



**TITLE**

***Decadent Digital Art growing into Architecture for Virtual Reality + Artistic Interpretations. Artworks: slideshow of JPGs from projector.***

***Topic: Art and Architecture for Virtual Reality.***

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**Abstract**

I have been working on my digital artworks since 2010. I started to visualize my dreams, stories through photos, hand drawings, collages from paper. Later I used computer 2D and 3D programs. I created 3d models, rendered them and made collages again. I wanted to enter those 3D virtual spaces, be immersed in the digital world. Because I could only print 2D final digital images or present a computer slide show of digital images as a result.

With the possibilities of the technology of virtual reality is now possible to inhabit virtual space. Since 2015 I have been a PhD student at Czech Technical University in Prague. I figured out that in virtual reality you can cross the boundary between art and architecture. The border of what is the virtual art object, what is the virtual statue, what is architecture for virtual reality no longer exist. I have spent 3 months in Barcelona on visiting research at ETSAB/UPC. I developed a case study architecture for virtual reality. I was interpreting Casa Milà of Antoni Gaudí and the urban plan of Ildefons Cerdà. I was able to design virtual spaces in 3D, but I was not able to transform it into virtual reality with VR equipment yet. That will be my next step.

I deleted functions and activities that are not happening in VR. I formulated a new manifest for architecture in VR:

1. Architecture in VR can float in space, can exist without gravity.
2. Architecture in VR can have no bearing structure or structure that has not connected parts.
3. Architecture in VR can change shapes and moves.
4. Architecture in VR can exist without project documentation.
5. Architecture in VR can be made without many pieces.
6. Architecture in VR architecture can disappear.

I would love to show my experiments during the Generative Art 2018 conference in Verona. It would be the JPGs slideshow.

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***Key words:*** digital art, architecture, virtual reality, virtual environments.

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- [1] Benedikt, Michael, *“Cyberspace: First Steps”*, MIT Press, Cambridge, Massachusetts, 1992
- [2] Manuel Kretzer, *“Alive: Advancement in Adaptive Architecture”*, Birkhauser, Basel, 2014

## ***Decadent Digital Art Growing into Architecture for Virtual Reality. Presenting Paper and Artworks for GA2018***

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### ***Abstract.***

This paper is about the development of my digital art into Architecture for Virtual Reality. I was educated as an architect, after graduation I worked a for few years in architectural offices in London and Los Angeles. In 2009 I got back to the Czech Republic and I worked for Universal Production Partners, UPP as a matte painter and I was creating digital backgrounds for films. I worked with Photoshop a lot and I learned how to create 2D collages very well. Then in 2010, I started to create my own art, in fact, I did collages from magazines with hand sketches. I drew on top of them. One day I used the computer to work on my collages digitally. In 6 months, I was thinking how to use 3D programs to create environments, renderings and how to express stories, emotions that I had in mind. Digital collages from renderings of 3D models were my step two. Every day I did at least one digital collage. I was learning by doing. I was experimenting with digital models and textures with hand sketches. Sometimes I even designed fantasy spaces, fantasy architecture, fantasy concepts. Since 2015, I have been a student at Czech Technical University in Prague, Faculty of Architecture. My topic of the thesis was the Theory of Smart Structures. But step by step I decided to deal more with virtual reality. I wanted to design environment, the architecture for virtual reality. Because I hope that in the future, we as humans will inhabit virtual space and work, relax and have fun online in VR platforms. Even now you can see people concentrated on the screen of their cell phone or tablet when they are in the city.

## 1. Digital Art.

Beatriz Colomina [1] in 2017 during her lecture in Prague asked the question, what will happen to the cities when people will no longer pay attention to the existing reality? My question is what will happen in virtual space if people will be inhabiting that virtual space? Should this space be designed by architects?

