49). Using watercolors he created abstract paintings in a row with the aim to create an abstract color film. The film never realized but Leopold Survage managed to introduce the dimension of time and rhythm to the otherwise static work of art. Eight years later, the German painter and filmmaker Walther Ruttmann created Lichtspiel Opus I inventing a new animation technic (Fig.50). Ruttmann painted with oil on a glass and captured each stage of the painting using a camera. Opus I is the oldest fully abstract motion picture known to survive.

From as early as 1909, Wassili Kandinsky was interested in the interrelation between different forms of art. He created a stage composition under the title “The Yellow Sound” as an attempt to combine color, movement, words, and music to a theatrical piece of art. Kandinsky’s research on color theory and synesthesia was developing in parallel with the less known experimentations of Hilma Af Klint. Her work took also a form of a spiritual abstraction and is often seen as the first sample of abstraction before Kandinsky.

After returning to Germany, Kandinsky accepts an invitation of Walter Gropius, the founder of Bauhaus. Kandinsky became a key figure in that newly created school inheriting to the students his spiritual ideas about art and theater as well as his views on the theory of colors and shapes. The beginning of Bauhaus was probably one of the most significant events in modern history as it was a period of experimentation and productivity that led to new approaches in the architecture of the gallery space.

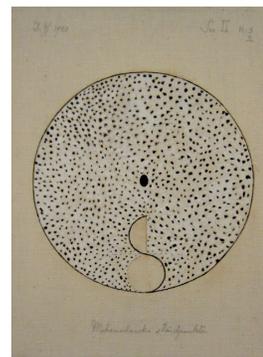


Fig.52\_ The Mohammedan Standpoint, Hilma Af Klint, 1920



Fig.53\_ Wassily Kandinsky, Lithographie Blau, 1922

2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS

The period of Bauhaus is of particular interest because it establishes the bond between art and utilization. The plain lines and clear forms of Bauhaus will soon lead to a widespread need for minimalistic showrooms and galleries. These spaces will prevail for their utility as a neutral container of the object of art and will raise questions about the way they interact with the artworks. While the Bauhaus period is expanded between 1919 and 1933, the need for a combination of arts, crafts, and architecture already existed. The influence of the production community of Wiener Werkstätte on both the visual language and concepts of the Bauhaus movement is crucial.

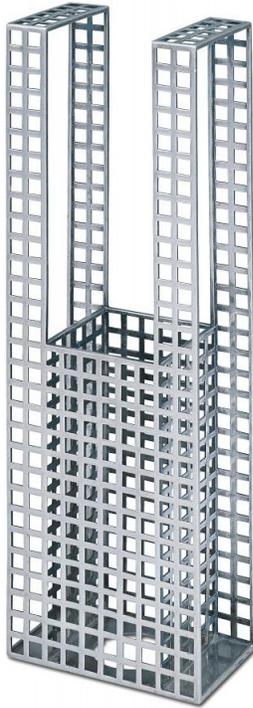


Fig.54\_ Koloman Moser, Silver Basket, 1904

Before the birth of Wiener Werkstätte in 1903 and sixteen years before the founding of Bauhaus, a pivotal art movement was formed in the same city known as the "Vienna Secession". It began in 1897 as a union of architects, painters, and sculptures who joined their forces in order to explore the possibilities of creating art outside the Academy. Their objective was to free themselves from historical traditions and experiment with different forms of visual language. Among the leading figures of Vienna Secession was the artists Koloman Moser, Gustav Klimt and the Austrian architect Josef Hofman.

In 1903, Moser and Hofman founded Wiener Werkstätte, an organization that aimed at the production of modern decorative objects that will blend with everyday life. They introduced the notion of Gesamtkunstwerk which is translated as the "total work of art". With this word, they expressed their core idea about the need for a bold combination of art and crafts - an idea that we will see spreading among the Bauhaus movement.

Bauhaus which was founded in Weimar by Walter Gropius, as in the case of Wiener Werkstätte and Constructivism, desired to reform the notion of art as a condition independent of real life. It was housed in three different cities - Weimar (1919 - 1925), Dessau (1925 - 1932), and Berlin (1932-1933) and soon became a place where the distinction between art and crafts seized to exist. Art, dancing, pottery, architecture, graphic design, painting, product design, sculpture, and theater were all approached equally.

The influence of everyday objects on the artistic practice was enormous. The design of manufactured objects penetrated the artistic mind and influenced the visual outcome of both architecture and art. The Koloman Moser's "Silver

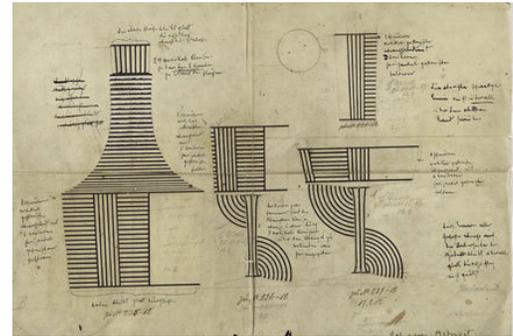


Fig.55\_ Josef Hoffmann, Sketches for glassware, 1912



Fig.56\_ Robe, Josef Hoffmann, 1911

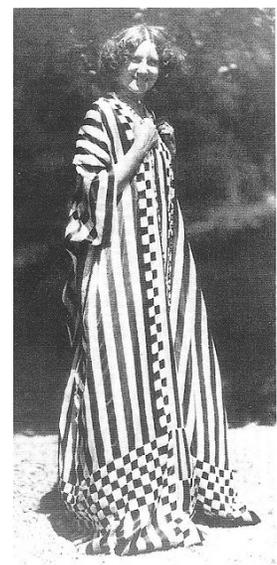


Fig.57\_ Dress, Gustav Klimt, 1905

## 2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS

Basket" from 1904 (Fig.54) resembles the structures of Bauhaus architecture as well as to the buildings of the architectural movement of "New Objectivity" that emerged in Europe in the 20's. The sketches for glassware by Josef Hoffman (Fig.8) are being translated into dresses (Fig. 56,57) and Gustav Klimt's robe (Fig.8) into the textile patterns of the Bauhaus artist Anni Albers(Fig.58).



Fig.58\_ Anni Albers wall hanging textile, 1926

The case of the "Adolf Sommerfeld House" by Walter Gropius and Adolf Meyer in 1920 reveals an interesting intersection between the widespread motifs which were used in the decoration of everyday products and the Bauhaus architecture. The house, along with its furniture, was created during the first expressionist period of Bauhaus and the patterns on the main door (Fig.60) resemble the visual language of Wiener Werkstätte indicating a strong relationship between the first period of Bauhaus and the decorative arts. The Melnikov house (Fig. 59) is a similar example created by Konstantin Melnikov in Russia in 1929.

Bauhaus, as in the case of Wiener Werkstätte and Constructivism developed a strong relationship with machine manufacturing and technology. Although traditional crafting methods were still in use, the industrial production was a desirable target. As we see in the last period of Bauhaus, the clean and simple geometric forms prevailed due to their flexibility in construction during the production process.



Fig.59\_ Konstantin Melnikov, The Melnikov House, 1929

For the first four years, the painter Johannes Itten was responsible for the preliminary courses where he conveyed the ideas of Bauhaus to the new students. Many of the tutors were already famous artists, designers, and architects with a significant lifework. Some of them were: Anni and Josef Albers, Mariane Brand, Wassily Kandinsky, Oskar Schlemmer, Naum Slutzky and Marcel Breuer. In 1922,

Wassily Kandinsky invited Paul Klee in the college to teach and in 1923, the sculptor and designer Oskar Schlemmer became a teacher in the theater workshop where he experimented on a new form of abstract dance.

Schlemmer's theatrical piece "The Triadic Ballet" (Fig.64) became one of the most famous pieces in the history of Bauhaus indicating a bold relationship with the Dada movement. It was segmented into three parts where the mechanical movements of the dancers were incorporated with vivid colors and music into a unique combination of visual experience. Schlemmer worked on the mechanics of the costumes trying to design them in a way that would follow the mechanical movements of the dancers.

The influence of Dada movement on the performative part of Bauhaus was huge. The marionettes of the play "King Stag" designed by the Dadaist Sophie Taeuber-Arp, four years earlier (Fig63), is a bold example. Her puppet show "King Stag" was the first play that utilized marionettes to convey adult messages and mimic machine-like movements. Sophie Taeuber-Arp created the choreography of the marionettes based on her

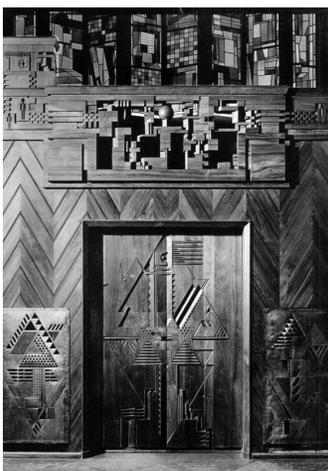


Fig.60\_ Walter Gropius & Adolph Meyer, Adolf Sommerfeld House, Berlin-Dahlem, Germany, 1920

## 2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS



Fig.61\_ Costume of Hugo Ball, Sound Poem Karawane, Zurich 1916



Fig.62\_ Sophie Taeuber-Arp, Dancing in Costume - Zurich, 1916



Fig.63\_ Sophie Taeuber-Arp, Scenes from the marionette play, King Stag, 1918

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previous dancing performances. As a Dada artist, she designed her costumes and she made several performances of abstract dance during the Cabaret Voltaire sessions. The photograph of figure 62 comes from that period and captures her dancing in a costume that restricts her upper body-part movements. In Cabaret Voltaire many Dadaists were interested in being disguised. Hugo Ball wore a cardboard costume when he recited the dadaist poem Karawan in Zurich. Although not captured in black and white photographs, Dada costumes were painted with vivid colors. The way their red, brown, yellow, silver and gold parts resembled with the colorful costumes of Schlemmer's Triadic Ballet in Bauhaus is impressive.



Fig.64\_ The triadic Ballet, Oskar Schlemmer,

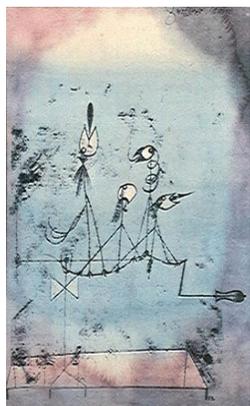


Fig.65\_ The Twittering Machine, Paul Klee, 1922



Fig.66\_ The triadic Ballet, Oskar Schlemmer, 1922

Although not captured in black and white photographs, Dada costumes were painted with vivid colors. The way their red, brown, yellow, silver and gold parts resembled with the colorful costumes of Schlemmer's Triadic Ballet in Bauhaus is impressive.

Schlemmer's interest in machine movement led him to the creation of a theatrical play that blended machinery with biology in order to represent the way technology dehumanizes people. Paul Klee was interested in the same issue as well. In 1922 he created "The Twittering Machine, where bird-like figures were connected with a mechanical hand-crank (Fig.65). The resemblance of these figures with Schlemmer's costumes (Fig.66) indicates how common was the notion of the human-machine relationship among the Bauhaus artists as well as how the disciplines of painting and theater were interconnected.

Dada's relation with the Bauhaus movement is also notable both in the fields of photography and Graphic Design. The experiments with photograms in 1926 by László Moholy-Nagy, (Fig.68), one of the Bauhaus leading figures, remind us the rayogram experiments of the Dadaist artist Man Ray created four years earlier (Fig.67).

## 2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS

Moholy-Nagy's work varied among different areas of the artistic practice and, as the majority of the Bauhaus artists, he was influenced greatly by the Constructivist ideas and practices. His work "Kinetic Constructive System; Structure with Moving Parts for Play and Conveyance" (Fig.69), in 1922, reflects his ideas about the need for an integration between technology and the arts. In his sketch, he creates a transparent spiral space with paths for different human activities designing an immersive energetic structure that resembles Tatlin's Monument for the Third International.



Fig.67\_ Man Ray, Couple, Rayogram, 1922



Fig.68\_ László Moholy-Nagy, Photogram, 1926

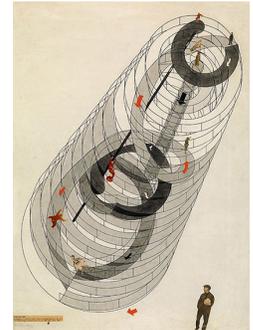


Fig.69\_ László Moholy-Nagy, Kinetic Constructive System, 1922

Lazlo Moholy-Nagy, who was a teacher in Bauhaus during the years 1923-1928, believed that technology is a way to expand human senses and saw, from early on, the potentiality of new media to the conveyance of artistic ideas. He was interested in the creation of multi-sensory artworks and he experimented with new media artworks throughout his career. Along with paintings and sculptures, he made a huge amount of pioneering artworks in film, photography, collage, costume and graphic design and he created immersive light and sound installations. He held the idea that the artists should become designers and utilize as much as possible the tools that are provided by the industry.

In 1925, Moholy-Nagy became the art director of the Bauhaus magazine "Bauhausbücher". The publications had the form of monographs and aimed to explain to the public the work that was made in Bauhaus.

Between 1925 and 1930, a total of fourteen magazines were published discussing the contemporary theories and the artistic practices of Bauhaus. The covers, made by Lazlo Moholy - Nagy, reveal the shared aesthetics between Dada, Constructivism, and Bauhaus. The graphic design of the cover of Mondrian's monograph by Moholy Nagy in the Bauhausbücher 05 in 1925 (Fig.72) resembles the, ten years earlier, cover of Stieglitz's journal 291 by the Dadaist Francis Picabia (Fig.70) as well as El Lizitzky's graphics in the cover of the Unchained Theatre in 1922 (Fig71).



Fig.70\_ Francis Picabia, Machine portrait of Stieglitz, 1915



Fig.71\_ El Lissitzky, The Unchained Theatre, 1922



Fig.72\_ László Moholy - Nagy, bauhausbücher 05 Piet Mondrian, 1925

Along with the publications of "Bauhausbücher" magazine the ideas of Bauhaus spread among the artistic world and influenced greatly the whole Modern era.

## 2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS



Fig.73\_Josef Hofman, Teapot, 1903



Fig.74\_Sophie Taeuber Arp, Untitled Dada bowl, 1916



Fig.75\_Naum Slutzky, Teapot, 1920



Fig.76\_ Marianne Brandt, Tea-Infuser, 1924

Like the Constructivists, Bauhaus artists believed that art should be linked with production and serve the industry. That notion led to the creation of minimalistic product designs that emphasized functionality over aesthetics. During the Bauhaus period, exceptional pieces of consumer products were created and their clear and simple lines reflected the demands of a constantly expanding modern world for clarity and efficacy.

The goldsmith Naum Slutzky and the artist Marianne Brandt were two of the most significant designers of the Bauhaus period in the field of modern design and manufacturing. They were both entered the metal workshop and under the supervision of Laszlo Moholy - Nagy, they created series of remarkable designs that are still reproduced today.

Before entering the Bauhaus, Naum Slutzky was working as a jewelry artist in Wiener Werkstatte. After being invited to Bauhaus, he ran the Jewelry workshop and in 1920, he designed a teapot (Fig.75) that has its origins in his influences from his Wiener Werkstatte period. The form and functionality of the Wiener Werkstatte teapot by Josef Hofman in 1903 (Fig.73) confirms this bond and reveals a preexisting need for simplicity and utility.

Marianne Brandt, although a woman, worked in the metal workshop for five years and managed to stand out establishing herself as a skillful designer. In 1924 created the "Tea Infuser" (Fig. 76) one of the most representative objects of the Bauhaus period. Brand created a substantial number of designs throughout her career which reflected the same ideas of utility and economy and she is remembered as one of the most intelligent and versatile artists of the period.



Fig.77\_Kazimir Malevich, Teapot, 1923

The designing of everyday objects gained ground while many artists outside the design community experimented with the creation of utility products. The Suprematist Kazimir Malevich in 1923 designed a porcelain Tea Service (Fig.77) that reflected his ideas of geometric composition. Taeuber-Arp's Dada Bowl from 1916 is already mentioned as a representative sample of the integration between art and design. Although not related to the core ideas of Bauhaus, both those objects reveal the tendency of the artists of the early twentieth century to utilize new technologies and expand their creativity in the field of applied arts

2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS

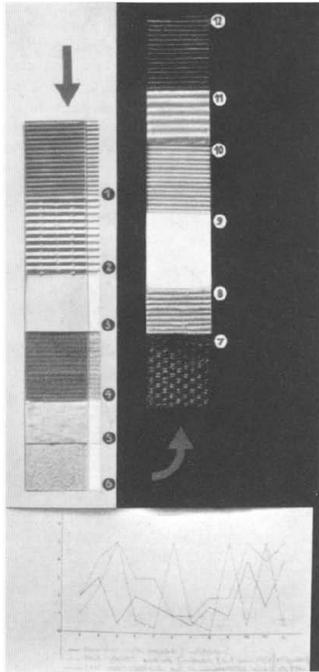


Fig.78\_Gerda Marx, Bauhaus 2nd semester, Experiments on Pressure, 1928

This integration with industry initialized a vast new era of experimentation on the properties of materials and structures. The material experiments of the Bauhaus period are considered to be among the most creative in the history of industrial design and architecture. One of the core figures in this area of investigation was the German artist and educator Josef Albers.

Albers who had previously studied Lithography was invited in Bauhaus in 1922 to run the glass workshop and teach glass and metal technics. Three years, later he became a professor and got involved with other disciplines as well, such as furniture design and typography. His lessons in the Preliminary Course in Dessau between 1927 and 1930 will be remembered as a great example of pedagogy. As a teacher, Josef Albers advocated a scientific model of experimentation where observation and practice played the most important role. He was using a series of innovative teaching methods in order to trigger the visual perception of his students and enhance their observational skills. His method of "defamiliarization" included drawing exercises with the non-dominant hand, writing backward, and more. Years later his strategies became standard teaching methods in many Art Schools and Academies.

As we learn from the "Bauhausbücher" Magazine, in his Preliminary course, Albers challenged their students to experiment with Origami technics (Fig.80, 81). He used paper as a versatile material that allowed students to better understand structure and allowed them to create unorthodox shapes. Gerda Marx's experiments on materials(Fig.78) and the "Vibration and Pressure Bridge of Gustav Hassenpflug in 1927(Fig.82) provide us with an idea of the form of Alber's exercises and the resulting models. In the description of the numbered square samples of figure 78, we read the words "smooth, rough, hard, soft, grooved, ribbed and dimpled" which describe the material's texture. The purpose of these courses as Hans



Fig.79\_Marcel Breuer, Marcel Club chair (model B3), 1927

Beckman notes was not to create products but to experiment with constructive thinking while preserving the inherited characteristics of the materials.

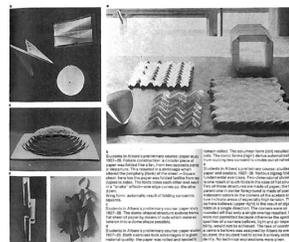


Fig.80\_Josef Albers, teaching Origami at the Bauhaus, 1927

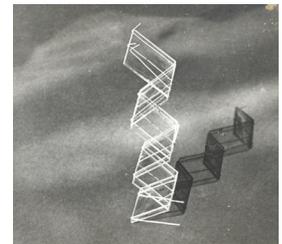


Fig.81\_Untitled Paper Study, Josef Alber's Preliminary Course, 1927

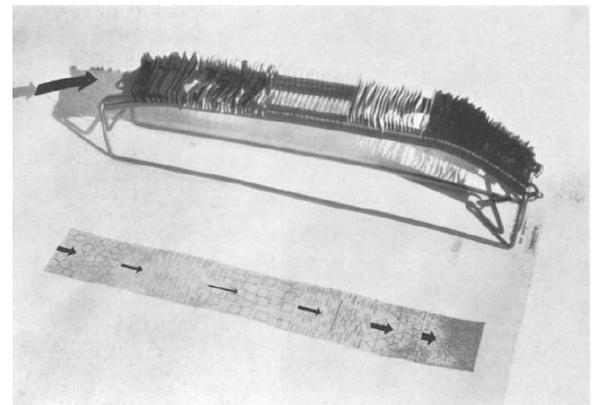


Fig.82\_Gustav Hassenpflug, Vibration and pressure bridge, Bauhaus, 2nd semester, 1927

## 2.1.2 BAUHAUS - MATERIALS AND FUNCTIONS

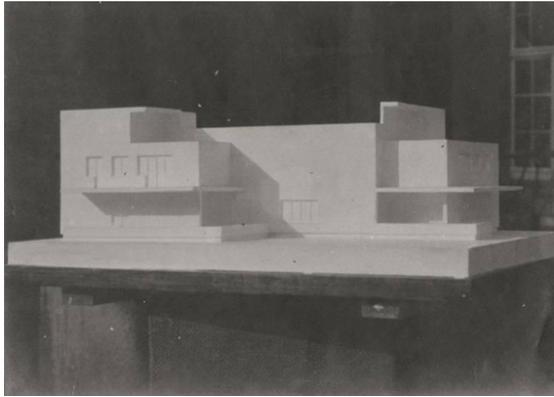


Fig.83\_Model of Bauhaus Master House, Dessau , 1925

The idea of making the most out of the bare properties of materials resulted in innovative ways of constructing. Marcel Breuer's famous "Club Chair" in 1927 (Fig.79) is an example of how a Bauhaus designer would make use of the properties of tubular steel and canvas. Breuer, understanding tubular steel's properties, instead of cutting and welding, he bent the chair's parts and slotted them together. The chair was easy to manufacture and at the same time comfortable because of the absence of stiff welded joints. His innovation resulted in the reduction of both production time and costs and it is considered to be one of the most important creations in the field of furniture design. Walter Gropius, four years earlier, designed an armchair that reflects his architectural ideas about the purity of form (Fig.84). In 1923, for the "Great Bauhaus Exhibition" he designed the "Director's Office",

a square room with furniture that followed the cubist structure of the space. With no legs, the Gropius Armchair is considered to be the precursor of the Cantilever chair and one of the most characteristic pieces on the Bauhaus notion of pure form.