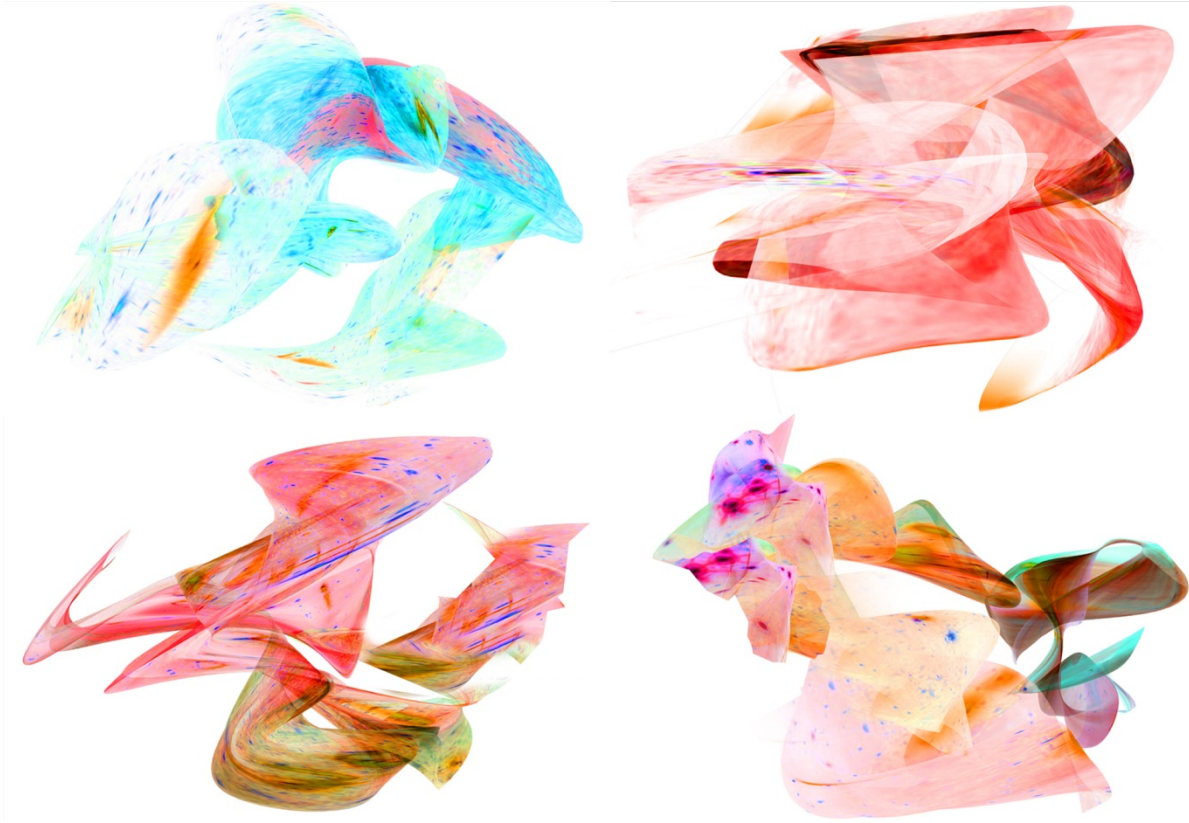
Vincent Guallart [2] writes about the meaning of the word **digital**: “New Technologies make it possible to transform data flow to the point of creating authentic landscapes. Spaces with or **without gravity**. The paradigms and the physical laws of the real world are not necessarily applicable to the virtual world. But this virtual world could be a clone of a real world or **generate infinite possible spaces**, like a world with infinite times and therefore infinite possible, parallel histories. Quasi-real spaces. An acoustic space: a music room. A fractal trajectory. A mountain of infinite dimensions. A cloudy dawn: a city. **Settings for virtual meetings and real use**. Spaces and computer programs accessible from an **intermediate space that can lead to a virtual world full of real content**. ”



Fig.1 Digital Art, renders: *Dear Emotion*, 2010.

In my artwork occurred the topic of the virtual environment, virtual architecture, also interpretations of the virtual universe, space with no gravity, space with emotions. I was trying to figure out how to enter those digital spaces. In fact, when you can **immerse yourself** with the digital virtual space you are already in-between disciplines of digital art and closer to Architecture for Virtual Reality.





*Fig.2 Digital Art, renders: My Private Universe, 2011.*

Word **virtual** by Marcos Novak [2] means: “The virtual-as-construct enabled by the technologies of cyberspace or neurobiology is not to be confused with the virtual-as-ideal that exists as a hermeneutical figure, relativized and beyond all scrutiny. Just as the recognition of the embodied mind renders absolute the Cartesian mind-body division, the virtual-as-construct enacts an embodied that is engaged in the world as we are constructing it, in all its problematic but rich specificity. The virtual-as-ideal, on the other hand, stops short of engaging the underlying matrix of physics and materiality that makes both mind and cyberspace possible; the virtual-as-ideal limits itself to making isolated conventional forms in conventional space, dressing them in rhetorical conceit and leaving the world unchanged. The virtual-as-construct includes the virtual-as-ideal, for rhetoric, has its place in human affairs too, so the issue is not one of exclusion or dichotomy, but rather one of the considerations of the critical concerns of the visual-as-ideal in the production of artefacts within the virtual-as-construct. While the virtual-as-ideal operates by ‘troping’ and interpretation to enact power-plays of membership and exclusion, **the virtual-as-construct encompasses a variety of existing, emerging, and still-to-be invented forms of expression, including liquid architectures, trans architectures, hypersurface architectures, and other as-yet-unnamed alien hybrids of bodyspace and cyberspace.**”



Fig.3 Digital Art, renders: *Virtual Fashion Show Atlantida, 2013.*

My invention is **Architecture for Virtual Reality**. I think it will be a new discipline for architects, artists and designers who would design and create environment and spaces for virtual reality, because of the recent fast development of virtual reality and it's devices like VR glasses and headsets for VR.

Before I got to the topic of Interpretation of Architecture into Architecture for Virtual Reality, I had the topic Smart Structures in 2015 at the Czech Technical University in Prague, Faculty of Architecture. I was interpreting imaginary structures by 3D models from Rhinoceros, these models were my fantasies, creative designs that were inspired by real Smart Structures by Philip Beesley [4] or Manuel Kretzer [3]. From these 3D structures, I did renders, from renders I did 2D collages. But virtual reality works with 3D models only.

In my opinion architects, artists and designers should collaborate on creating the environment and architecture for virtual reality together with VR Specialists. I think that the exchange of knowledge between architect, artist and designer and between IT and VR specialist would really help both sides and they could create regular discipline Architecture for Virtual Reality. Just like when new media film emerged about a hundred years ago, there was no discipline called film architect. But with the new development of film as a media architect in that field was needed.





*Fig.4 Digital Art, renders: Compositional Archontextures-Smart Structures, 2015.*