Fig.84\_ Walter Gropius, Armchair, 1923

In 1925, Walter Gropius made the architectural maquettes of the "Master Houses" in the city of Dessau (Fig.83). He was designing the buildings that would house the director and the master teachers of the Bauhaus. Gropius created structures of interconnected cubes in various dimensions and as we see in his "Director's House" (Fig.85) he used the openings in a way that enhanced the simplicity of the structure. The buildings were made out of concrete blocks and other mass produced materials and served as an experiment on how the assemblage of similar structures could result in visual diversity while remaining cheap and easy to build.

Gropius marked the beginning of the period of "New Objectivity" in German architecture where clean and simple structures were implemented in the creation of cheap and practical buildings. The country's postwar crisis demanded quick and effective strategies and a versatile architectural mindset. Gropius, recognizing those needs from early on, responded with the creation of a series of cost-effective building designs that most of them still exist. His notion of "practical beauty" spread in the Modern era and characterized the architecture of the contemporary world. His views have been vastly adopted by the architects as they address spacial and structural issues providing at the same time good aesthetics and practicality.



Fig.85\_The Director's House, Walter Gropius, 1926

### 2.1.3 THE URGENCY FOR WHITE WALLS

Gropius' contributions to the field are responsible for the transformation of the gallery space into a bare container for the artworks as well as the intensification of the artistic need to exhibit in a neutral background. Apart from the decisive influence of Constructivism, the development of the architecture of Bauhaus and the New Objectivity has its origins in the theoretical propositions of the Dutch Avant-garde. The impact of the De Stijl movement on the formation of a plain, non-decorative architecture was critical. Although De Stijl did not result in the creation of many and diverse artworks, it influenced greatly the way space and structure is being perceived.

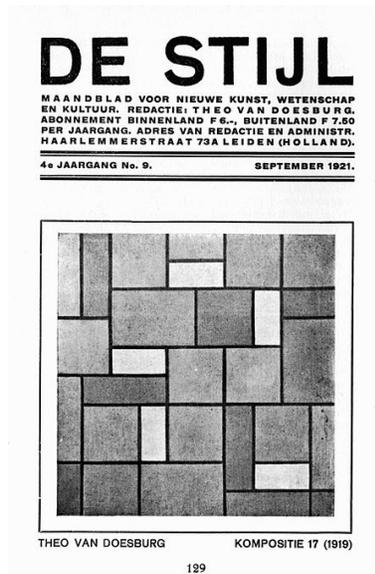


Fig.86\_ De Stijl Magazine, september 1921

of a geometric abstraction that consists only of fundamental shapes and primary colors. They published "De Stijl" magazine (Fig.86) in which they promoted their ideas about design and abstraction.

The De Stijl movement, which emerged in Netherlands two years before the genesis of Bauhaus, comprised both artists and architects. Among them was the painter Piet Mondrian and the artist and architect Theo van Doesburg who opposed traditional painting and proposed that art should take the form

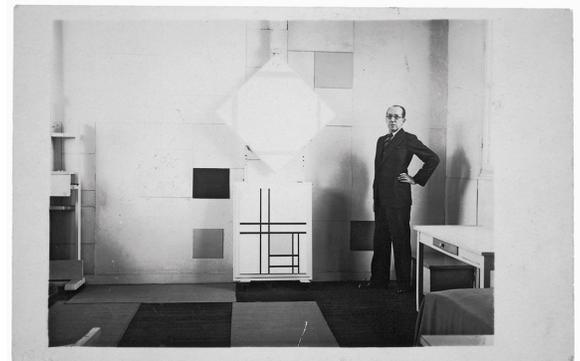


Fig.87\_ Mondrian in his Paris Studio

By that time, the Suprematist Kazimir Malevich had already made his famous "Black Square" (Fig.88) marking the "end of painting". Malevich influenced by the investigations of Wassily Kandinsky on the relation between shapes and emotions, he experimented with basic shapes trying to visualize spiritual principles. In 1918 he paints "White on White" (Fig.8) in which he uses the dynamics of a tilted square to push the viewer into a metaphysical state of mind. His work reflects his theory about the supremacy of pure feeling and reveals a firm link with the work and concepts of Piet Mondrian and the Bauhaus notion of pure form.

Mondrian, inspired by the philosophical movement of Theosophy, was searching an artistic path that could serve as a condition for spiritual development. Rejecting figurative and symbolic references, Mondrian creates a world of rectangular shapes and colors compromised in horizontal and vertical arrangements. His radical approach led him to convert his artistic language into a way of living. His studio in Paris (Fig.87) was transformed into a composition that served in the creation of harmonious and balanced emotions. Mondrian's studio was a clean white environment with rectangular planes of basic colors carefully arranged. When exhibiting his artworks, he demanded an orderly gallery space with white walls.



Fig.88\_ Kazimir Malevich, White on White, 1918

### 2.1.3 THE URGENCY FOR WHITE WALLS

Soon after the ideas of Bauhaus spread around Europe, the merits of purity and simplicity were received with pleasure throughout the world. The "Machine Art Exhibition" (Fig.89,90) in the MoMA Museum in 1934 provides us with a good example of the changes that were made in the exhibition space, during the first half of the twentieth century, in an attempt to address the demands of Modernity.

Machine Art Exhibition took place in the USA, after the shutdown of Bauhaus by the Nazis, marking a pivotal moment in the history of art. For the first time, a big institution introduced to its premises objects of ordinary use and gave value to the aesthetic merit of the industrial object and machinery. The achievements of the Bauhaus period got the attention they deserved and the public got in touch with consumer goods in a completely different way. Machine Art Exhibition established the industrial object as a piece of art and grew the faith in the power of the white cube as the optimal exhibition space.



Fig.89\_Machine Art exhibition, MoMA, 1934

The objects, seen as artworks, were exhibited on pedestals. In their description was written information about the designer, the manufacturer, the price and the place in which someone could go and buy them. Philip Johnson, who made the exhibition design, created a condition that allowed the objects to be considered separately from their use. He transformed the heavily ornamented walls and ceilings of the Moma Museum into neutral surfaces and placed the objects in eccentric arrangements. In this way, Johnson managed to isolate the exhibited objects from their references to the world giving the opportunity to the viewers to observe them from a totally new perspective. Machine art exhibition reflected the puristic views of Modern Era in the exhibition making and became a reference point for many of the exhibitions that followed in the USA.



Fig.90\_Machine Art exhibition, Moma, 1934

In Europe, the first Museum that made determining changes in the way it exhibited art was the Stedelijk Museum in Amsterdam. In 1937, its conservator Willem Sandberg decided to change the colors of the museum walls into white and covered its roof with a canvas. In April, he organized the exhibition "Abstract Kunst" in which the artworks were unconventionally arranged and presented in a totally white background. Sandberg's experimentations led him to stop using museum's neutral spaces and corridors as exhibition places, establishing his new aesthetic to the exhibition making. The way Modern artists preferred to exhibit their artworks soon prevailed among the practices of big Institutions and Galleries and determined the viewers' experience.

### 2.1.3 THE URGENCY FOR WHITE WALLS



Fig.91\_ Matthew Barney, Facility of Decline, 2016

The transformation of the exhibition space into a White Cube gave birth to the creation of a series of artworks that could not be created and exhibited without this precondition.

In his 2016 installation "Facility of Decline" (Fig.91), Matthew Barney takes advantage of the surrounding elements of the gallery space and uses them as an extension of the artwork. The position of the door openings could never change without interrupting the sensitive balance of the installation. The array of lights on the ceiling creates a second rectangular level that corresponds with the pink rectangular shape on the floor. The hanging element connects those

shapes enhancing this correlation. The installation of Matthew Barney could never be the same if exhibited in a different place. As we are going to discuss in a later chapter, the ways that gallery space determines the exhibited artworks were clearly described by the artist Brian O'Doherty, in 1976, in his book "Inside the White Cube" while the first attempt, made by an artist, to interconnect the artworks with the exhibition space was made in 1942 by Marcel Duchamp in the exhibition "First Papers of Surrealism".

The visual neutrality of the exhibition space does not serve only narrative installations as the one of Matthew Barney but it also strengthens the pure nature of minimalistic artworks. The "Wirth" (Fig.92), created by Larry Bell in 2017 is a semi-transparent cube which would lose in meaning if exhibited in a more complex background. Without achromatic empty surroundings, artworks like this, lose their artistic attributes and therefore, convey contrasting messages to the viewer, completely different from the intention of the artist. Minimalistic artworks demand clear and simple spaces because, in any other context, the compatibility with their artistic genre brakes.

The examples of artworks that demand clear spaces are many. After the influence of Constructivism, Bauhaus, De Stijl and Minimalism in the fields of art and architecture, many artists followed the trend and created artworks meant to be exhibited in white cubes. Some of them broke the rules and experimented with the presentation of their artworks within complex and unorthodox places while others, condemned the gallery space as a whole. With the advent of Computer Aided Design, the way artists create and exhibit artwork changed once again owing its origins to the contributions of the American Pop Art.



Fig.92\_ Larry Bell Hauser, Wirth, 2017

### 2.1.4 POP ART, DESIGN AND MASS REPRODUCTION



Fig.93\_ Broom Magazine cover, issue 6.1, El Lissitzky

Americans were introduced to the European avant-garde through the "Broom" magazine, published from 1921 to 1924. "Broom" (Fig.93) was an international magazine, designed by the Constructivist artist El Lissitzky, which aimed to inform the world about the progression that was made in the fields of arts regarding contemporary ideas and technics. Through the magazine, the artworks of Laszlo Moholy-Nagy, Man Ray, and El Lissitzky familiarized the Americans with unconventional printing methods as well as the technics of photomontage and collage which we will see further developed by Andy Warhol, the core figure of the American Pop Art.

Until the beginnings of Pop Art in the mid-50s, the American artists, influenced by the remnants of the European Expressionism and Surrealism, had developed their own form of abstraction. Jackson Pollock, Willem de Kooning, and Mark Rothko were prominent artists of that period who advocated the value of automatism and expression into the artistic practice. The American Pop Art, which emerged as a reaction to the prevailing movement of Abstract Expressionism, came to question the notion of art as an emotional representation of a higher value proposing a more common approach.



Fig.94\_Escher, No63, Pessimist-Optimist, 1944

As the effects of Constructivism and Bauhaus continued to legitimize the integration between art and design, the American Pop Art began its journey as the most popular art movement of the twentieth century. With a great interest in mass reproduction, Andy Warhol began to investigate the notion of repeatability reproducing copies of his own printings. Working with his famous screenprinting technics managed to introduce to the solemn artworld the popular imagery of the American idols of the time.

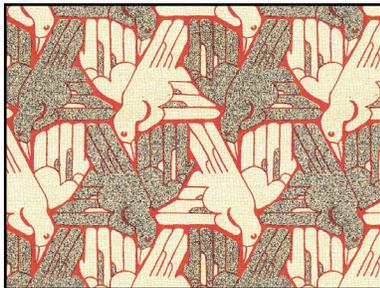


Fig.95\_Koloman Moser Die Tausend Raben, from Die Quelle detail, 1904

After the Industrial Revolution, the repetition of motifs on textiles created patterns that characterized everyday imagery. The textiles of Wiener Werkstätte, Constructivism, and Bauhaus along with less known designs of repetitive patterns were widely used on clothes, wallpapers and film settings around the world. The textile designs of Koloman Moser in 1904 (Fig.95) uses the multiplication of a bird theme in the same mathematical way that was used in the painting of the famous graphic artist M.C.Escher(Fig.94) forty years later. As the industries continued to produce consumer products in great quantities filling the shelves of supermarkets with arrays of identical objects, people became increasingly familiarized with the notion of repetition and it was a matter of time for art to follow.

2.1.4 POP ART, DESIGN AND MASS REPRODUCTION



Fig.96\_Andy Warhol  
Campbell's Soup Cans,  
1962

In that context, Andy Warhol's series of "Campbells' soup cans" in 1962 (Fig.96) and "Brillo Box" (Fig.98) two years later, seem a logical continuity. Being fascinated by mechanical reproduction, Warhol replicated his favorite products arranging them in series resembling the arrangements of products on the supermarket selfs and declared that "the degree to which an object gets distributed is the only possible way to determine its quality". Through his work, consumer goods - the symbols of capitalism - gained a secure place in the world of art making art inseparable from everyday life.

Warhol transformed the American culture in an unprecedented way. By abandoning hand painting, introduced a new era in the history of art where the mechanical reproduction of the artwork does not diminish its artistic value. With his silk-screening technics, he printed numerous copies of his work exhibiting and selling them to the collections of big institutions and galleries. Although much of his work could be easily copied, he managed to establish the value of his prints as exceptional art pieces becoming one of the higher-priced artists in the art market.



Fig.98\_Andy Warhol, Brillo Soap Pads Box,  
1964

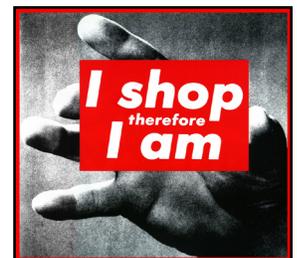


Fig.97\_Barbara Kruger, I  
shop therefore I am, 1987

Without the complete legitimization of the graphic arts by the Pop Art, artists like Barbara Kruger (Fig.97) could not have made a career. Although her work criticises the capitalistic view of the world opposing the conceptual perspective of Andy Warhol, Kruger owes to him the right to exhibit this kind of artworks without them being rejected as a worthless form of graphic design. Andy Warhol and his contemporary Roy Lichtenstein inherited to the new generation of artists the right to work with any kind of mass production technics. Their work and strategies led many designers to become artists and many artists to embody graphic design technics in their artwork.

## 2.1.4 POP ART, DESIGN AND MASS REPRODUCTION

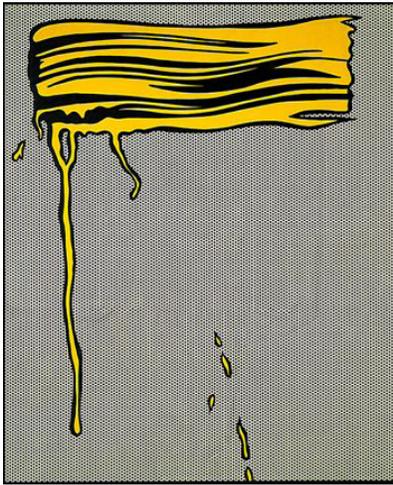


Fig.99\_ Roy Lichtenstein, Yellow brushstroke, 1964

The late work of Roy Lichtenstein provides us with a characteristic example of how the aesthetics of the artistic product are being shaped by machine technology.

Roy Lichtenstein, who was experimenting with many and diverse styles throughout his career, in 1961 made a series of paintings inspired by comic magazines. Using a mixed technic of painting by hand and mechanical reproduction, he took sketches from comic books and recreated them in greater dimensions. Although he made several alterations to the originals, the majority of his artwork from that period resembled to a great extent the initial images.

In 1964, he made a painting under the name "Yellow Brustroke" (Fig.99) in which he simulated the actual texture and dripping qualities of a real brushstroke. Around this period, he used the fake brushstroke element in his paintings making a statement against the visual language and practice of Action Painting. Lichtenstein, soon, started to mimic a printing technic that was used in the comic books of the 50s and 60s. At that time, the effect of depth in printed images was illustrated by the use of an optical illusion similar to

the one of Pointillism. The image colors were decomposed into dots of cyan, yellow, magenta and black and were printed on top of each other in various densities. "Ben-Day Dots" (Fig.100), which took their name from the illustrator Benjamin Day, became Roy Lichtenstein's visual idiom. Imitating this technic by hand, he created paintings that looked like enlarged printed pages of comic magazines introducing to the world of art the mechanical gesture of technology.

In 1954, the designer Irving Hopper designed Marshmallow sofa (Fig.101) for the American company Herman Miller. The sofa was manufactured in several color versions that could be assembled together creating different variations of the furniture. Hopper decided to design it when a company that was manufacturing plastics approached his studio informing them of their capability to create round foam shapes which had a high-density surface and a soft core. Marshmallow sofa reflects the way technological achievements determined the artistic outcome.

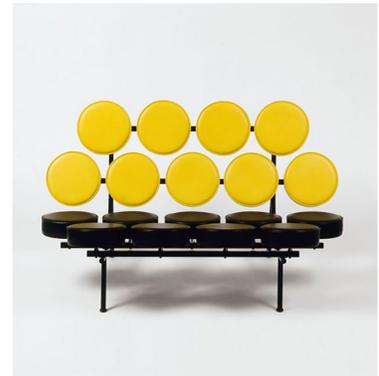


Fig.101\_George Nelson Associates, Inc. (Irving Harper) Marshmallow sofa, 1956

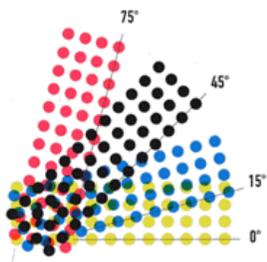


Fig.100\_ Color Dots

The functional object of Irvin Hopper pairs with Lichtenstein's brushstroke in a combination that reveals the extent to which art and design began to blend. After the "Machine Art Exhibition" and the previous involvements of architects into the artistic practice, the collaborations between the disciplines of art, design, and architecture become more and more frequent. In the next years we observe great similarities in the visual outcomes of the three fields and as we come closer to the contemporary era, that distinction gradually disappears. The majority of Pop Artists had a strong background in the commercial arts.

Their experience in the fields of graphic design and advertising brought them closer to the popular culture and made them realize the needs of ordinary people

## 2.1.4 POP ART, DESIGN AND MASS REPRODUCTION

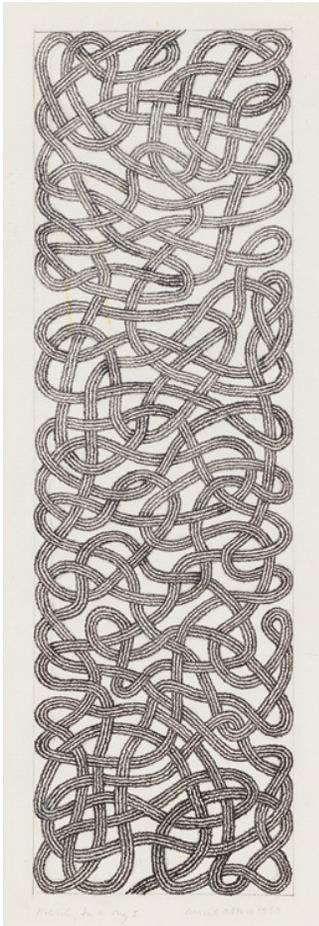


Fig.102\_Anni Albers, Drawing for rug, 1959

as well as identify the visual language in which they better communicate. They embraced technology, manufacturing industry and media in a practical and utilitarian way triggering a chain reaction that led to the creation of numerous hybrid objects in between art and design.

In 1969, in Italy, a revolutionary design movement emerged lasting until the 80s. The Anti-Design movement opposed the perfectionist aesthetics of Modernism declaring the need for abnormality. The Italian designers were interested in the creation of objects that would be functional but not necessarily beautiful. They created diverse objects and they investigated the visual vocabularies of kitsch and distortion. Anti-Design movement reversed the established requirements about a designing approach that would serve people's needs but instead, make people adapting to them. The Anti-Design movement opposed the Bauhaus motto which declared that "form should follow function" putting into stake the core characteristic of design. Their approach got nearer to art and led to the creation of both conceptual and usable objects.



Fig.103\_Frattini and Castiglioni, Boalum Floor Lampb, 1970

In 1970, the Anti - Design artists Frattini and Castiglioni created the Boalum Floor Lamp (Fig.103). It was a flexible plastic object with internal light bulbs that was giving the opportunity to the owner to decide himself about its final form. The resemblance of Frattini and Castiglioni's lamp to the drawings of the Bauhaus artist Anni Albers is impressive (Fig.102). Albers was the first woman designer that in 1949 had a solo exhibition in New York at The Museum of Modern Art. Her contributions to both art and design are of great value and her work continues to influence artists and designers until today.

Another example of the increasingly blurry boundaries between art and design are the works of the French industrial designer Roger Tallon and the American artist Cady Noland. Tallon's chair of Charles de Gaulle (Fig.105) was created in 1967 in collaboration with the artist Cesar Baltaccini. Tallon and Baltaccini created a series of portrait seats and used them both as industrial objects and parts of multimedia installations. Cady Noland's "Untitled Herox" (Fig. 104) is an artwork created with the same technic and when seen side by side with the portrait seat of Tallon and Baltaccini provokes questions about the role of art.



Fig.104\_Cady Noland Untitled Xerox CutOut (Betty Ford Alcoholism), 1993



Fig.105\_Roget Tallon, Portrait, Charles de Gaulle, Plywood and metal, 1967

2.1.4 POP ART, DESIGN AND MASS REPRODUCTION

In 1964 the artist and designer Gunnar Aagaard Andersen created a reinterpretation of the classic Chesterfield chair under the name "Portrait of my Mother's Chesterfield" (Fig106). His hybrid object has been reproduced in several versions through the years and some of them belong to prestigious museum collections. Not being made for mass reproduction, Andersen's chair brakes the boundaries between sculpture and design.