*Fig.5*

*Digital Art, renders: Compositional Archontextures-Smart Structures, 2015.*



## 2. Digital Art in Virtual Reality.

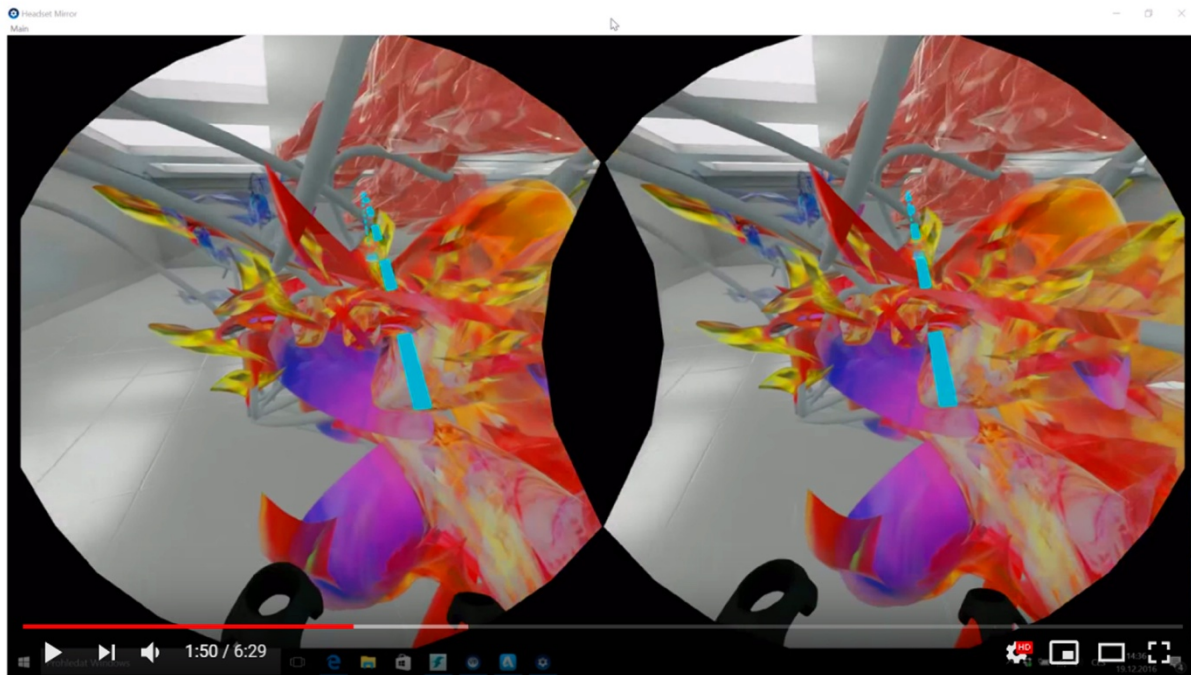
In 2016 I wanted to make the step from my digital artwork into the project in virtual reality. But there are some rules that must be followed in virtual reality that I was not aware of. I didn't know how the transformation of 3D model works into Unity or Unreal Engine. I tried to learn with tutorials myself. I even was a part of VR hackathon in 2016 with VR specialists and programmers. But I was not able to work alone in those programs. In fact, it is not possible to design collages there in VR. The 3D model must speak for itself without 2D corrections. The only possible work in 2D is on textures for 3D models.

I realized that I must simplify my models and use fewer textures and have no layers in 2D. By that time, I designed case study Magic Flower in 2016 and together with the help of MSF Digital office, we created Magic Flower. The size of this 3D model was as large as the size of a room in a virtual gallery. But this scale of it was not enough for me so the next step was to put this 3D object in the city. I redesigned the 3D model and changed the scale to the size of the city. We created in a team of 3 people (Jindřich Ráftl and Marek Kulkovský, the tutor was Miloš Florián) a video Green Travelling. The idea was that in the future people will travel in virtual reality in the body of an avatar to the virtual cities that they cannot visit personally in reality or meet friends and family there.