Fig.106\_Gunnar Aagaard Anderson, Portrait of My Mother s Chesterfield, Polyurethane foam, 1964

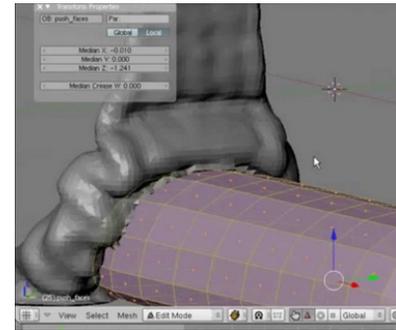


Fig.107\_Computer Generated Chocolate Simulation, Blender, 2010

The "Portrait of my Mother's Chesterfield" was made by hand from layers of Polyurethane foam and it was painted with brown color.

The artist of the past had the opportunity to experiment with dripping materials only through physical experimentation. Today, technology provides diverse tools enhancing the chances of successful materialization of any kind of structure. In Figure 107, a Computer Generated Simulation of chocolate cream that was made in Blender in 2010 is an example of how CAD could be used in the experimentation stage of Andersen's chair. The simulating capabilities of today's programs are vast. With the use of any of the mainstream CAD software, artists can experiment and foresee the physical form of their artworks. They have the opportunity to manipulate objects as if they were real and experiment with structure, scale, and texture effortlessly and at no considerable cost.



Fig.108\_ Original Melitta Teapot



Fig.109\_ Utah Teapot, Computer Rendering

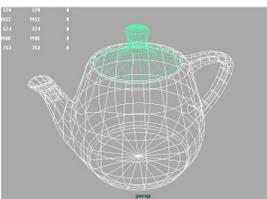


Fig.110\_ Utah Teapot Computer Mesh

The transition from the real to the virtual world was a procedure that took years to develop. Today, virtual objects can resemble the physical version of themselves with stunning accuracy. The original Melitta Teapot (Fig.108) made with clay in the first half of the twentieth century, became the virtual representation of a simple mathematical model (Fig.110) inside Maya and was renamed to "Utah Teapot" the symbol of CAD software. The rendered version of Utah Teapot (Fig.109) able to reach high levels of accuracy results in a situation where there is no apparent difference between the real and the virtual.

By the end of 1970, CAD software had been already created but it was after the year 1982 that Autocad reached the public becoming the first CAD program available for Personal Computers. The advent of 3D designing programs fueled the experimentations in many fields of the visual arts. Gradually, more and more artists and designers incorporated them into their practices. As the technology of computational machines progressed many artists began using computers in their studios as an essential tool realizing their potentials regarding the limitation of costs and effort as well as the provided visual capabilities. The old school studio gave its place to contemporary buildings fully equipped with sophisticated hardware.

## 2.1.5 CAD SOFTWARE AND THE CONTEMPORARIES



Fig.111\_ Jean-Michel Basquiat in his studio, Great Jones St, New York City, 1982



Fig.112\_ Takashi Murakami in his Studio, 46th Road Long Island City, New York, 2016

In 1982, Jean Michel Basquiat was interviewed in his studio in New York City. With a hole in his right shoe, he is surrounded by his artworks (Fig.111). The contrast between Basquiat's studio and Damien Hirst's new 9.000 square-meter massive laboratories in south-west England is enormous. Hirst's studio became the biggest art production studio in the world. In less than 30 years, contemporary art skyrocketed the prerequisites for the contemporary art practice making the need for large-scale studios imperative.

The Japanese artist Takashi Murakami is one of the first artists who incorporated CAD technology in his work on a great scale. In his studio (Fig.112) we see employees working on designs for his artworks in front of computers. Murakami initially named his studio "Hiropo Factory" in homage to the "Warhol's factory" later he founded a company and renamed its facilities to "Kakai Kiki". Murakami's studio conditions are described vividly by Sarah Thornton in her book "The Studio Visit" published in 2008. She writes: "Once there, we ascended to the studio in an elevator. When the doors drew apart, we faced a stainless steel and glass door for which a fingerprint scan and a four-digit PIN were required. Once we were across the threshold, the swath of bare white walls and well-sanded wood floors initially



Fig.113\_ Computer Generated V-Ray Material Preview



Fig.114\_ Takashi Murakami, Invoking the Vitality of a Universe Beyond Imagination, 2014

evoked a gallery back room, but on closer inspection, it was clearly a high-security digital design lab. [...] His workstation, a sixteen-foot-long table, was situated in the center of a large room, surrounded by his team of four designers and five animators, all of whom sat with their backs to him, their gazes purposefully directed at their white-rimmed twenty-inch screens".

In 2014, Takashi Murakami created a sculpture under the name " Invoking the Vitality of a Universe Beyond Imagination" (Fig.114). Its aesthetics and use of material resemble the aesthetics and materials used in computer-generated objects. The preview of a V-Ray chrome material (Fig.113) inside the Rhinoceros 3D software, reveals an impressive similarity between the virtual and the real object.

### 2.1.5 CAD SOFTWARE AND THE CONTEMPORARIES

Through the last years, artists of all kinds have incorporated CAD in their practices for its ability to visualize realistic images as well as providing the tools to materialize their virtual models. CAD software enabled artists to design artworks that several years earlier were impossible to be produced. With the use of CNC cutting machines, engravers and 3D printers, the examples of artworks that made use of computer software and hardware capabilities are many



Fig.115\_ Aaron Curry, Installation view, Michael Werner gallery, New York 2008

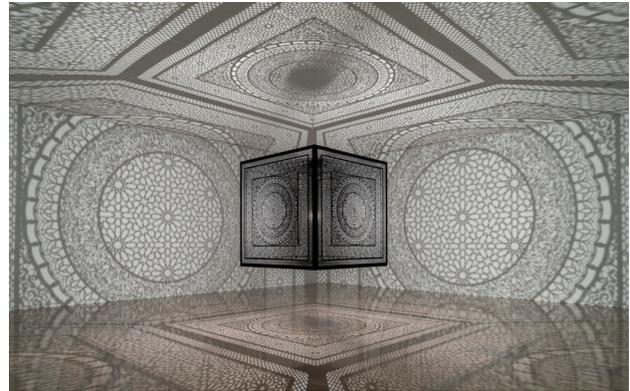


Fig.116\_ Anila Quayyum Agha, 'Intersections', completed in 2013

The Pakistani artist Anila Quayyum Agha in her installation "Intersections" in 2013 (Fig.116) she used laser-cut technology to create complicated geometric patterns on a wooden cube. Lighted from the inside by a single light bulb, the cube cast its shadows to the walls creating a spiritual experience. The elaborated designs which Anila Quayyum Agha used were not new. We find similar patterns in the art and crafts of Islamic art where the creation of an analogous structure curved by hand would have taken days of work and a great amount of effort. With a basic knowledge of CAD software, the artist Aaron Curry created his 2D sculptures using the same laser-cut technic on plywood and aluminum surfaces (Fig.115). Due to the 2D nature of his sculptures, they were easily reproduced, textured and rendered inside a computer program. Xavier Veilhan is a French contemporary artist who makes use of CAD software in a distinctive way. Veilhan, who sculpts his artworks mechanically using 3D scanners, mimics the polygon structure of his computed generated meshes. His mesh sculpture "SophieNo2", in 2007 (Fig.117), is an example of his idiom. Xavier Veilhan brought to the real world the inherent aesthetics of the virtual and technical aspect of software in the same way as Roy Lichtenstein did with his Ben-Day Dots almost fifty years earlier. Machine aesthetics, owing their origins to Dada, Futurism, Constructivism, and Bauhaus, continued their walk in the field of art giving their place to computer aesthetics.



Fig.117\_ Xavier Veilhan, Sophie No2, 2007

## 2.1.5 CAD SOFTWARE AND THE CONTEMPORARIES

The advent of 3D Printing revolutionized the way structure is being designed. The additive process of material layering enabled the creation of extremely complicated structures with a high amount of detail. 3D printing reversed the prevailing method of subtracting manufacturing, opening a new era of experimentation. Able to be curved in the inside, 3D printed objects were introduced in our world covering constructional needs of specialized components and exposing a new visual style.

One of the first indications of the power of 3D printing in the visual arts came in 2010 through the work of the Dutch fashion designer Iris van Herpen. In the X-Machina exhibition, she presented an impressive collection of 3D printed clothes (Fig.118) pushing the boundaries of haute couture. The pioneer Iris van Herpen uses 3D printing methods blended with traditional sewing techniques. Her work has been exhibited in several museums of art and throughout her career, she has collaborated with progressive musicians and artists such as Bjork and Marina Abramovic.

In the theatrical opera "Pelleas and Melisande" in 2018, Marina Abramovic used costumes designed by Irvin van Herpen (Fig.119). Abramovic who was responsible for the design of the settings and the general visual outcome of the play embraced the multidisciplinary interests of the designer. Inspired by the eye as an organ of seeing, Abramovic created cosmic settings with spherical elements and a hue from the past. The cloths of Iris van Herpen provided her the connection with today's world emphasizing the timeless value of the play.

In 2014, the architects and programmers Benjamin Dillenburger and Michael Hansmeyer created a masterpiece of Computational architecture. Their project "Digital Grotto" (Fig.120) was created algorithmically. Through procedural calculations, a simple initial form was divided multiple times resulting in an incredibly complex structure. Dillenburger and Hansmeyer 3D printed their digitized designs using sand. The result was a rich organic architectural structure with a complex topology and a high amount of void and solid parts impossible to be created by traditional constructing methods. The structural density of the structure is unprecedented. Such organic forms, usually created by natural processes transform our notion of architectural design and trigger the creation of a totally new visual vocabulary. In comparison with the sculpture "Water Cast" by Matthew Barney (Fig.121) these procedural structures seem to have been produced from a similar process. Barney casted hot metal in a big vessel field with water and received a similarly complex structure with internal cavities and solid parts. Covered with white plastic the visual outcome of his organic sculpture resembles the computational structures of Dillenburger and Hansmeyer.



Fig.118\_ Iris van Herpen, 3D printed Crystallization Top manus, X-machina exhibition, 2010



Fig.119\_Marina Abramovic, Pelleas and Melisande, Costumes: Iris van Herpen, 2018



Fig.120\_ Michael Hansmeyer & Benjamin Dillenburger, Digital Grotto, 2014



Fig.121\_ Matthew Barney, Water Cast 12, White Dwarf, 2015

### 2.1.5 CAD SOFTWARE AND THE CONTEMPORARIES

Architects were the first who dealt with procedural design processes. Following the history of Bauhaus and Albers' courses on origami and paper folding techniques (Fig.122), contemporary architects materialize structures that have surpassed the methods of their precursors. Implementing CAD software and programming they designed parametric systems that served contemporary needs.

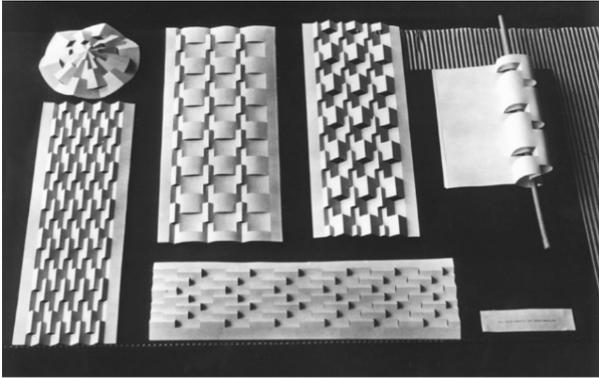


Fig.122\_ Josef Albers, Preliminary course with plastic materials, Exercise with paper, paper folding, 1927

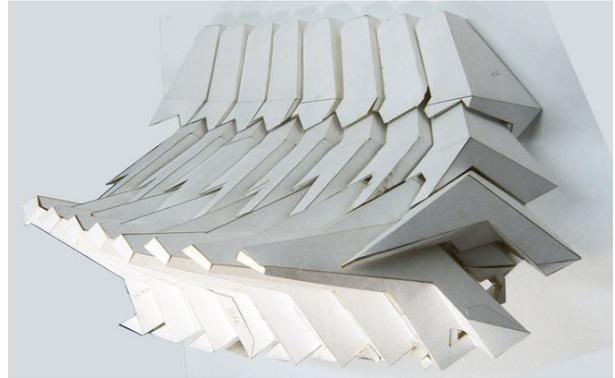


Fig.123\_ Parametric Wall System, Gage Clemenceau Architects

The wall system designed by the French-based Gage Clemenceau Architects (Fig.123), was a part of a series of experimentations on parametric design materialized with paper. Over the past fifteen years, parametric design became a source of inspiration for the architectural avant-garde as it provided flexibility both in the creative and manufacturing process. The Iraqi-British architect Zaha Hadid was one of the first architects that experimented with parametric design as well as with 3D printing technologies. Her model "Une Architecture" for the mobile Art Pavillon in Paris (Fig.124) is an example of the use of both techniques.

The transition from traditional designing methods to the use of Computer Aided Design allowed architects to design faster and visualize their models with great accuracy. In the last few years, the progress that is made in the field of architecture is unparalleled.



Fig.124\_ Zaha Hadid, Une Architecture, Mobile Art Pavilion, Paris, 2017

The designing tools of CAD programs determined the visual outcome in extreme ways. The Dancing House in Prague (Fig.125), created by the Croatian architect Vlado Milunic could never be conceived without the familiarization of its designer with the "twist" and "bend" tools of the used software. The intuitive way in which virtual topology deforms, provides the opportunity to designers to experiment on a great number of variations of their initial ideas. With no considerable costs in time and effort, contemporary designers are able to experiment with materials and structures in a way that was not possible in the past. With the current technical standards in the areas of engineering and material technology, the materialization of complex structures became feasible.



Fig.125\_ Vlado Milunic, Dancing House in Prague, Czech Republic, 1992

## 2.1.6 MOCK-UPS AND VIRTUAL REALITY



Fig.126\_ Olivier Demangel, Ty-Hedfan Virtual Reality in Architecture, Ty Hedfan Table, Real (left) and Virtual (right), 2015

In the scope of Architectural visualization, the progress that has been made is immense. Starting as a basic need to communicate concept designs, rendering engines developed into a powerful tool for accurate representation. Programs such as V-ray, Arnold, Mental Ray, and Maxwell were implemented in the production of high-quality realistic images that most of the times are inseparable from original photographs.

While for many years, three-dimensional visualizations were rendered as a form of a predefined walk-through animation, the advent of Augmented and Virtual Reality changed the landscape. Many architectural offices began to use both of these methods to create stunning visualizations of their projects allowing the user to move freely inside the models and experience the essence of the buildings in full sense. The field of architecture realized from early on the potential of Virtual Reality to provide an immersive experience to the clients as well as enhancing team collaboration. According to Chaos Group, over two-thirds of professionals in the field of architecture plan to use Virtual Reality in 2018.

With Virtual Reality visualizations reaching the level of perfection, Olivier Demangel was one of the first professionals who experimented with the potential of Virtual Reality to produce realistic environments. In 2015 he designed the virtual version of Ty-Hedfan house from online photo references. He created an interactive environment made for the Oculus Rift headset in which you could walk, open doors, change wall colors etc. In figure 126 we can see a comparison between the real house located in Wales and the virtual model.

Virtual Reality was used in 2016 by ENEAD studio for the lighting simulation in their model for the Shanghai Planetarium For Science and Technology. The team used advanced technics to simulate the way light penetrates the building throughout the day and they created a Virtual Reality environment which reflected their research (Fig.127). Immersive architecture serves both professional and clients to communicate and predict the outcome. AECOM design team is one of the companies that implemented Augmented Reality for communicational purposes. In 2016 its designers used AR to convey their ideas to their clients (Fig.128)



Fig.128\_ AECOM A design team, AR Collaboration, 2016

For one more time, the technological developments in the fields of Applied art and Architecture show to the artists a way of rich possibilities and convenience. The steps that have been made in the field of visualization, offer valuable tools to the contemporary artist and curator. As the limits of physical reality cease to exist through the digitization of the designing practice, the artistic creativity could reach unprecedented levels of experimentation.

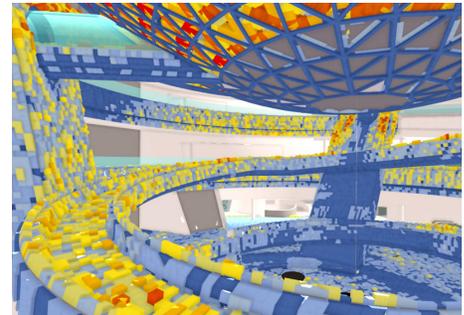


Fig.127\_ ENEAD, VR for lighting conditions throuthout the day, Shanghai Planetarium, 2016

## 2.1.6 MOCK-UPS AND VIRTUAL REALITY

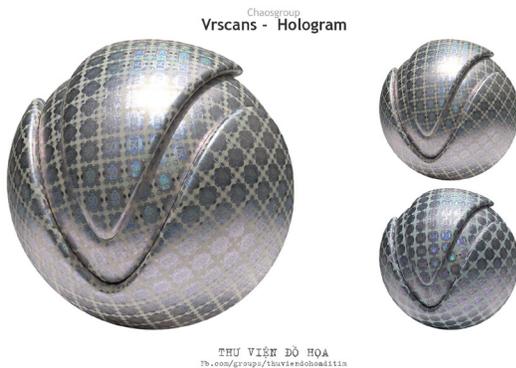


Fig.129\_ 50 Euro Hologram, VRayscan Material preview

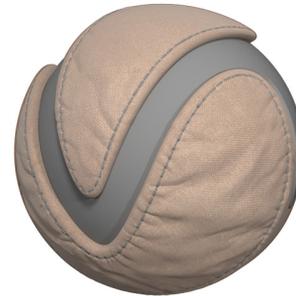


Fig.130\_ Fabric With Stiches, VRayScan Material preview

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Throughout the history of art, artists' experimentations with materials have many times determined their artistic concepts as well as the visual outcome of their work. For visual artists, materials are the core elements of their visual language with which they achieve good communication of their artistic concepts. The collages of the Dada period indicate this relation between material and message. We can only imagine how those collages would have looked like if the Dadaists had had the opportunity to use contemporary editing software like Photoshop. The same applies to the Constructivists or the artist of Bauhaus - how revolutionary their work would have been if they had the technology to use CAD?

The level of realism of virtual materials is crucial when intended for usage in the field of arts. The closer the materials are to reality, the more accurate the conceptual correlations. With the advent of 3D scanning, virtual materials became more sophisticated. They resemble the physical materials with absolute precision and when they are used combined with Physically Based Rendering software (PBR), their level of realism is stunning. In Figures 129 and 130 we can see V-Ray materials produced from 3D scanings of original materials. With this technology, "Ruber Mat" by Mona Hatoum (Fig.131) is an artwork that could be easily produced with the use of basic CAD software and the application of a basic plastic material to the created mesh.



Fig.131\_ Mona Hatoum, Rubber Mat, 1996

With combined the tools of CAD, Virtual Reality, 3D scanning and printing, contemporary artists have a powerful toolbag. They are able to model their artworks, experiment with lights, textures, and scales and even create them intuitively working exclusively inside a virtual space. Contemporary artists have the opportunity to design virtual galleries exhibit and promote their 3D artworks via the internet, use them for funding and if necessary materialize them for the need of a physical exhibition.

The power of contemporary tools in the fields of design, visualization, and manufacturing, serve every professional in the art world. The ability to create virtual models of gallery spaces and their containing artworks blurs the limits between the artistic and curatorial practice in an unprecedented way.

## 2.1.6 MOCK-UPS AND VIRTUAL REALITY

Artists adopt the role of curator and design virtually their own exhibitions while for curators, Virtual Reality becomes a tool to design exhibitions in an intuitive way. The experience of rearranging the artworks “on the fly” leads to creative experimentations on the field of exhibition design and in innovative curatorial approaches.

Commonly, the preparation of an exhibition is made with the use of a 2D architectural plan of the exhibition space and small photos of the artworks (Fig.132). Curators make small papers with photos and descriptions of the artworks meant to be exhibited. Using technical information about materials and dimensions, formulate the conceptual connections needed for the optimal placement. This method omits a core parameter. The physical presence of the artworks is a determining factor in the practice of exhibition design and influences the outcome in a multidimensional way. Curating visual art without interacting with the actual pieces, many times leads in undesirable results. Curators formulate the conceptual correlations in a linear way without taking into account the spatial and structural impact of the artworks.

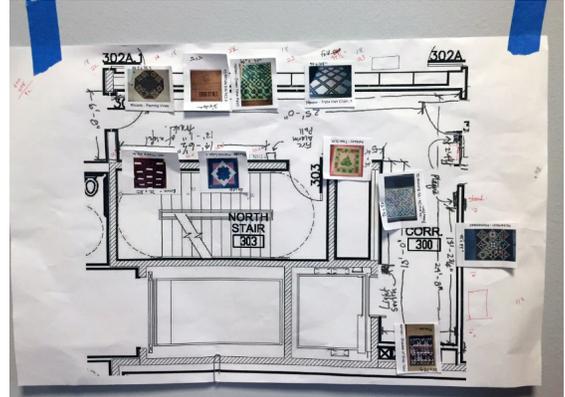


Fig.132\_ Curatorial Plan 2017

Looking forward to an era in which the artworks will be represented as virtual models, it is hard to imagine the extent of innovation that would be achieved both in the field of art and curating. With the highly realistic models and the sense of immersion that Virtual Reality provides (Fig.132), exhibitions will be transformed into a field of immense creativity and experimentation.

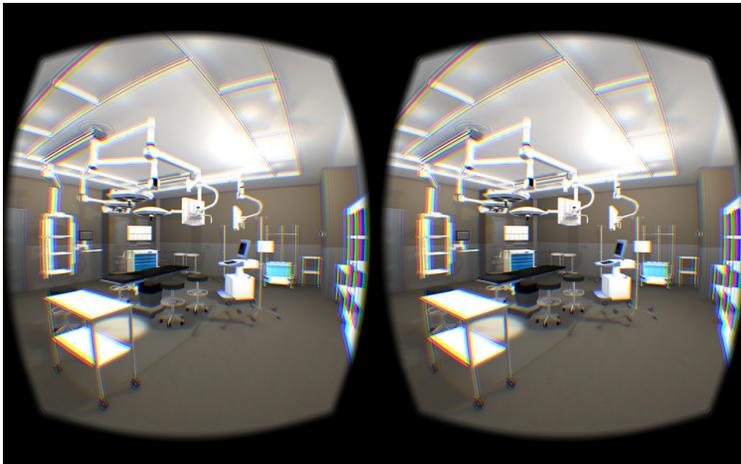


Fig.132\_ View through Oculus Rift, 2017

Virtual Reality transforms the notion of the White Cube from a place of mere presentation to a condition that includes the parameters of interactivity and placelessness. With the implementation of 3D scanning techniques, any artwork could be easily converted into a high-quality virtual model and enter the virtual world of the exhibition. The impact of this potential on the exhibition practice is huge.

In the next few chapters, we will trace the development of the curatorial practice through the examples of significant curators. We are going to analyze the concept of the white cube as well as detecting the penetration of artists into the curators' territory.

## 2.2 EXHIBITION DESIGN: THE CURATOR'S PERSPECTIVE

"The nineteenth century mind was taxonomic, and the nineteenth century eye recognized hierarchies of genre and the authority of the frame"

[Brian O'Doherty – Inside the white cube, 1976]

### 2.2.1 ORIGINS

The onset of art exhibitions goes back to the middle Ages where, during annual and seasonal festivals, craftsmen displayed their objects to the public. An apprentice's craftwork was allowed to be exhibited only when it was approved by the master instructor. Paintings and sculptures were not exhibited in the streets but inside wealthy houses in an attempt to demonstrate the status of their owner. For the ordinary people, the opportunity to get in touch with this kind of artwork was limited. The only way they could see elaborated paintings and sculptures was inside Cathedrals and other places of worship.

In the middle of the seventeenth century, French Academy began its Salon exhibitions and soon enough, state museums - like the one of Louvre in 1793 - came into being. That was the time when the profession of decorator emerged and great collections with chronological consistency displayed to the public. During the French Revolution, the exhibition rooms of the museum of Louvre took the form of

historical presentations boosting the national morale of the French people and, for the first time, raising issues of continuity in the viewers' experience.



Fig.133\_Samuel F.B. Morse, "Gallery of the Louvre" 1830-'33

The twentieth century brought major innovations in the way artwork was exhibited. Until then, paintings were displayed in dense collections in a side by side arrangement and from floor to ceiling (fig.133). As O'Doherty proposes in his set of essays in 1970, Claude Monet with his large horizontal paintings marked the beginning of a huge shift in the way we present artwork. Deliberately, paintings started to grow larger and the space between them increased. Ultimately, some paint-

ings were hanged on their own or with greater distance between them. The frames became thinner and gradually cease to exist resembling today's way of exhibiting.

With these changes in the installation practices, we are moving into the Modern era where the exhibition space gradually transformed into a spare container of the exhibited artworks. Throughout the years many groundbreaking exhibitions were designed changing the notion of the gallery space as a place of mere presentation. Curators tried to brake the rules and treat the exhibition space differently. One of the first attempts that indicate this transition is Alexander Dorner's approach in the Hannover Museum.

## 2.2.2 CURATORIAL DEVELOPMENT

In 1925, the curator Alexander Dorner became a director in Hannover Provincial Museum. He stayed in this position until 1937. During those years he transformed the notion of the museum as a sterilized place of preservation to an interactive environment where the viewers could absorb a full experience of the artworks. Dorner believed that exhibiting Abstract art demanded a completely new approach. He proposed that the museum should become a dynamic place of transformation and movement in which artworks would be exhibited in a way that triggers viewers' perception.

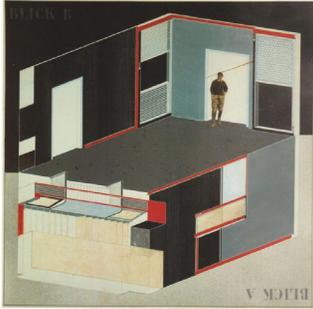


Fig.134\_ El Lissitzky, Plan for the Cabinet of Abstraction, Hannover Museum, 1927

In 1927, Alexander Dorner asked El Lissitzky to propose a new form of displaying artworks. Dorner was interested to experiment on how Constructivist ideas would be implemented in the exhibition making. With the same goal and believing in Duchamp's notion that the viewer does half of the job, he collaborated with many avant-garde artists of the period such as Walter Gropius, Laslo Moholy-Nagy and, Herbert Bayer.

The Constructivist El Lissitzky designed his exhibition pavilion under the name "The Cabinet of Abstraction" (Fig. 134, 135). He created a space that promoted a two-way interaction in which the viewer's physical movement supplemented the artworks. Lissitzky's room allowed viewers to interfere with its content creating an unprecedented experience of participatory interaction with the otherwise static exhibits of the museum.

The room was covered with strips which were set at right angles to the walls. On the one side stripes were painted black, on the other gray and on the edge white. With every move, the spectator was seeing the walls from a different angle perceiving the general color of the space differently. The paintings and sketches were displayed on sliding panels that anyone could move around. The visitors for the first time could curate the exhibition by themselves. In this space were exhibited his artworks as well as paintings by Piet Mondrian, Mies van der Rohe, Moholy-Nagy and other avant-garde artists of the time.

El Lissitzky began his experimentations on exhibition design from 1920 through his research on how Abstract art could be extended in the architectural space. He designed the plans for "The Cabinet of Abstraction" (Fig.8) as a continuation of his previous artistic and architectural works creating a place which is an art piece itself. His collaboration with Alexander Dorner in Hannover Museum resulted in the creation of a unique exhibiting condition.

For Dorner, the museum was primarily a laboratory in which transformative forces interact with the visitors affect and being affected by them in complex ways. His curatorial practice and ideas influenced contemporary curators and after the publication of his book "The way beyond art" in 1958, his ideas spread in the artistic world, establishing the notions of interactivity and immersion in the exhibition making.

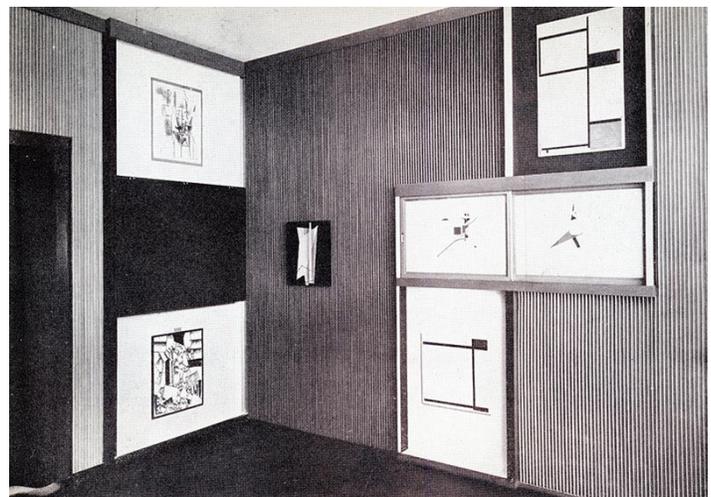


Fig.135\_ El Lissitzky,Cabinet of Abstraction, Hannover Museum,

## 2.2.2 CURATORIAL DEVELOPMENT

Seven years after the groundbreaking “Machine art Exhibition” in the United States, another approach in exhibition making was proposed through the curatorial work of Rene d’Harnoncourt. The museum of MoMA was already known as a place of diverse exhibition practices. With Alfred Barr, his previous director, much progress was made in the field of exhibition design resulting in the transformation of the exhibition space into a white cube.

Harnoncourt, who was previously working in Mexico organizing art and crafts exhibitions on local artists, began his career in MoMA as an assistant of Alfred Barr. With a big experience in the anthropological aspect of art, Harnoncourt organized one of the most influential exhibitions of the twentieth century in which he combined art and anthropology in a still relevant correlation.

His exhibition, under the name “The Indian arts of the United States”, took place in MoMA Museum in the 26th of March in 1941. Rene d’Harnoncourt who understood art as a global expression, displayed more than one thousand art pieces from the history of American Indian art, inviting Native American sand-painters to show their practice to the public (Fig.136). The artists, undisturbed by the museum staff, painted with sand and destroyed their artworks just before completion. The ancient ritual of sand-painting and destruction provided to the visitors a unique experience transforming the museum into a historical showroom.



Fig.136\_ Navajo Indians sand painting, Indian Art of the United States, Moma,

Harnoncourt divided the museum into three main sections. In the first one he exhibited art Indian art from the prehistoric period, in the second artworks from contemporary American Indians and in the third; he exhibited contemporary Western art in conjunction with Native American art. In this third section, he emphasized the extent to which contemporary American artists were influenced by the American Indian culture. Ancient and contemporary artworks exhibited together, triggered conceptual correlations hard to be perceived without the experience of comparing those artworks side by side. We should not forget that in the 40s and without the inter-

connectivity of the Internet, the opportunities to compare diverse artistic contents simultaneously were rare.

Harnoncourt’s exhibition will be remembered as the first exhibition in which artworks were exhibited following not linear conjunctions but instead, correlations of affinity. The art pieces arranged independently from the date of their creation were displayed in an abstract but rather accurate way in respect of their content. The exhibition “The Indian arts of the United States” paved the way for several contemporary attempts at curating artworks from diverse historical periods. One of them is the exhibition “Raid the Icebox” which took place in the Museum of Rhode Island in 1969 and it was designed by Andy Warhol.

## 2.2.2 CURATORIAL DEVELOPMENT

In 1958, a new state museum was formed. Located in Stockholm under the name "Moderna Museet", this place soon became the heart of contemporary art in Sweden and a reference point for the European art scene. The figure that marked its development to a legendary institution was the art historian Pontus Hulten. Being the director of Moderna Museet between the years 1957 and 1972, Hulten curated numerous pioneering exhibitions that enhanced the notion of the museum as an open space.



Fig.137\_ Pontus Hulten, "Hon- a Cathedral" exhibition, Moderna Museet, Stockholm, 1966.

In 1966, Hulten curated one of the most idiosyncratic events in the history of contemporary art. Under the name "Hon; a Cathedral", his exhibition ran during the summer of the same year. Hulten invited Jean Tinguely, Niki de Saint Phalle, and the Swedish Per Olof Ultvedt to create in-situ installations. While, during the 60s, the idea of freedom of expression was prevalent among the artists, the introduction of in - situ collaborative practices inside a state institution was new. Hulten managed to create a climate of confidence and creativity that led artists to express themselves freely and realize their strange and provocative idea.

The group of artists decided to construct a hollowed body of a gigantic laying woman in which people could enter through her vagina and navigate the artworks exhibited inside

(Fig.137). The twenty-eight-meter structure of the woman was meant to serve as a contemporary Cathedral and took five weeks to finish. Inside her body, the artists designed several constructions that implied particular conditions and attitudes. Between them, it was a small planetarium showing the Milky-Way, a man who was watching TV, a small cinema showing a film with Greta Garbo, a bar that served milk and a gallery which displayed fake paintings. The artists made sketches of her body and viewed it as a contemporary building of worship (Fig.138). They decided to name her "Hon" - this word means "she" in Swedish - and identified her as the symbol of woman and femininity in the contemporary world.

Hulten's decision to design the "Hon" exhibition was criticized negatively. Although many people visited the museum and entered the body of "Hon", the exhibition was ignored by the art world for many years. The recognition came much later when other artists started to involve the notion of internal space into their works. Hulten's ideas for an open Museum influenced other big institutions which incorporated in their practice public events and in-situ installations.



Fig.138\_ Exhibition Plan, Hon exhibition, Moderna Museet, Stockholm, 1966.

## 2.2.2 CURATORIAL DEVELOPMENT

Organized by the philosopher Jean-Francois Lyotard, "Les Immatériaux" exhibition (Fig.139) is a milestone in the development of the curatorial practice. Shown between 28 March and 15 July 1985 in Centre Pompidou in Paris, became a reference point to both artists and curators indicating the future of digital art. Lyotard aimed to highlight the transition from a material representation to the immaterial world of digitization and information technology designing the first multidisciplinary exhibition which combined art with science.

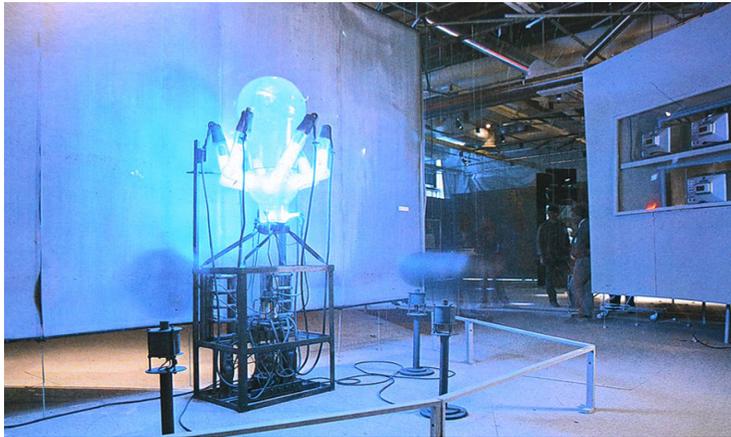


Fig.139\_ Les Immatériaux installation view, Centre Pompidou, Curated by Jean-François Lyotard, Paris, 1985

For the exhibition design, Lyotard created an open space with multiple pathwalks. The objects and installations were exhibited in between semi-transparent panels stretched from floor to ceiling (Fig.140). The viewers were provided with headphones which transmitted radio signals that faded in and out as they approached different areas. As the art critic Pierre Restany vividly describes in his article "Immatériaux: let us leavened with Lyotard" in Domus magazine in 1985, the exhibition was "a mysterious kingdom of microwaves and ultraviolet, laser beams and integrated circuits, screens and diagrams". Through this momentous sensorial experience, the viewers

were absorbed in a dream-like environment where telecommunication technology was combined with mechanisms, projections, and objects into an ingenious mixture of complementary conditions.

Les Immatériaux, marked the beginning of a vast new era of experimentation and philosophical questioning relevant to the notion of post-modernity and its relation with immateriality. After Lyotard's exhibition, new forms of art began to emerge starting to include to their quests the notion of interactivity. New media art owes its establishment to that historic exhibition because the focus was shifted to the integration between science and the arts. Lyotard managed to create a multilevel exhibition that stressed the distorted perception of contemporary realities through the use of advanced technologies and foresaw the introduction of communicative elements in the forthcoming art practice.

The growth of technoculture confirmed Lyotard's concepts on the way scientific and technological advancements affect the post-modern era. In the field of curatorial practice, his concept of creating an exhibition that would provide to the viewers the freedom to become emerged to the condition itself opened an ongoing conversation about how contemporary art should be exhibited as well as how the exhibition space functions.



Fig.140\_ Les Immatériaux installation view, Centre Pompidou, Curated by Jean-François Lyotard, Paris, 1985

## 2.2.2 CURATORIAL DEVELOPMENT

The exhibition "In Living Contact" at 28th Sao Paulo Biennial in 2008 was curated by Ivo Mesquita and Ana Paula Cohen and became a subject for prolonged controversies. The curators invited forty international artists to participate with the aim to discuss the role of Biennials and their relation to the notion of community.

Mesquita and Cohen began a race of criticism on the way Biennales are structured highlighting the fact that they have become detached from real life and they serve as institutions of representation and promotion rather than creative places in which people would have the opportunity to interconnect. They decided to communicate their ideas through the exhibition design and they proceed in the creation of a structural cartography of the space in which space itself became the context.

They divided the exhibition into three parts. All the artworks were displayed on the third floor, near the library and the conference rooms. Among the artists were Marina Abramovic, Joan Jonas, and Erick Beltran. In the first floor, the curators organized interdisciplinary events transforming the space into a platform for discussion and interchangeability and they proposed a new breathing relationship between the Biennial and the people. The second floor was left entirely empty (Fig.141). The vast room, awkwardly vacant, exposed its architectural structure to the public anticipating people to experience the feeling of the space.

Although many important artworks were exhibited and many interesting ideas were discussed, the empty floor drew the most of the attention. The curators' decision to leave the room completely empty, was regarded as a disturbing idea. Pichadores, a group of protesting artists who opposed the idea of living the exhibition space empty, made graffiti on the floor.



Fig.141\_ The empty Floor in the 28th Sao Paulo Biennial, In Living Contact 2008

Mesquita and Cohen envisioned the Biennial institution as a platform rather than an exhibition. They used the vacuum space to enhance their ideas about contextualization of the institution's role in the society and criticized the contemporary practices in the fields of arts. Although a subject of criticism, the transformation of the second floor into a white cube indicated a brave gesture of curatorial design and initiated many constructive discussions.

## 2.2.2 CURATORIAL DEVELOPMENT

In 1969, Harald Szeemann curated an exhibition that took place at Kunsthalle Bern in Switzerland under the name "Live in your head: When Attitudes Become Form". Szeemann invited prominent artists of the period such as Josef Beuys, Bruce Nauman, Lawrence Weiner and others, to construct and exhibit their artworks in an exhibition that proved to be one of the most significant events in the history of art. In this exhibition, he displayed diverse pieces of art covering the areas of, minimalism, Op Art, conceptual art, and Fluxus.

Harald Szeemann's contributions to the exhibition were huge. He directed the conceptual outcome of the artworks and placed them in meaningful combinations. The success of this historic exhibition became an inspiration for the curator Germano Celant who decided to reconstruct the Bern exhibition in Venice Biennial in 2013. Germano, in collaboration with the artist Thomas Demand and the architect Rem Koolhaas, redesigned Szeemann's exhibition in the Venetian Palazzo. In figures 142 and

143 we can see the artwork of Josef Beuys in 1969 reexhibited for the needs of Venice Biennial in 2013.



Fig.142\_ Josef Beuys, Live in Your Head - When Attitudes Become Form, Kunsthalle Bern, 1969



Fig.143\_ \_ Recreation of Josef Beuys' artwork ,Live in Your Head - When Attitudes Become Form, Venice, 2013

Germano asked private Museums and collectors to loan the artworks that had obtained from the Bern exhibition and through an ingenious rearrangement into a totally different space, managed to transform Venetian Palazzo into a regeneration of Szeemann's exhibition. Germano and his group recreated the exhibition based on Szeemann's ideas and with the aim to honor his precious contributions to the world of art.

Szeemann is considered one of the greatest curators of the twentieth century. He was also an art historian and an artist and with his involvement in the curatorial practice promoted the role of curator as a creative person and the exhibition making as an artistic process. His contributions to the field of performative arts are huge. He was the director of Documenta 5 exhibition in Kassel where he introduced new forms of art such as happenings and performances. He believed in an open way of creating and exhibiting art which had nothing to do with the approaches of Documenta in the previous years.

The exhibition "Live in your head: When Attitudes Become Form" in Venice was the first international exhibition that dealt with the idea of copying a previous exhibition and recreate it as close as possible to its original version. Germano's project was welcomed from the art world with enthusiasm because he tried to realize the rebirth of a very important event in the history of art which everybody wanted to view as if it was the real one.

### 2.2.3 THE CONCEPT OF THE WHITE CUBE

In 1976, the artist Brian O'Doherty began publishing a series of influential articles in the Artforum magazine under the titles "Notes on the gallery space", "The eye and the Spectator", "Context as Content" and "The Gallery as a Gesture". Those articles were published later in a book entitled "Inside the White Cube - The Ideology of the Gallery Space". O'Doherty, in an era where the ideology of the white cube was already established, criticizes the sterilized gallery environment and analyzes the origins and effect of the white cube on the contextual meaning of the artworks.

O'Doherty starting from the gradual transformation of the gallery space into a white cube during the first half of the century examines the contributions of the gigantic horizontal paintings of Claud Monet to the new way artworks began to be exhibited and highlights the relationship between the picture plane and the underlined wall. He writes: "Once the wall became an aesthetic force, it modified anything shown on it. The wall, the context of the art, had become rich in a content it subtly donated to the art. It is now impossible to paint up an exhibition without surveying the space like a health inspector, taking into account the aesthetics of the wall which inevitably "artify" the work in a way that frequently diffuses its intentions".

In 1967, William Anastasi photographed the west wall of the Dwan gallery and exhibited the photo on the same wall (Fig.144). Apart from an early comment, as O'Doherty notes, this artwork had a continuous after-effect in the gallery space even after it was removed. The gallery wall became a kind of ready-made mural and changed every show exhibited in that space thereafter.