*Virtual Reality – Magic Flower, 3D object and background, 2016.*

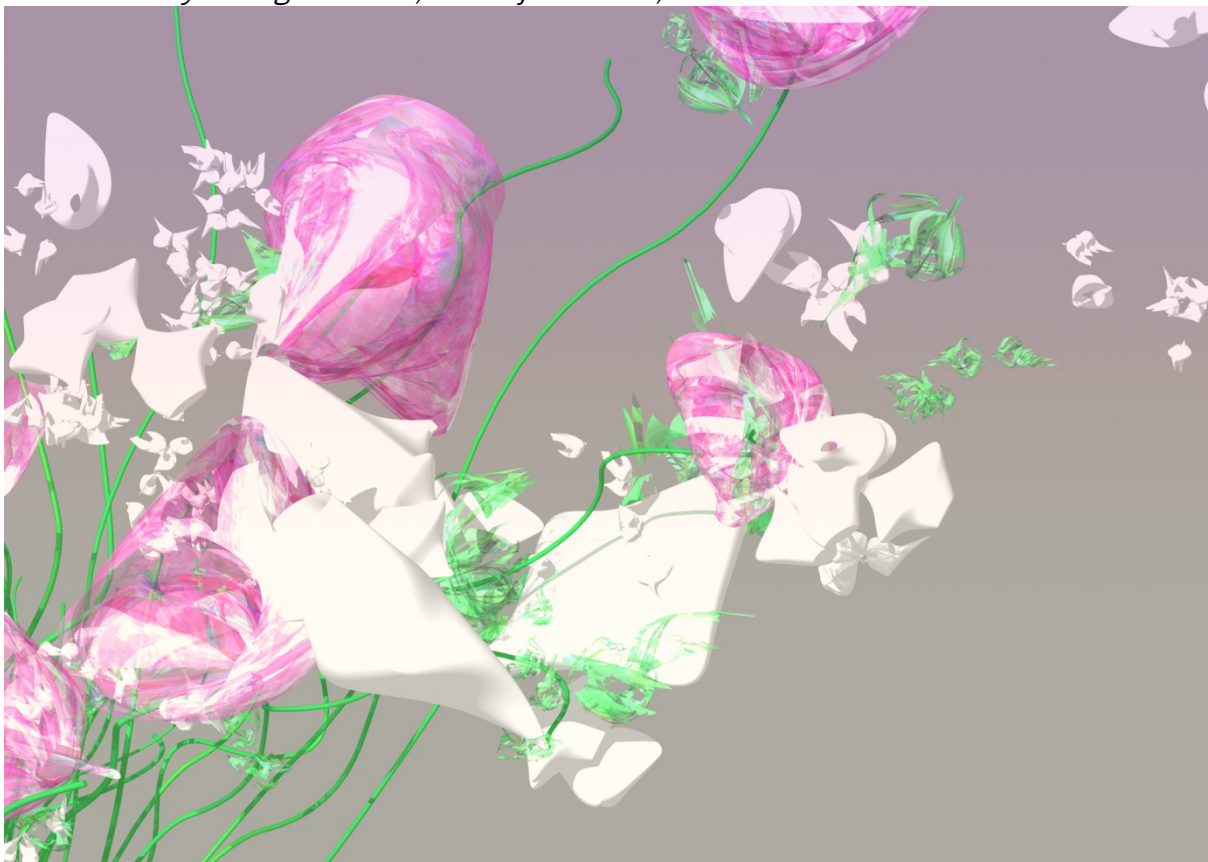
*Fig.6 Art for*



Screen Capture of Virtual Dream Space with MFS Digital

*Fig.7 Art for*

*Virtual Reality – Magic Flower, 3D object in VR, 2016.*



*Fig.8 Art for*

*Virtual Reality – City Flower, 3D object for animation, 2017.*





Fig.9 Art

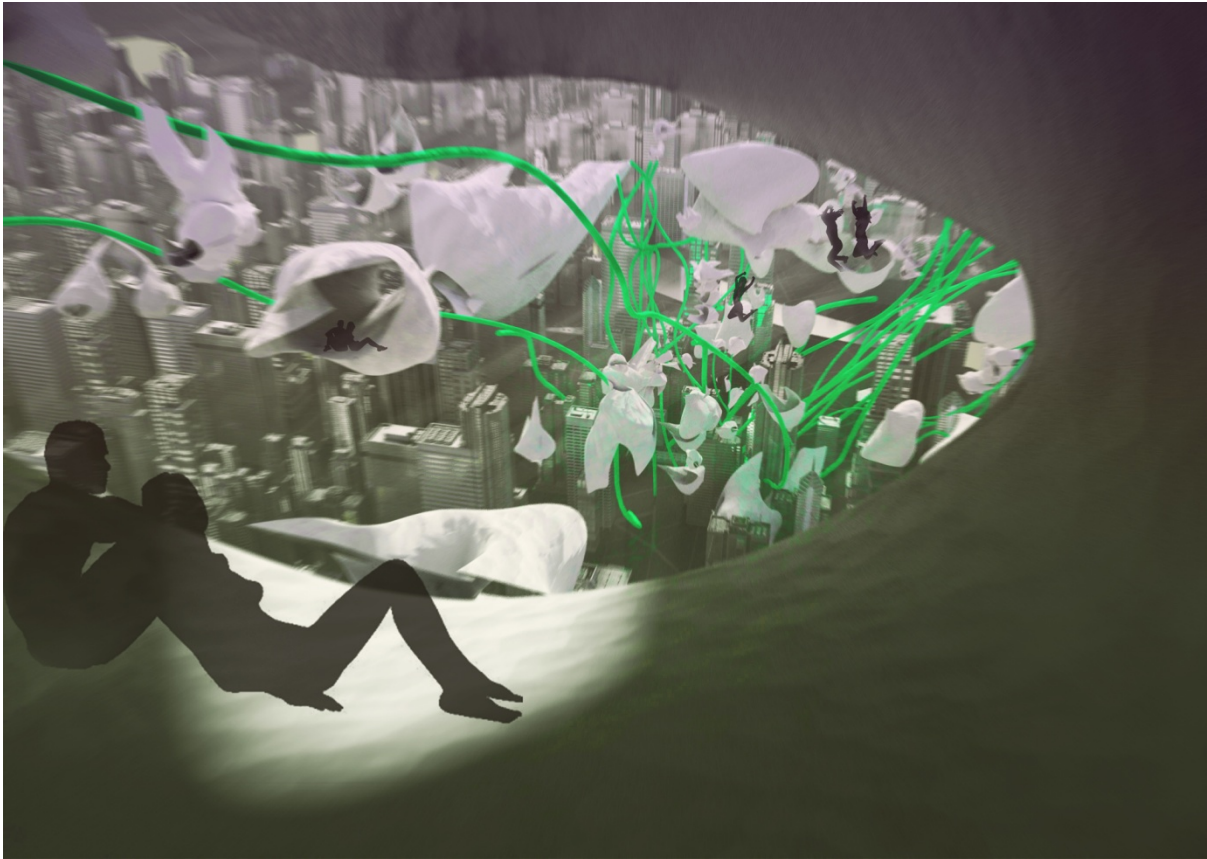
for Virtual Reality – City Flower, 3D object for animation in Blender, 2017.