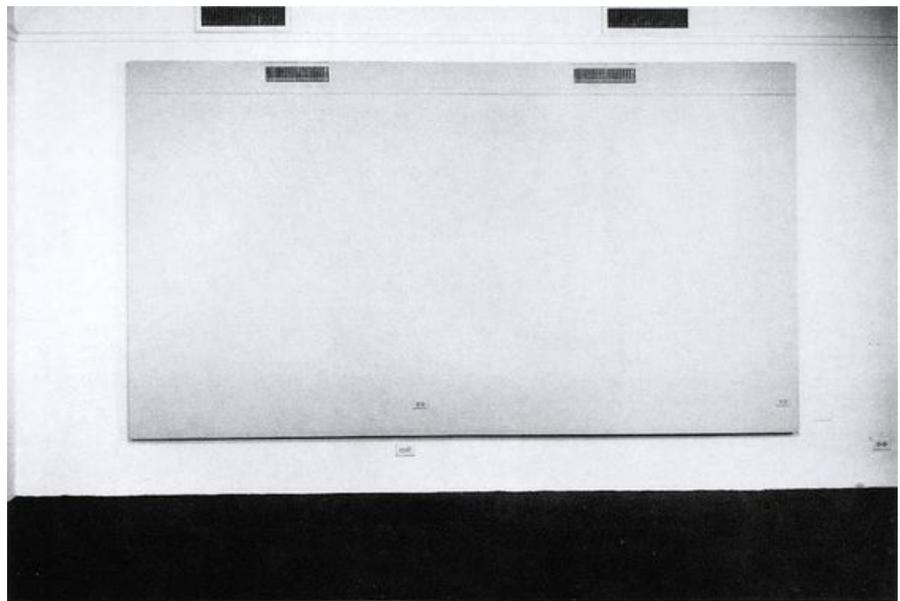


Fig.144\_William Anastasi, West Wall, Dwan Main Gallery, 1967

With Postmodernism the gallery space abandons its neutrality and become transformed into a place in which the aesthetic and

the commercial blend together. The white walls enhance the mystification of the artworks even if the artworks are deprived of their original meaning. The contributions of Modernism in the development of the white cube led in the modification of the gallery space into a condition that excels the relationship of the artwork with the real world and distorts its meaning. No longer the gallery is the extension of the outer world, instead, it excludes everything that could serve as a reminder. As O'Doherty notes in his third article "The Context as Content", "The spotless gallery wall, though a fragile evolutionary product of a highly specialized nature, is impure. It subsumes commerce and aesthetics, artist and audience, ethics and expediency. It is in the image of society that supports it, so it is a perfect surface off which to bounce our paranoias [...] The white cube is usually seen as an emblem of the estrangement of the artist from a society to which the gallery also provides access. It is a ghetto space, a survival compound, a proto-museum with a direct line to the timeless, a set of conditions, an attitude,

### 2.2.3 THE CONCEPT OF THE WHITE CUBE

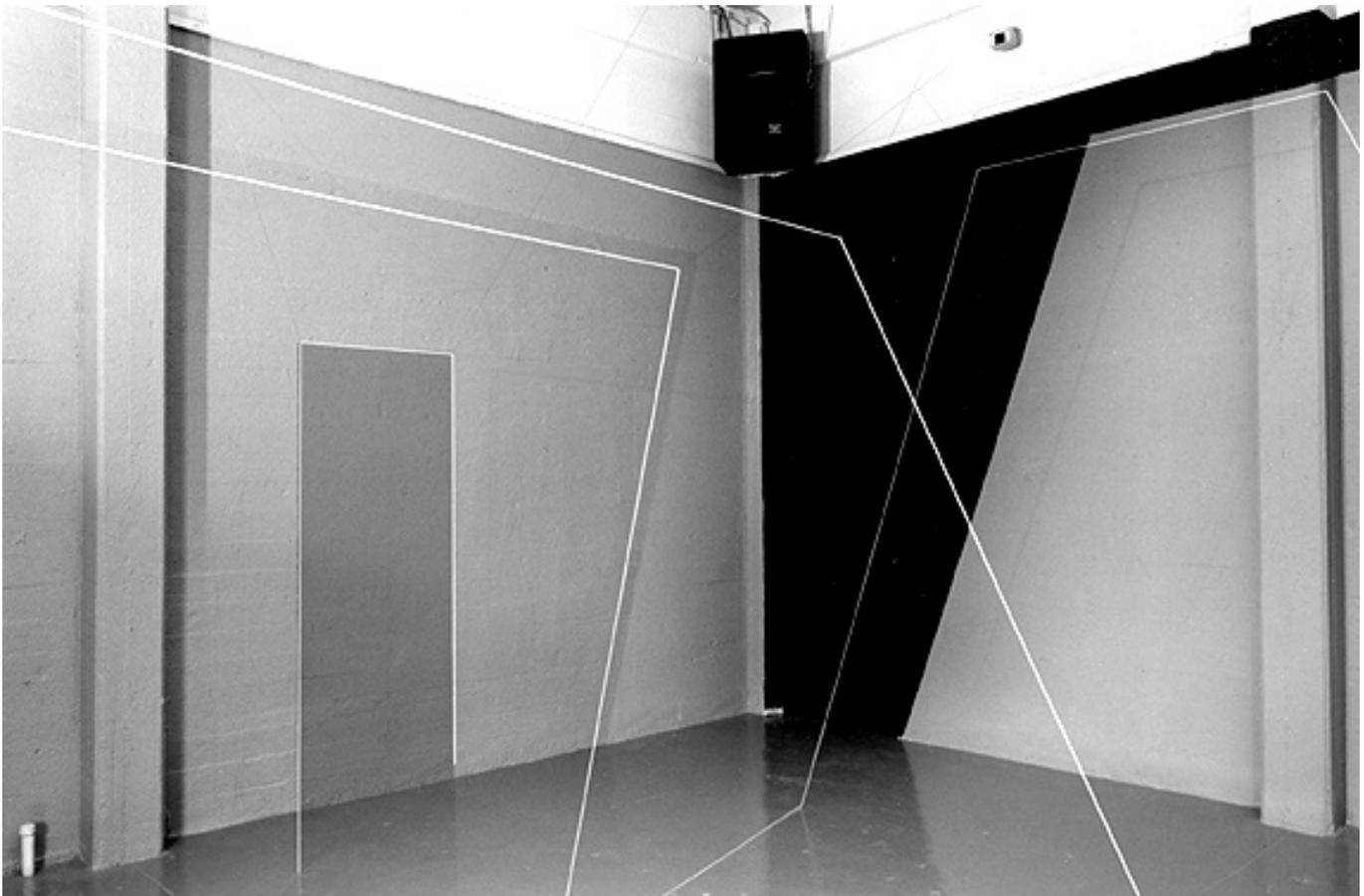


Fig.145\_San Francisco Bay area 1987 rope installation by artist Patrick Ireland the pseudonym of Brian O'Doherty

aplace deprived of location, a reflex to the bald curtain wall, a magic chamber, a concentration of mind, maybe a mistake".

During the 60s and 70s, artists began to act upon the gallery space in extreme ways. The artist Armand P. Arman, in 1960, filled Iris Clert gallery with a massive amount of useless objects that looked like garbage living no empty space. Eight years later, Daniel Buren sealed the door of his exhibition in Galleria Apollinaire in Milan with stripes making the gallery space inaccessible. In 1969, Jannis Kounellis puts horses inside the exhibition space while in the same year Christo wrapped with fabric the entire building of the Museum of Contemporary Art in Chicago.

All these actions indicated the need for an inversion of the established notion of the gallery as a white cube. The artists recognized the inhuman idealized force that such a place applies to its visitors and after O'Doherty's publications, White Cube was never perceived separated from its content. Artists began to investigate different ways to exhibit their work opposing the commercial propositions of the sterilized exhibition space and they made groundbreaking exhibitions and performative actions outside the galleries. The first indication of the breaking of the idealism of the gallery space made by an artist, comes from Marcel Duchamp in 1938 with the exhibition "The International Exposition of Surrealism" that we are going to examine in the next chapter.

## 2.2.4 THE ARTIST AS A CURATOR

In 1855 Gustave Courbet submitted to the French Salon a portrait of himself with the title "The artist's studio". The Salon rejected his proposal and Courbet decided to erect a temporary pavilion outside the main venue where he exhibited forty-four of his paintings under the title "Pavilion of Realism". With this action, Gustave Courbet gave to the artistic world the first paradigm of an artist who opposes the power of patrons and takes responsibility for his own exhibition. After the second half of the nineteenth century, many artists have adopted the role of the curator gaining artistic autonomy and in many cases influence the course of art in a radical manner. Those exhibitions attracted attention not only because of the originality of the exhibited artworks but because it was the first time in the history of art that artists treated the exhibition making as an artistic medium in its own right.

Marcel Duchamp provides us with two unique examples of exhibitions which put at stake the protocols of the entire Modern era, the first was "The International Exposition of Surrealism" (Fig.8) in Paris in 1938 and the second one is "the first papers of surrealism" (Fig.9) which took place in New York four years later. In the first exhibition, Marcel Duchamp exhibited in the last of the three main rooms of the gallery. The spectator, after passing near of a taxicab which carries snail-covered mannequins and through a surrealist confusion of installations and performances, proceeds to the dark Duchamp's room where he sees 1200 bags of coal hanging from the ceiling. This was the first time in the history of exhibitions that an artist used the actual structure of the gallery not to passively present his artwork but rather to create a strong experience for the viewer. The 1938 Surrealist Exhibition paved the way for the Fluxus art movement of the 60s and is responsible for many of the diversities that we observe in exhibition practices afterward. It was the first time that artists created a site-based sensory experience that was impossible to be recreated in another place without their active involvement. In 1942, another pivotal show took place in New York under the title "First Papers of Surrealism". It was the first show of Surrealists in the United States and it was there that the considerations of the first exhibition became even sharper. Marcel Duchamp, who designed the entire show, exhibited his famous "Mile of string" (Fig.146). With this unorthodox installation, Duchamp, made the visitors view the exhibited artworks through a web-like net. The way Duchamp treated the exhibition space produced a scandal - the center of attention was not anymore on the exhibited artworks but on the space itself. The previously neutral space between the viewer and the object of art became instantly meaningful and the notion that the spatial context of artworks influences their meaning more clear.



Fig.146\_Marcel Duchamp, mile of string, First Papers of Surrealism, Whitelaw Reid Mansion, Manhattan, New York,

The American philosopher John Dewey, in his book "Art as Experience" which was published four years before the International Exposition of Surrealism, investigates the way art interacts with the viewer creating a holistic experience and he argues that the way people experience things is determined by their context. The urge of the artists to control the context of their exhibited artworks seems to be justified. The artistic process involves aspects that are difficult to be completely understood by the curator. Nevertheless, art history verifies that leaps in the curatorial practice have been triggered by artists in the role of curators or from curators who treated the exhibition making as artists.

## 2.2.5 INFLUENTIAL EXHIBITIONS DESIGNED BY ARTISTS

After Duchamp's groundbreaking exhibitions, artists either started to treat the gallery space as an extension of their artworks or curating the works of other artists. In this chapter, I will present five illustrative occasions in which artists involved with the exhibition making starting with the "Exhibit" exhibition in 1957 by the British Pop artist Richard Hamilton and Victor Pasmore.

In that exhibition, Hamilton and Pasmore pioneered a new method of treating the gallery space. Although both having a Pop-art background, they decided to adopt a rather abstract approach. The title of the exhibition clarified that its subject was not the artworks but the exhibition itself. In the show, the artists worked with 48 x 32 inches panels which hung from the ceiling at varying heights. The color palette was restricted. White, red, black and transparent panels were organized parallel to the walls and ceiling creating an inward extension of the gallery surfaces (Fig.147).



Fig.147\_ Richard Hamilton and Victor Pasmore, Exhibit, ICA, London,1957

The experience of becoming emerged in a gallery environment was new and deliberately highlighted by the fact that almost no artistic intervention was noticed by the viewer except for some circles here and there which disrupted infrequently the uniformity of the space. The artists intended to create an abstract exhibition with, as Hamilton wrote, "no theme, no subject, not a display of things or ideas".

A series of discussions and Alloway's texts on the exhibition attempted to clarify how this show should be perceived by the spectator. Alloway tries to distance this project from the Avant-garde experimentations of the past, emphasizing a non-architectural approach. The attention here is not on the notion of "pure form" but on the spectator itself and how he experiences his navigation in the space. The issue here is not the structure but rather the absence of structure which is reinforced by the mindful use of the transparent panels and the way they blend with their surroundings. As Alloway wrote: "The visitor is asked to look neither for separate works of art nor for symbols but to inhabit, for the duration of the game, a real environment". Hamilton mounted a series of groundbreaking exhibitions between 1953 and 1966 in which he continued experimenting with the relationship between art and space.

In 1969, Rhode Island School of Design invited another Pop Artist, Andy Warhol, to curate an exhibition at the Museum of Art. Until that time the Museum owned a great collection of masterpieces and a series of attempts were made to be exhibited to the public following other than chronological relations. Andy Warhol accepted the invitation and made six trips to Providence in the summer of 1969 to look through the collection.



Fig.148\_ Richard Hamilton and Victor Pasmore,CA, London, Catalog, 1957

### 2.2.5 INFLUENTIAL EXHIBITIONS DESIGNED BY ARTISTS

After exploring the numerous art pieces in the basement he decided to move them up to the gallery (Fig.149). Like Marcel Duchamp in his search for his Fountain, Andy Warhol collected items with values other than aesthetic, objects that could mainly be conceived as average. He was looking for leftovers, damaged things and even art pieces that seemed fake. When he finished, he ended up with eleven categories dating from 1900 to 1966.

Warhol exhibited his objects either alone or in clusters without discriminating them by qualitative criteria. He knew, as a collector, that there is no such thing as a "good" collection because any collection is always biased by the drive of its collector. In 1969, the exhibition took place under the title "Raid the Icebox" shaking the curating status quo for one more time - Warhol was not a curator who tried to present the best of the artwork he could find but instead, the ordinary or even the rejected.



Fig.149\_Shoe Closet, Raid the icebox I with Andy Warhol, Museum of art, Rhode Island School of Design, 1969

Between November 1971 and February 1972, another revolutionary exhibition was prepared. This time twenty-seven women collaborated in order to organize an exhibition in Hollywood, California under the title "Womanhouse". In a period when the problem of inequality between men and women was prevailing, those twenty-seven women chose to deviate from the established way of exhibition making, presenting their work inside a house. This ordinary building became the symbol of oppression and confinement. The Feminist artists expressed their fierce critique of the predominant culture of gender injustice highlighting the fact that in the field of arts, women are rarely supported.

In the house, each artist exhibited in her own room while during the day, conscious-raising sessions were taking place in the living room. Judy Chicago and Miriam Schapiro were the first female artists that took the initiative to organize the first female-centered installation in the western world and convince other women to take responsibility for them and resist. Judy Chicago in her interview on National Museum of Women in Art remembers how difficult it was for the women of that time to learn to live outside the social construct of femininity, become aggressive and claim their rights.

In "Womanhouse" exhibition many controversial installations were made. In figure 150 we are looking at a photograph of the collaborating work of three women artists, Suzan Frazier, Vicky Hodgetts and Robin Welch under the title "Nurturant Kitchen". This installation is a representative sample of the way symbols of femininity were used in order to convey strong gender-related messages. The materials utilized by that group were traditionally used by women and are from the field of decorative arts. The exploration of the hierarchies of materials is apparent in an artwork known as "Womb Room" by Sandra Orgel which is a complex structure of a colorful needlework.

## 2.2.5 INFLUENTIAL EXHIBITIONS DESIGNED BY ARTISTS



Fig.150\_ Nurturant Kitchen, Susan Frazier, Vicky Hodgetts + Robin Weltch, Womanhouse Exhibition, Hollywood, California, 1972

Over the course of the exhibition, the house was visited by ten thousand people documented in two films and gained considerable attention from the press. This exhibition, which is now perceived as a social sculpture, gave us a unique example of how a project could strongly impact the course of art without any assistance of major institutions and outside of the conventional space of a gallery.

The legacy of "Womanhouse" continues today through the existence of hundreds of womanhouses around the world where women experiment, discuss and take action within a gender-oriented society which is still struggling to accept women's equality.

Many years later in 1993, a project of John Cage named "Rolywholyover A Circus" was ready to be shown to the public (Fig.151). Cage was preparing this show for three years and sadly passed away one year before the opening. He was planning to create a "composition" rather than an "exhibition" and as Julio Lazar describes: "to create a dynamic environment where people and art would coexist in a compositional environment that exemplified a real situation where hierarchies were leveled off and where people enjoyed the opportunity to become aware of the possibilities of self-government".

The exhibition took place in the Philadelphia Museum of Art and, as Cage said, the goal was to create an exhibition that would change so much that if someone came back for the second time he would not recognize it. Cage created a constantly vibrating environment of exchangeable performances, films and videos, readings, installations, music and special programs. Using a computerized process randomized the positions of the objects which were rearranged daily. The artworks were obtained from fifty Philadelphia museums and collections, chosen by chance procedures. Works from 67 artists were presented among them were Kazimir Malevich, Arnold Schoenberg, Lazlo Moholy-Nagy, Joseph Beuys, Aaron Copland, Nam June Paik and others.



Fig.151\_ John Cage, Rolywholyover A Circus, Philadelphia Museum of Art, 1993

The curatorial treatment of "Rolywholyover A Circus" was unparalleled. John Cage managed to organize a constant flux of artistic possibilities breaking the established notion of the museum as a sterilized place of "dead art". This exhibition is going to be a reference for the future not only because it reflects Cage's relationship with the concept of randomness but because it is considered as one of the most successful examples of a curatorial practice made entirely by an artist.

### 2.2.5 INFLUENTIAL EXHIBITIONS DESIGNED BY ARTISTS

In 2006 in Paris, Centre Pompidou organized an exhibition that will be remembered as one of the most radical experiments in the history of curating. Jean-Luc Godard, six months before the opening of the exhibition and after firing the curator, started collecting cinematic art, paintings, and installations from multiple historical periods in order to create a kind of retrospective synthesis.

Godard opened the exhibition without a press release and left it constantly in preparation throughout its duration. The spectators were navigating the space passing over cables inside a confusion of moving images and objects. The exhibited artworks were diverse and they were coming from different periods of the history of art. Godard's film extracts were exhibited in a room named "Yesterday" and screens showing pornography and sports were blending conceptually with installations, modernistic paintings from the museum collection and great cinematography.



Fig.152\_ Jean-Luc Godard, *Voyage(s) en utopie*, Centre Pompidou, Paris, 2006

Godard's film extracts were exhibited in a room named "Yesterday" and screens showing pornography and sports were blending conceptually with installations, modernistic paintings from the museum collection and great cinematography.

The show was carried on under the title "Voyage en utopie" (Fig.152) and marked the contemporary history of exhibition making to the same extent as the famous "Les Immateriaux" exhibition by Jean-Francois Lyotard in 1985. In his 2006 show, Jean-Luc Godard treated the place of the museum as an intermediate space between the past and the future. He presented the artworks blending them in an unorthodox unity of conceptual and spatial associations.

Through the last one hundred years, many artists got involved with the profession of the curator. In many cases, they had to offer new ways of seeing and distinctive methods of installing. They usually, approached the exhibition making through an atypical world-view which, most of the times, contradicted institutionalized perspectives. Every time something new emerged in the field of arts, a revolutionary way of exhibiting was following.

Nowadays, contemporary art concepts indicate new ways of curatorial approaches. The notion of interactivity and participation of the viewer is blend with innovative artistic practices provided by the accelerating development of technology. In this context, the affinities between the past and contemporary artworks change along with the way they are exhibited. In a contemporary version of Godard's exhibition, net art and Virtual Reality would have taken their own space and their relation with art forms of the past would have been even more complicated.

## 2.2.6 CONTEMPORARY NEEDS

After the beginnings of New Media art, curators started to investigate new ways of exhibiting. Immaterial artworks demanded a completely new curatorial approach. Net art highlighted the fact that the White Cube did not serve anymore the presentation of net-based artworks. As they dealt with the notions of interactivity and immateriality, computer-driven installations were hard to be exhibited following the established curatorial forms.

The exhibition "Art for networks", which was curated by the artist Simon Pope in 2002, indicated this shift in curatorial practices. He invited artists that were working with computer art and networks to participate in a form of exhibition that resembled the function of a software. Pope created a project that could change in response to the exhibition space and the particular social moment. It was exhibited in multiple galleries and each time the data flow and the installation changed revealing different aspects of the artworks. The flowing events triggered viewers to experience how would be like to be part of a network. During that time, many British artists have experimented with new exhibiting formats noting that New Media art should be exhibited not by curators but by artists themselves.

In 2002, Nina Pope and Karen Gurthrie began a project that was dealing with the placelessness of the Internet. They created a curatorial model that implemented TV broadcasts in order to make net art that viewers watched live. Under the name "TV Swansong" (Fig.153) the project's website transmitted eight artworks

focused on the "current state of flux in television". They related the medium of the Internet with traditional forms of broadcasting. The project was hosted online blended with everything else on the Internet.

New Media art and the involvement of the artists in the exhibition design gave birth to a new curatorial practice named "Modular Model". Through time more and more curators adopted this exhibiting form because it better served new media art. According to the Modular Model, curators build their projects "in collaborative nodes or modules" with a network of institutions or exhibition venues. With this practice, each participant contributes to an open network of events that exist outside the institution.

After the curatorial practice of net artists who created and exhibited their work online, it became apparent that artwork is inseparable from the way it is displayed. Net artists used the Internet in an organic way. They created immaterial art which was meant to exist online. They implemented new technologies in creating art that, like the Internet, was a medium by itself. Net art began a new era of experimentations in curatorial



Fig.153\_Nina Pope and Karen Guthrie, TV Swansong, 2002

methods that led in the familiarization with the notion of spacelessness contributing to the creation of complex conceptual structures and interpretations. The Internet gradually became an area of creativity and exchangeability that led to the creation of innovative projects exhibited online.

## 2.3 ART DISTRIBUTION : THE SPECTATOR'S PERSPECTIVE

"The invisible world is no longer reality and the invisible world is not a dream anymore"

William Butler Yeats (13 June 1865 – 28 January 1939)

### 2.3.1 VIRTUAL GALLERIES



Fig.154\_ Rosa Menkman, Portret of Herself, 2011

and curator Rosa Menkman (Fig.154), experimenting on glitch art developed her theory about image resolution and in 2011 published "The Glitch Momentum" in which she explained the concepts of Glitch art and its relation to information theory. In 2013, Menkman founded "Transfer", an exhibition space that, as she writes, "explores the friction of networked studio practice and its physical instantiation". She collects Virtual Reality and other computer-generated artworks and exhibits them in both online and physical spaces. In 2013, another online platform for the creation and promotion of digital art was created under the name "The Wrong Biennale" (Fig.155). "Wrong" displayed artworks both online and offline. Several Virtual Spaces were designed, curated online, in which artists presented their digital artworks. In the offline version, The Wrong Biennale collaborated with Museums, galleries, and institutions in order to host workshops, lectures, and physical installations.

Virtual Reality offered a new perspective in the exhibition making. During the last years, it is established as a legitimate way of exhibiting and promoting art as it allows artists and curators to take advantage of the interconnectivity of the Internet and the free spirit that digital world has to offer.

During the last five years, Virtual Reality went main stream. Oculus Rift, HTC Vive, and VR Cardboards appeared much more affordable and closely connected with the game industry. At the same time, more and more architects implemented Virtual Reality as a visualization tool while many museums and private institutions began using VR applications as an extension of their practices.

Digitization inspired artists to make research and create artworks that were dealing with how digital images are created and how they affect our perception of reality. The artist



Fig.155\_ The Wrong (again)'s campaign artwork by Stefan Saalfeld

### 2.3.2 FREEPORT STORAGES - THE INVISIBLE ART

The German visual artist and theorist Hito Steyerl was one of the first contemporary artists that implemented 3D CAD imagery in her video narratives (Fig.156). Steyerl's work reflects the contemporary digital technology and at the same time highlights political aspects criticizing capitalism and its implications to the world. In 2014, she publishes "Duty-Free Art", a paper that tracks the life of the artworks after their sale. Steyerl makes a thorough investigation of the subject and reveals a network of tax-free zones in which artworks travel before their storage. Art collectors buy and store the art pieces in huge warehouses. Geneva Freeport (Fig.157) is considered to hold the greatest amount of artworks in the world. In those massive buildings, the artworks remain hidden until their value be increased by the art market and collectors decide to resale them.



Fig.156\_ A still from Hito Steyerl's film *How Not To Be Seen- A Fucking Didactic Educational .MOV File*, 2013

Steyerl makes a thorough investigation of the subject and reveals a network of tax-free zones in which artworks travel before their storage. Art collectors buy and store the art pieces in huge warehouses. Geneva Freeport (Fig.157) is considered to hold the greatest amount of artworks in the world. In those massive buildings, the artworks remain hidden until their value be increased by the art market and collectors decide to resale them.

Inside the warehouses, there are art pieces that nobody sees. Safe and discreet, the invisible art is received into hermetically sealed boxes and is stored behind high-security doors. In her paper "Duty-Free Art", Hito Steyerl writes: "The artworks travel inside a network of tax-free zones and also inside the storage spaces themselves. Perhaps as they do, they do not ever get uncrated. They move from one storage room

to the next without being seen. They stay inside boxes and travel outside national territories with a minimum of tracking or registration, like insurgents, drugs, derivative financial products, and other so-called investment vehicles. For all we know, the crates could even be empty. It is a museum of the internet era, but a museum of the darknet, where movement is obscured and data-space is clouded".

A huge amount of artworks, after their creation, are treated primarily as investments. The art, more than ever,

has become object of financial and monetary speculation. The secret warehouses allow trade without taxes transforming the artworks into symbolic objects. Being invisible for years, the hidden masterpieces reveal the transformation of our society into an immaterial world of logistical transaction and interconnectivity. Freeports, like computer memory, keep the objects of art registered until the time of resale.



Fig.157\_ Geneva Freeports, staff member walks in the warehouse, 2016

### 2.3.3 THE FUTURE OF ART

The future of art, as Lyotard anticipated, is becoming immaterial resulting both in artistic and financial mobility. The transition to the virtual space is a matter of time and the more artists adopt Virtual Reality technologies and computer-generated methods of production, the more possible it is to gain a place in the history of contemporary art as the leaders of a unique and promising era where artists, curators, and collectors could serve their interests creatively. With Virtual Reality the artists could freely produce experimental work without having the stress of funding, curators could manipulate creatively the exhibition making and collectors could buy and sell artworks in their virtual version without having to pay conservation and storage costs.



Fig.158\_ Woman wearing Virtual Reality Headset, 2018

Although Virtual Reality initiates a new era of creating, viewing and collecting art, the attempts made in the field are still in their first steps. The artists are still investigating the technical aspects of the medium similarly to the early filmmakers and their first attempts to understand the possibilities of capturing moving image. Like Hans Richter's effects in his movie "Ghosts Before Breakfast (1928)", contemporary artists experiment with the notions of interactivity, immersion and infinite space trying to make maximum use of the special features that Virtual Reality has to offer.

Curators discuss and work on virtual exhibitions treating virtual space either with creativity or skepticism leaving room for the artists to involve with curatorial practice. The viewers are gradually starting to familiarize with digital aesthetics in the field of art and interact with virtual environments in different ways. Institutions are using Virtual Reality to circulate their collections through the internet and collectors buy and sell online. The future of art dealing could be greatly influenced by the advent of Virtual Reality. The creation of Virtual artworks serves every professional in the field in an exciting new way. With acclaimed artists like Marina Abramovic implementing Virtual Reality in their artistic practice, it is expected to begin a flourishing new era of artistic creativity and the legitimization of Virtual Reality art as a new artistic genre. In that context and following the trend, the future of art dealing is expected to move even more to immaterial methods of trading. Becoming the future warehouse, Virtual Reality, is about to transform the physical artworks into reference objects.

### 3 - EXPERIMENTATION

#### 3.1 CREATING THE " WHITE CUBE"

In 1991, Gerasimos Kappatos founded one of the most acclaimed art galleries in Greece. Kappatos Gallery is located in the historic center of Athens and has presented numerous influential exhibitions by international artists such as Lynda Benglis, Santiago Sierra, Rebecca Horn, Marina Abramovic, Louis Bourgeois and others. Every year, Gerasimos Kappatos organizes an idiosyncratic exhibition in Lycabettus Hotel under the name "Rooms" with the aim to promote emerging artists. In collaboration with many established curators and art-historians, the rooms of Lycabettus Hotel are transformed into individual exhibition spaces where new artists present their artworks.



Fig.159\_ Photo of the physical Kappatos Gallery, Athens, Greece, 2017

The hotel rooms are small and although many of my artworks require confined space, the idea that Virtual Reality would allow me to visualize the main Kappatos Gallery into one of that tiny rooms and make a solo exhibition inside a group exhibition was very intriguing. I proposed my idea to Mr. Kappatos and he immediately responded positively. The next day he gave me the architectural plans of his gallery and I began working on the structure.

I made the three-dimensional models and UV mapping in Maya and imported my model into Unreal Engine. The reason I chose Unreal Engine instead of Unity is that it provides better quality in terms of visualization. In figure 160 we can see screenshots of the three dimensional model of Kappatos Gallery created in Maya 2018. After the modeling process in Maya finished, I imported my model into Unreal Engine and I applied basic materials. I connected my HTC Vive Headsets and created a navigation mesh in order to test Controllers' Locomotion (Fig.163 - 164).



3.1 CREATING THE "WHITE CUBE"

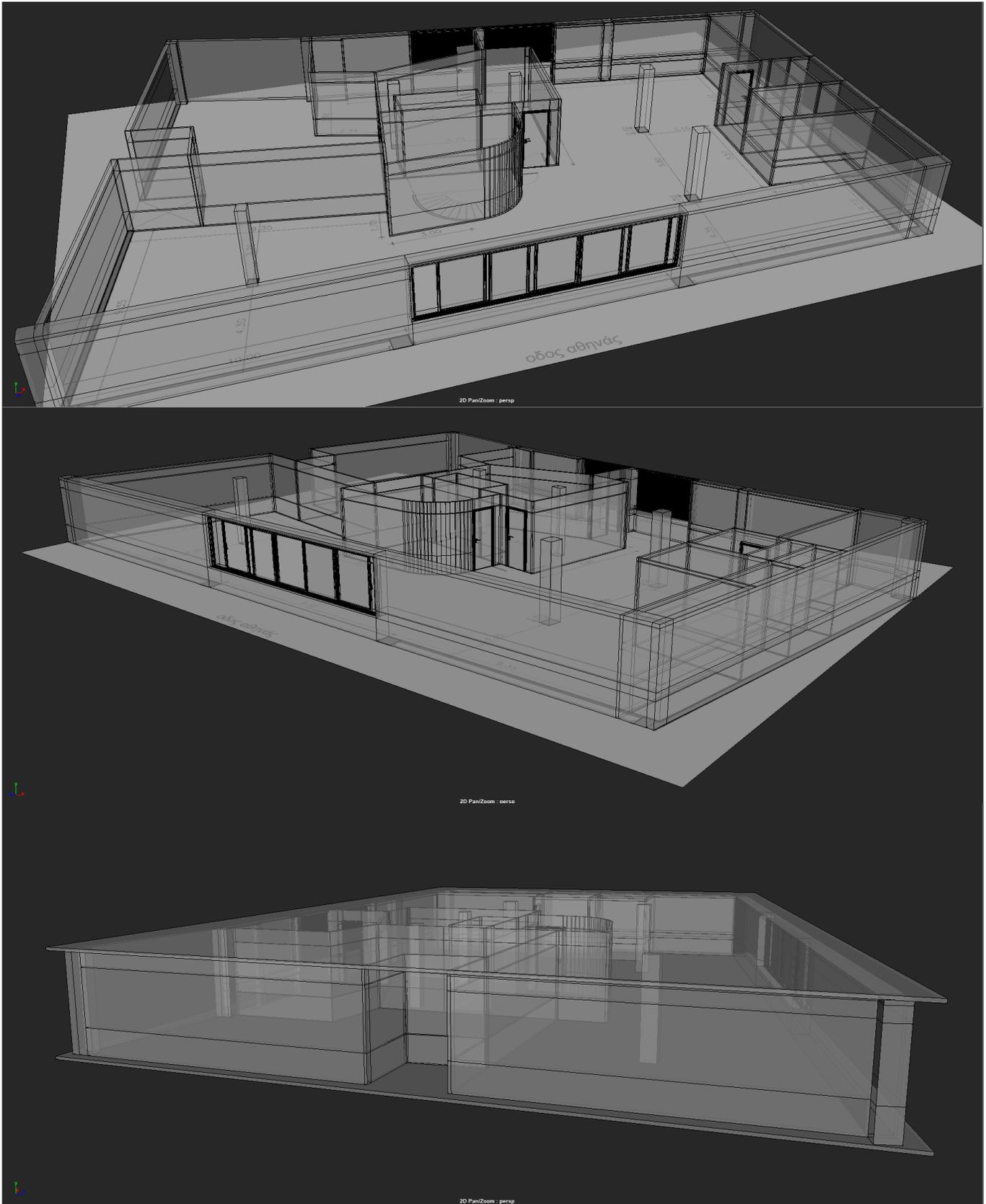


Fig.161\_ Korina Kassianou, Screenshots, the complete 3d Model of Kappatos Gallery, created in Maya 2018

### 3.1 CREATING THE " WHITE CUBE"

Having my previous studies in Sculpture made me realize how important it is for an artist to decode the rules of three-dimensional space before exhibiting. When a visual artist is preparing artworks for a particular exhibition it is crucial to get familiarized with the gallery space and experience its impact on him and his artwork. Most of the times, when artists plan a new exhibition they have little time to see the gallery space empty of artworks. Galleries are living organisms and they organize exhibitions one after the other usually with one or two days left in between where the artworks of the next exhibition are already in boxes inside the space.

The process of designing Kappatos Gallery gave me the opportunity to learn every single aspect of the space. Every time I had an idea for an artwork I would open my files and navigate through the virtual version of the gallery. Free from the stress of scheduling appointments and without losing time driving to the physical place, I had the opportunity to imagine and test my ideas. In this particular project, the goal was to create a Virtual version of the gallery that would serve both as the basis of a virtual exhibition and a preparation model for a physical exhibition. While Virtual Reality provides the tools to design a whole new artistic experience, it is also a powerful tool to visualize accurately three-dimensional artworks that would become materialized in the physical world.

Every gallery represents several artists which some of them are international living and working in a different country far away from the country where the exhibition space is located. The majority of them produce large-scale artworks and installations that are comprised of numerous separate parts. Some of them are using projections as part of their installations while others meticulously design the intermediate space between the artworks. The task of placing contemporary artworks in the gallery space is not simple anymore. Curators have to deal with complex structures and multiple artwork parts that when they are placed incorrectly the balance and meaning of the artworks are disturbed. In order to avoid such issues, artists and curators are obliged to travel several times per year and giving the fact that many of the artists participate in more than five exhibitions per year, the cost of this method becomes considerable as regards time and effort.

The implementation of Virtual Reality in the visualization of three-dimensional models of the artworks and exhibition spaces will benefit every professional of the art world. When every gallery and art institution will make available to curators and artists the virtual version of their spaces, the task of exhibition design would become effortless and effective. Artists and curators will be able to manipulate 3D artworks in the virtual space while communicating in real time. With the technology of 3D scanning developing fast, the artworks could be scanned easily through a smartphone and became managable 3D models through a simple software such as Agisoft. In figure 162 we can see a 3D Model of an egg package, scanned with photos taken from my iPhone.



Fig.162\_Egg Package, 3D scanned with photos in Agisoft PhotoScan Professional, 2018

### 3.1 CREATING THE "WHITE CUBE"

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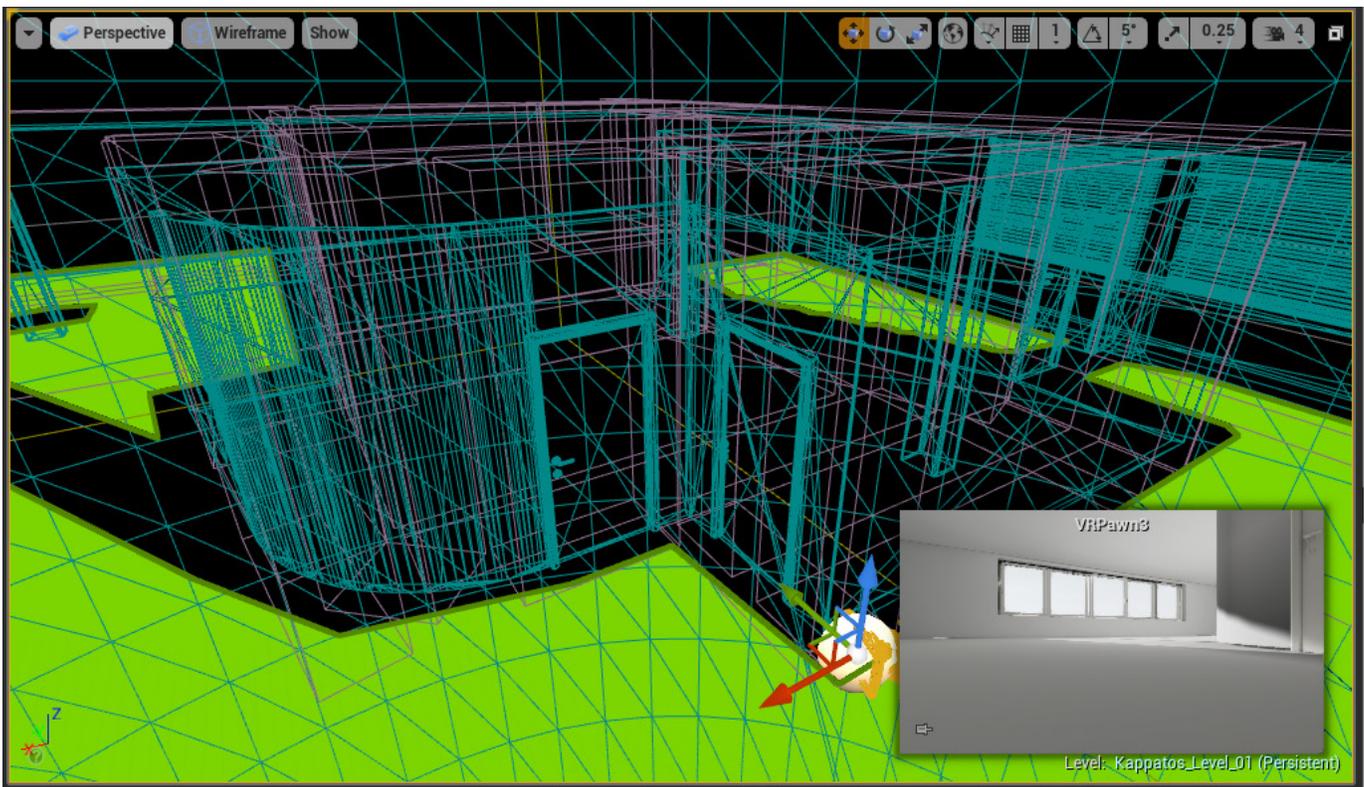
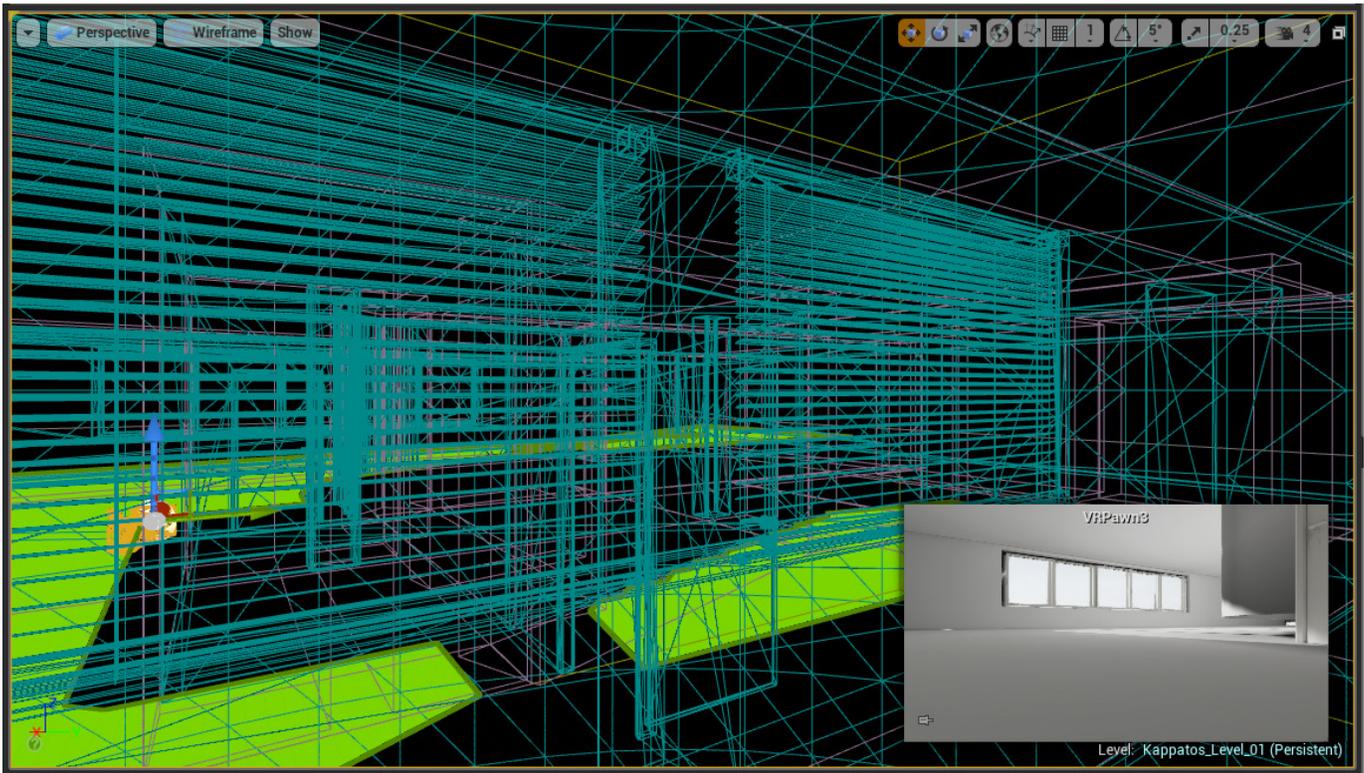


Fig.163\_Navigation mesh, Unreal Engine, 2018

3.1 CREATING THE "WHITE CUBE"

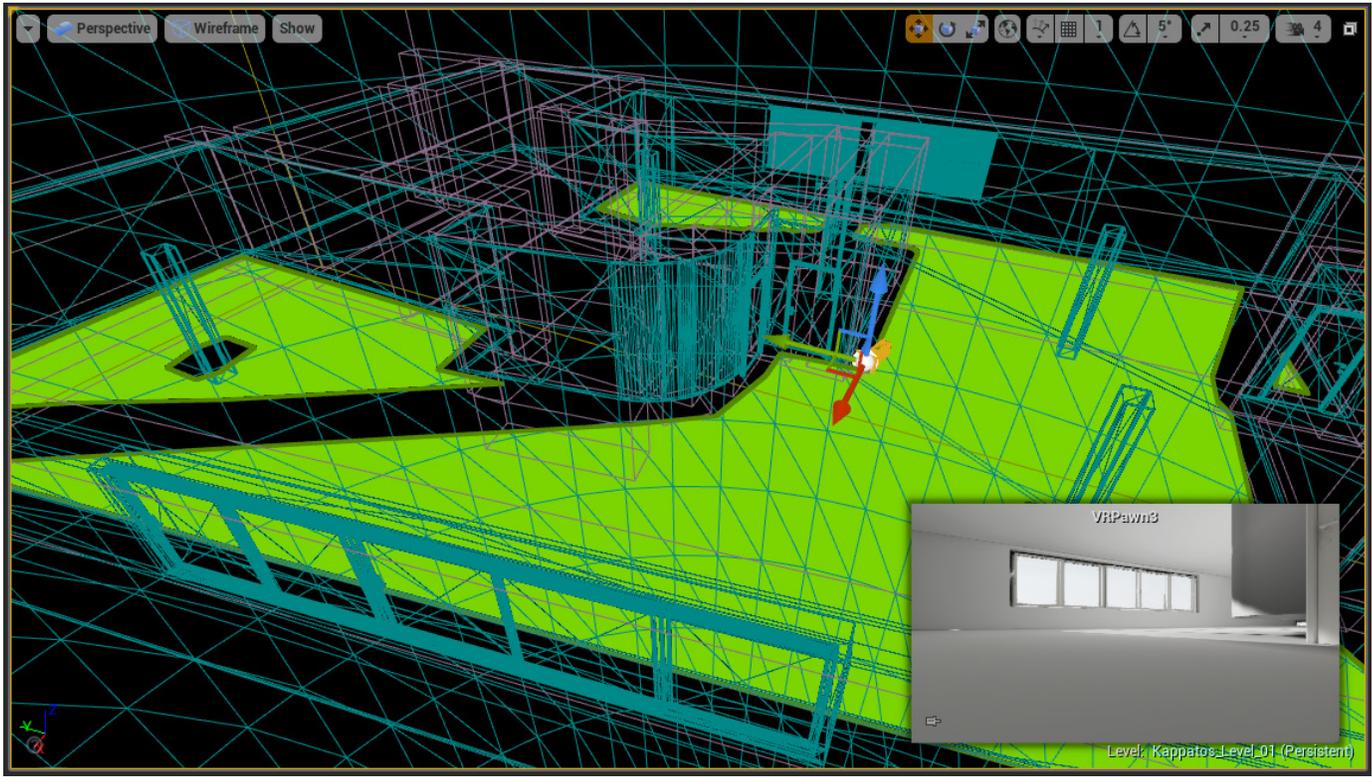
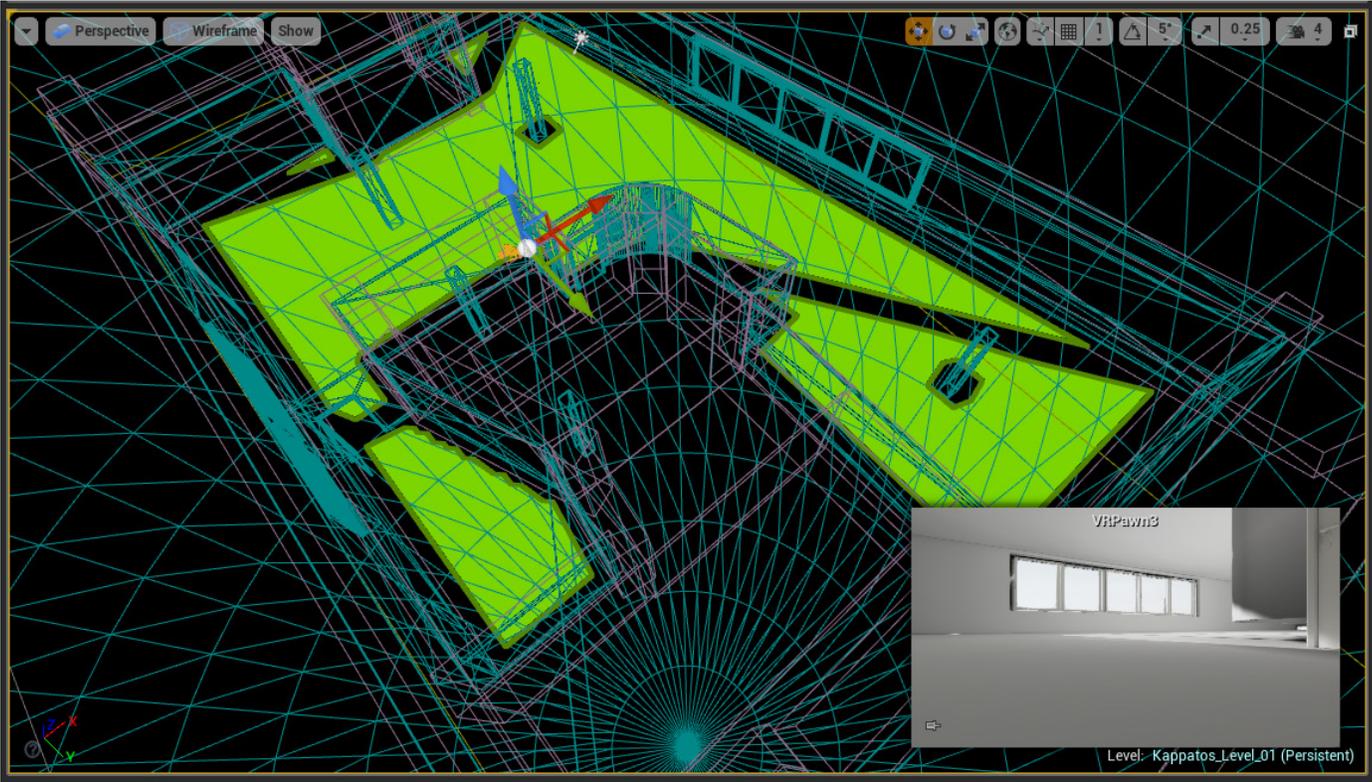


Fig.164\_Navigation mesh, Unreal Engine, 2018

### 3.1 CREATING THE “ WHITE CUBE”

The way viewers navigate through the exhibitions space is of great importance. In the physical space, curators control the flow of the visitors using panels with which they separate the exhibition space according to a plan and sometimes they block entries or exits in order to create an exhibition-specific navigation path different from the one of the actual building.

The contribution of Leotard in the design of the path-walks in Les Immatériaux exhibition in Centre Pompidou in 1985 is a bold example of how decisive is flow control to the exhibition making. The panels that Lyotard used in order to separate the space was semi-transparent and they served both as barriers and as unifying elements. They allowed viewers to navigate freely without blocking their sight and at the same time they added a characteristic look to the whole exhibition.

In the Virtual space, navigation is possible to be treated in unorthodox ways. Unlike in the physical space, Virtual reality allows absolute control over the way the viewer moves and interact with the environment. In our Intensif project “Constructs of the Mind” in 2018 (Fig. 165) we made use of the capabilities of Virtual Reality restricting the viewer’s movements in a one-meter radius around his body. In this way, the viewer had the ability to interact with the HTC Vive Controllers and experience the triggered events without being able to walk through the settings.

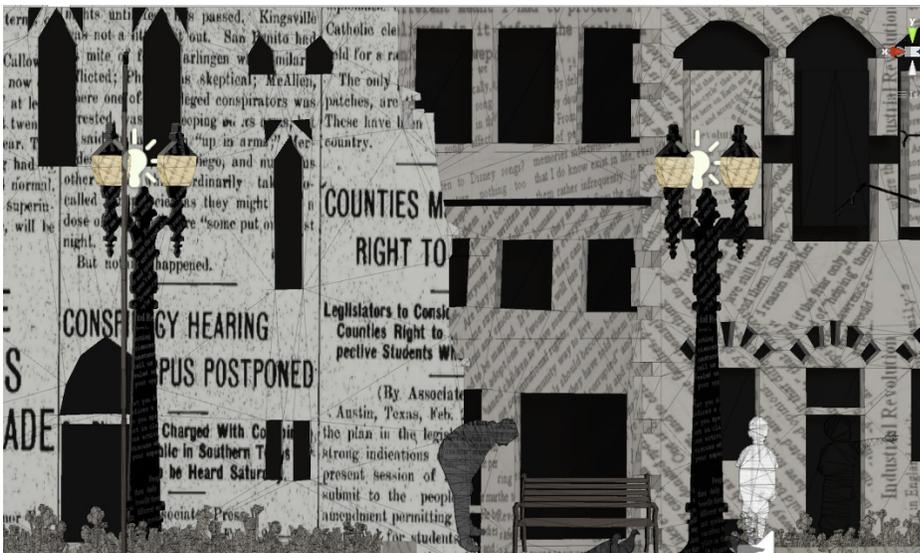


Fig.165\_Screenshot of the Virtual Reality project “Constructs of the Mind”, Intensif, Université Paris 8, 2018

As regards the exhibition making, Virtual Reality offers the option to mimic unorthodox conditions such as flying motion and experience the exhibition space in a totally new way. Flying through the space, the viewer is able to levitate over the virtual ground, walk through walls and experience the artworks from unusual angles. Those dream-like states begin a new era in the exhibition making. Lyotard’s innovative method of implementing radio signals to indicate artworks proximity is now an easy task for the Virtual Reality Designer. Now, the creation, placement and triggering of sound sources inside the Virtual World requires only several minutes of work. The artists and curators have the opportunity to control the attention of the viewers as well as the way they walk.

In Unreal Engine, even with little or no programming knowledge, you can determine dead zones encapsulating the areas that you do not want the viewer to pass from. With a single command and a little manipulation, the exhibition designer is able to create bound volumes that restrict viewer’s navigation. In figures 164 the green area is the navigation mesh on which the user is able to walk through the controllers’ locomotion and the black areas are places that the user is unable to be transported over. The purple volumes are Navigation Mesh Bounds Volumes and when they are attached to the navigation mesh they deactivate it.

### 3.1 CREATING THE " WHITE CUBE"

After I tested that my application was working with the HTC Vive and that the user was able to navigate accurately through the gallery, I created individual materials and textures and applied them accordingly to every asset. I tweaked lightmap's resolutions and began testing the lighting conditions. Building lights in Unreal Engine is an enjoyable process and the outcome is most of the times decent. In figure 166 we can see my results after baking the scene for the first time. After changing several parameters and bake again I got the results of figure 167.

For years, learning to distinguish different light qualities was the primary goal for the artists. From the ancient Mesopotamia art until the European Modernism, visual artists were studying the way light flows on surfaces and how it changes their form and color. In the 3D world, light continues to have the same importance. Every virtual object depends on the lighting conditions. Bad lighting can destroy a good artwork and a

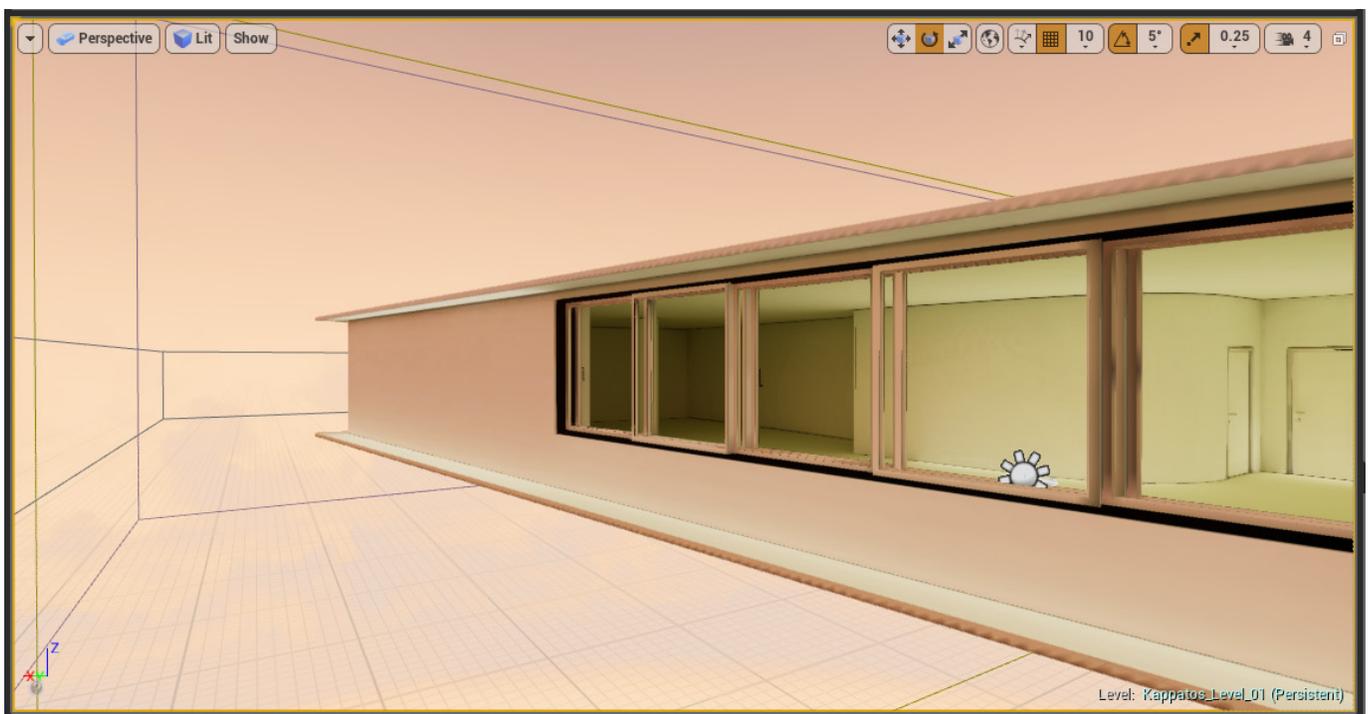


Fig.166\_Screenshot of the exterior rendered with tinted sun in Unreal Engine

mediocre work can look stunning when the lighting conditions are well designed. In figure 166 is a screenshot of the exterior of my 3D Model lighted with a yellowish tinted sun. In comparison with the figures 167 and 168 we can see how the tweaking of a single parameter could produce a totally different result.

With the new technological advances, rendering engines such as V-Ray provide natural results and allow the user to create high-quality two-dimensional renderings in any kind of lighting conditions. In real time applications, photorealism is harder to be achieved but in some cases the results are also impressive.

In the exhibition making lighting design is crucial. Using light sources at will, curators are able to determine points of interest and guide the viewer in space at will. A gallery space which is illuminated completely with white light becomes a sterilized white cube where the artworks are detached from real life. The power of light has been used by every professional in the field in order to create interesting conditions and memorable experiences for the viewer.

### 3.1 CREATING THE " WHITE CUBE"

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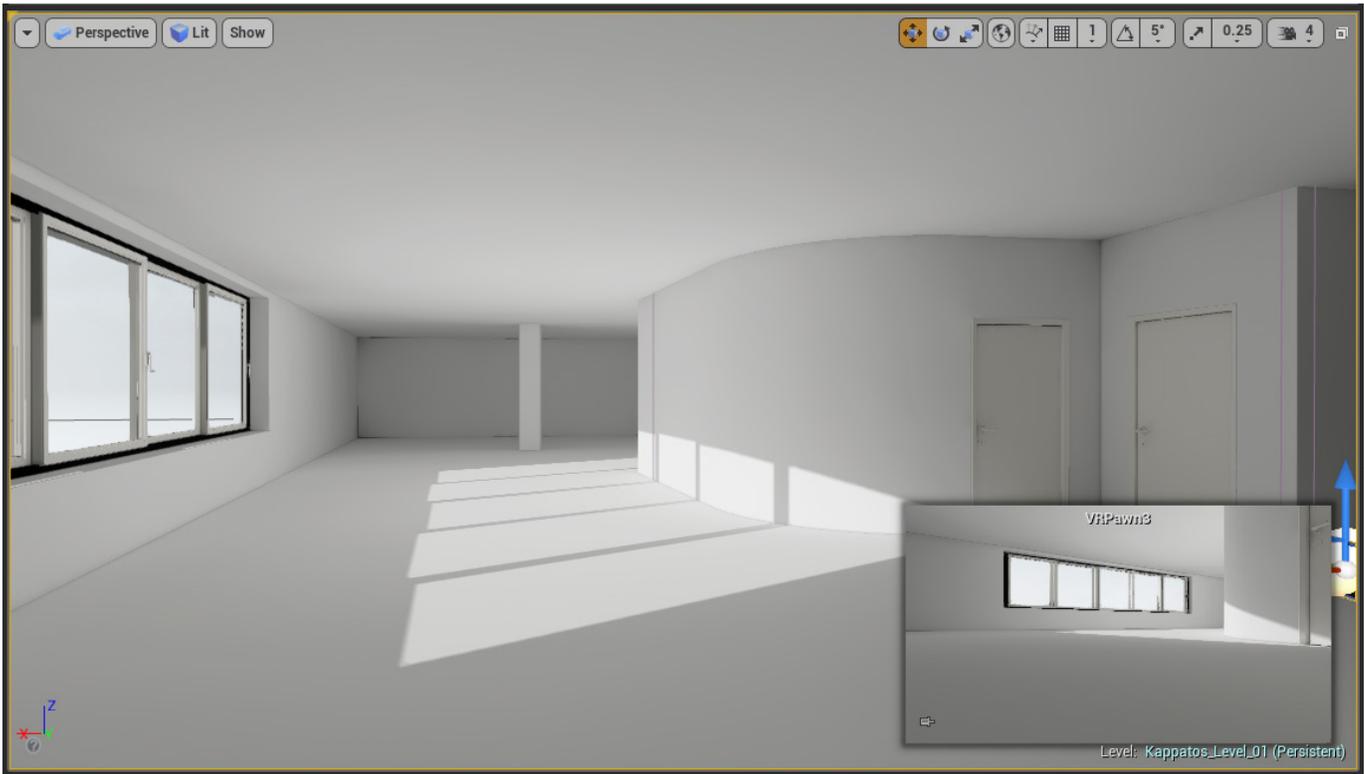
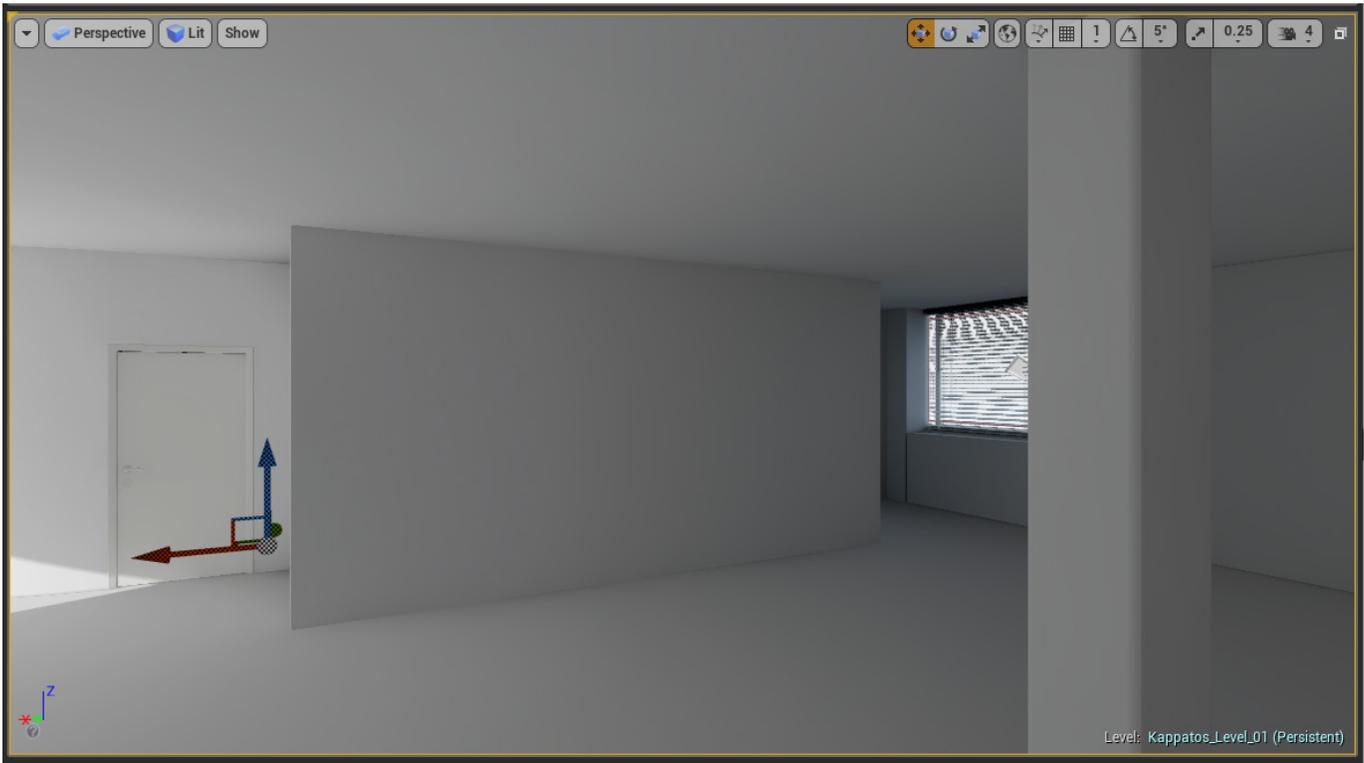


Fig.167\_ 3D Model of Kappatos Gallery rendered in Unreal Engine, 2018

3.1 CREATING THE " WHITE CUBE"



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Fig.168\_ 3D Model of Kappatos Gallery rendered in Unreal Engine, 2018

3.2 ARTWORK CREATION



Fig.169\_No 01, Experiment with Glass and Grass materials, Created in Rhinoceros 3D, Rendered with V-Ray

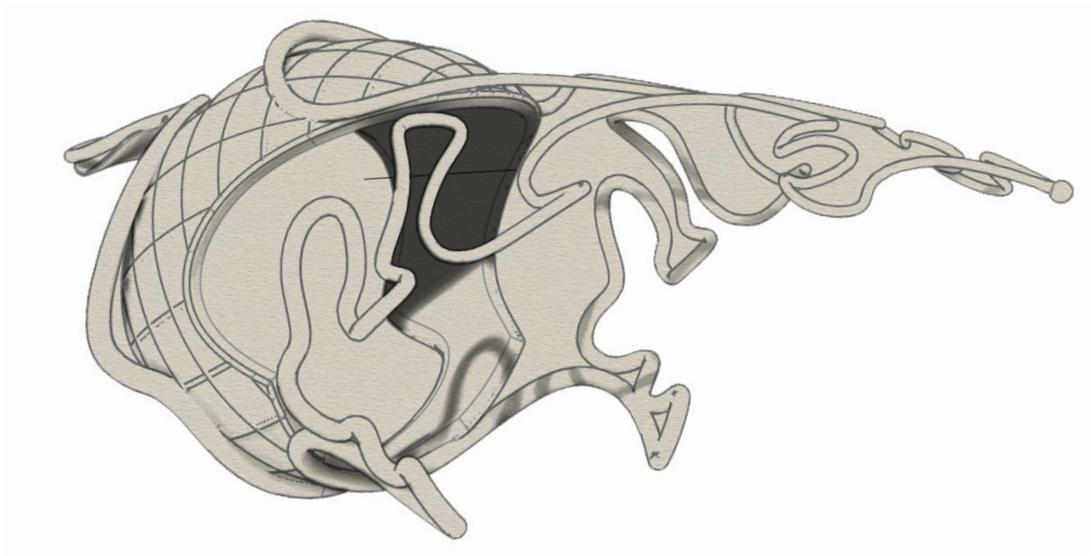


Fig.170\_Study for a metal ring, Created in Rhinoceros 3D, 2016

### 3.2 ARTWORK CREATION

My experiments on the creation of three-dimensional artworks began as a way to visualize artworks and installations that were difficult to be materialized without a high-budget. Three-dimensional space allowed me to work freely and experiment with expensive materials and large scales. In figure 170 is a three-dimensional sketch of a metal ring created in Rhinoceros 3D. Initially, its length was 120 millimeters. When working on a single object, digital space removes your actual feeling of scale. When I was working on the ring, I was perceiving its scale much larger. I decided to design a white cube, cover the model with grass, put it inside a net-like glass and transformed it into a large scale installation. At that time, I modeled five different gallery spaces, lighted them properly and placed my simple experimental structures in white backgrounds.

I soon started to try different designing methods and materials. In page 78 (Fig. 172) is a complex structure that I created using displacement maps of two-dimensional artworks. I produced them using glitching techniques. The two-dimensional artworks became textures for many of my later artworks. The installation of figure 172 is meant to be materialized with numerous enameled wooden sticks placed on top of each other. In figure 173 I was experimenting with parametric design. I created the green structure using the Grasshopper plugin inside Rhinoceros 3D. The parametric design of my bed-like structure gave me the opportunity to have absolute control on its dimensions and number of parts. I was able to tweak its parameters and change its structure in relation to the exhibited space.

In page 79 (Fig. 174) I created a simple structure from basic tubes and I experimented with textures and the possibilities of multiplication. I duplicated the model and placed them in front of the digital artwork that was also used for its texturing. These artworks are meant to be materialized in metal printed aluminum. In Figure 175 is an experiment on the visualization of simple wooden structures. I was trying to create a wooden piece painted with lacquer and partly covered with a paper printing.



Fig.171\_No 02, Experiment with Glass and Grass materials, Created in Rhinoceros 3D, Rendered with V-Ray

3.2 ARTWORK CREATION



Fig.172\_No 03, Experiment with Displacement maps, Created in Rhinoceros 3D, Rendered with V-Ray

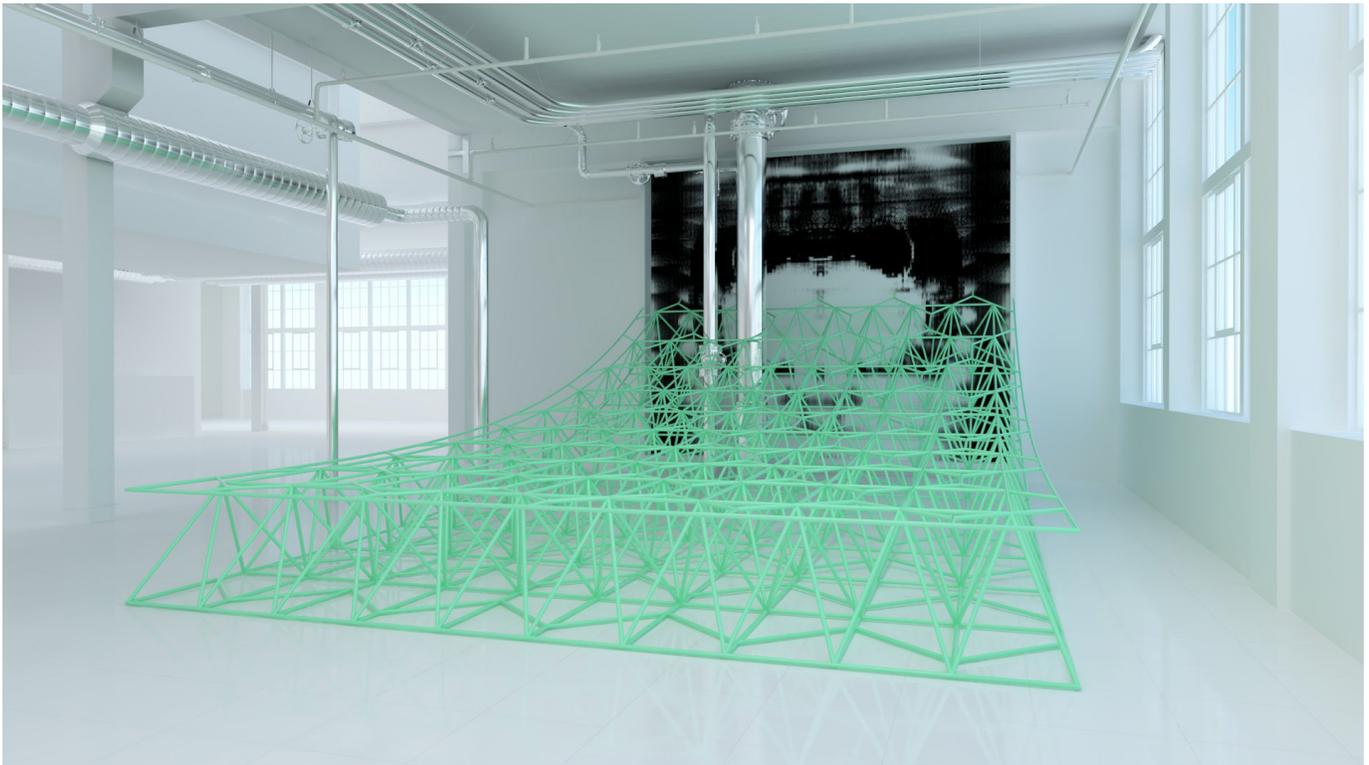


Fig.173\_No 05, Experiment with Parametric Design, Created in Rhinoceros 3D, Rendered with V-Ray

3.2 ARTWORK CREATION

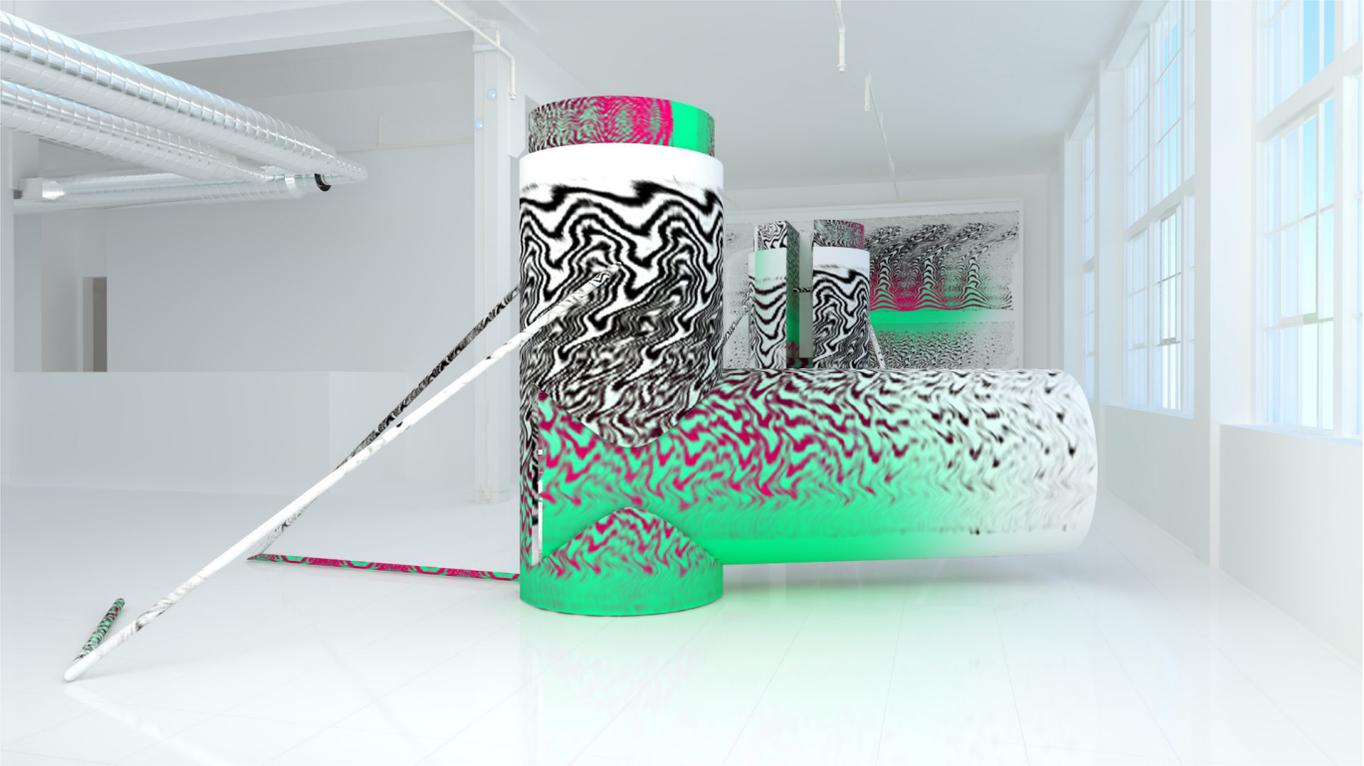


Fig.174\_No 04, Experiment with Textures, Created in Rhinoceros 3D, Rendered with V-Ray

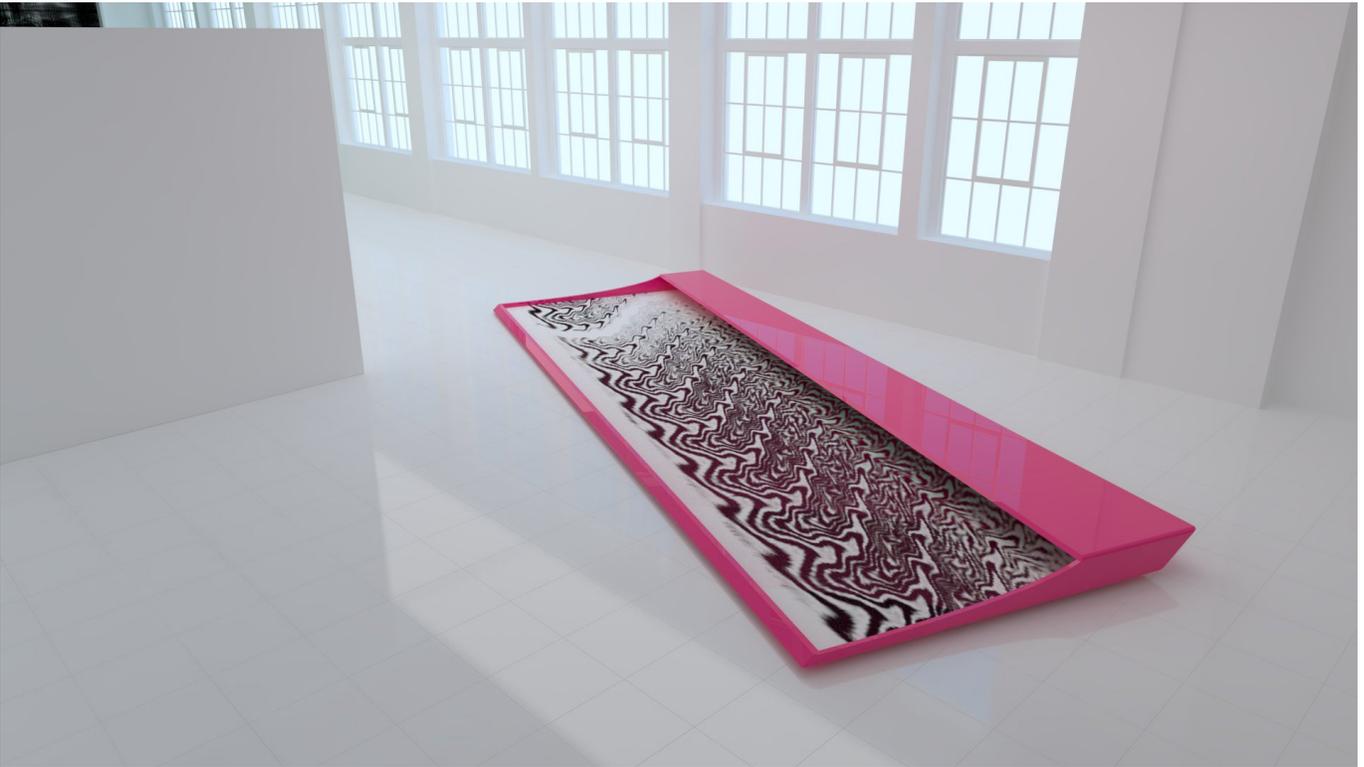


Fig.175\_No 01, Experiment with wooden structure painted with lacquer, Created in Rhinoceros 3D, Rendered with V-Ray

### 3.3 EXHIBITION-MAKING

When I had created the exhibition spaces and an adequate amount of artworks to support five exhibitions, I began designing their placement inside the exhibition space. I extracted still images of my video work and placed them on big screens - one for every exhibition space. I designed each exhibition around the conceptual meaning of each of my videos.

In page 82 (Fig. 177) I covered the walls and ceiling of the gallery with a black and white check pattern and experimented on its impact on the artworks. A total of six artworks are exhibited inside the particular space. In figure 175 we can see four of them. Every artwork in this exhibition is produced by computer-generated processes. When I was creating them I was investigating the notion of error in the creative process. The two-dimensional artwork on the left is created through the processing of more than forty times. I was interfering with image's code changing it, reimporting in photoshop, exported it and changed it again. After several attempts, I produced two glitched artworks. I decided to crop them in a circular format and exhibit them on white panels. The black and white artwork on the right is a video that was produced from still images and datamoshing technics. In the center are exhibited two identical sculptures that are produced from displacement maps I had created through the same processes. The impact of the check pattern on the wall is huge and it enhances the visual complexity of the whole exhibition. In addition, I made use of two of the structural elements of the building as a continuation of my artworks - the horizontal counters are part of the installation that includes the two skin-colored sculptures.

In figure 178, I made use of the metal structure of the loft to support a black and white mosaic. The artwork is impossible to be seen from the ground floor. When the viewer enters the exhibition he experiences sounds that pronouciate randomized letters of the alphabet. He experiences a complicated digitalized symphony of letters and sees a minimalistic arrangement of tubes that enclose digital images. At the back, there is a screen highlighting each letter while on the opposite wall there is a huge mouth-like structure (not seen in the picture). The viewer has to climb the stairs and only then the elaborated mosaic is revealed. The mosaic is made parametrically in grasshopper. I used the heightmap of a glitched image that I had made earlier and I analyzed its grayscale values. Then I placed cubes that corresponded in that values. The number, shape, and dimensions of the cubes were parametric. By elevating the mosaic on the loft, the exhibition design obtained a unique character. The main art piece that would normally be the center of the exhibition had relocated in an otherwise neutral space leaving the viewer to discover it by himself enhancing the element of surprise.

In page 83 (Fig.179), the exhibition is designed again in conjunction with one of my videos. Its title " With love to my aunt " has an ambiguous definition. When translated into Greek it means both "Whit love to my aunt" and " With love to Divinity". The video is a rapid sequence of video material that mocks the Greek attitude against the contemporary financial crisis dealing with the notion of God in a relation to the migration issue. In the video, I used the element of water to convey subconscious messages about the need for clarity and salvation. This exhibition contains six metal prints that are photos of dead mice painted with gold. The notion of divine elevation is enhanced by the white glossy structure that is placed under the windows. The blinding light mixed with video sounds of running water produces a feeling of catharsis. The glossy structure becomes the high altar of a holy church that generates the water of forgiveness. From there, hoses are extended along the exhibition space reaching the open windows of the opposite wall and pouring water outside.

### 3.3 EXHIBITION-MAKING

In figure 180, is captured one of the largest exhibition spaces that I created. It contains the artworks seen in figure 178, the artworks of the figures 173, 174, 175 and ten more. It is an industrial building transformed into a white cube. This exhibition space has a roof extension filled with openings that let the light flow on the ground floor. I decided to treat the floor as it was made from liquid and in its drying stage, it enclosed the oval structure of the main art piece. I created a shape that reminds the body of a whale and textured it with ripples. The two-dimensional artwork on the left is produced through the designs of a whale's bone. The other two circular pieces are glitched pictures of the ocean. At that time I was interested in how a well-hidden narration could affect the viewer subconsciously.

I created all my exhibitions with the aim to transfer the models to Unreal engine and create Virtual reality applications with basic interactions. In the future, I will record a computer-generated voice talking about each one of my artworks and place the sound source in close proximity. The viewer will have the ability to decide either to trigger the voice or not. My next goal is to create different versions of the artworks that will have hidden parts. The user will have the ability to touch and interact with their structure creatively as well as with the exhibition space itself.

I am also planning to design detailed construction plans of my digital artworks and use them for funding. The transition from the virtual to physical space is necessary. By materializing my ideas I have the opportunity to reach the general public and discuss my work in a different context. I have already printed samples of some of my two-dimensional pieces (Fig.176).

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Fig.176\_Photos of metal print samples in my studio in Greece, 2018

3.3 EXHIBITION-MAKING



Fig.177\_ Check pattern, Experiment on exhibition design, Created in Rhinoceros 3D, Rendered with V-Ray



Fig.178\_ Mosaic, Experiment on exhibition design, Created in Rhinoceros 3D, Rendered with V-Ray

3.3 EXHIBITION-MAKING



Fig.179\_ Hose, Experiment on exhibition design, Created in Rhinoceros 3D, Rendered with V-Ray



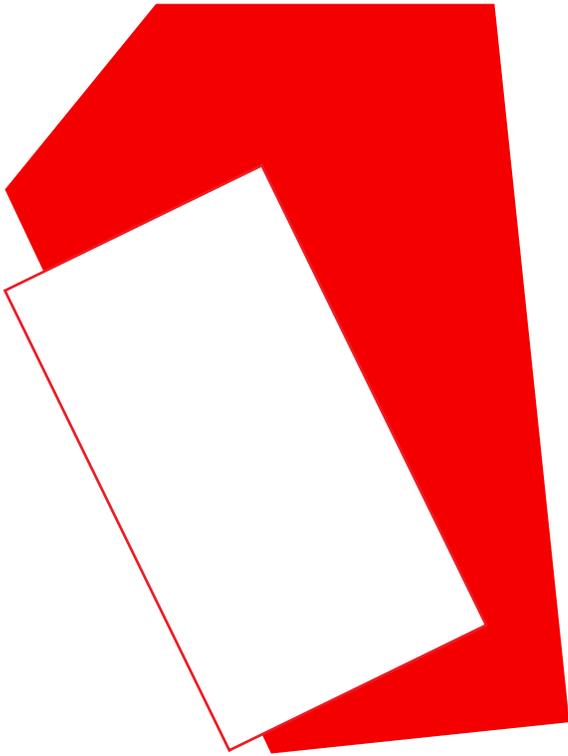
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## 4 CONCLUSION

My goal was to highlight the effect of the White Cube on the exhibited artworks and the possibilities of the implementation of Virtual Reality and CAD technologies on the artistic practice. Through a thorough investigation on the history of art and curating, I analyzed how new technologies shaped the artistic product transforming the notion of art creating the necessary conditions that gave birth to the concept of the White Cube. Through the examples of influential exhibitions, I examined how artists and curators treated the gallery space as well as their attempts to break the rules of the White Cube and invent new ways of exhibiting.

During my experimentation, I collaborated with Kappatos Gallery and recreated a virtual version of the gallery space. Working with Unreal Engine and HTC Vive, I created an empty container for my future artworks and made my files available to the Gallery for future use by other artists. I designed five different exhibition spaces and their containing artworks and produced photorealistic renderings with Rhinoceros 3D and V-Ray. Respecting the actual structure of the exhibition spaces and treated them intuitively as a continuation of my artworks, I experimented on different kinds of materials and scales and used the power of the White Cube to emphasize their attributes.

With Kappatos Gallery being the first gallery in Greece that will provide artists and curators with the actual 3D files of the exhibition space, I hope that other galleries will follow giving contemporary artists and curators the opportunity to implement Virtual Reality technology into their practices. In the next few years, Virtual Reality will eventually become mainstream causing immense effects on the art world. Anticipating the future we could only prepare our skills to welcome the new era.



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Walther Ruttmann, 1921, Lichtspiel Opus I, Germany

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