My method of research is the research by design. I just love the quote from Atelier Olschinsky [5] from Vienna, that was founded by Peter Olschinsky and Verena Weiss. They are operating in various fields such as graphic design, illustration, photography and art direction. Their motto is: ***"It is just so important to work as much as you can, to learn and to be open to new things. The journey is the award."***

I completely agree with this method. My method is learning by doing, testing as many possible designs as I can, try on reflect of what I did and never give up! I was imagining Architecture for Virtual Reality that can be inhabited by the humans in a body of an avatar in VR. I observed existing social VR platforms like VR chat [6], Rec rooms [7], Altspace VR [8], Facebook Spaces [9], Sansar [10], and new VR platform High Fidelity [11]. To be honest, I admire how these platforms, how they technically work in VR, but I am not happy with the design of that virtual environment. If you look at how buildings and interior of those spaces look like, it does not correspond at all with the spatial possibilities that the VR space has. And the design of the environment of IT specialists does not get close to the contemporary architectural scene in design computing.

In Green Travelling video and 3D model, I was missing a ***real interpretation of the architecture***. I realised that the Architecture for Virtual Reality should be ***site specific***. Why? Because if we are creating complicated spaces for virtual meetings we also need to deal with the time, in fact, spacetime. Let's just guess that in the future there will be a very complex system of the virtual environments and people need to meet in them. It is easy to copy the existing time and time zones if we relate existing real places to virtual sites. In fact, if you are virtually in Barcelona and, you are in New York and you are meeting someone from Tokyo, it is easy to check the real time in Barcelona and set the meeting for Barcelona time zone. About time, information-time-space writes also Manuel Gausa [2]: "Today we are conscious of a radical change in our interpretation of space (and

in its associated idea of order), associated with the recent understanding of the theories of chaos and quantum physics. Causal (absolute) time and space and modern (relative) time-space have been succeeded by **'information-time-space'**, open to the action of the local upon the global, and which gives rise to greater indetermination (and instability) **in our understanding of the universe**. At the same time, it has enabled us to introduce, definitively, the influence of combinatorial and diversified, universal and individual information (and its dynamical effects) into the spatial manifestation of processes."



*Fig.10 Art for Virtual Reality – City Flower, 3D object for animation in Blender, 2017.*

When we design as architects, we use a lot of information from the real site and real conditions, also we have the task from the client. We search for the urban plan of the area, plans of the site, we build a model and 3D model of the site. We work with square meters of the program, we organize the program into volumes, we must deal with the light, legislative rules for the site, we search for construction system and we interpret our vision of architecture as well. What would be different in Architecture for Virtual reality?



### 3. Architecture for Virtual Reality.

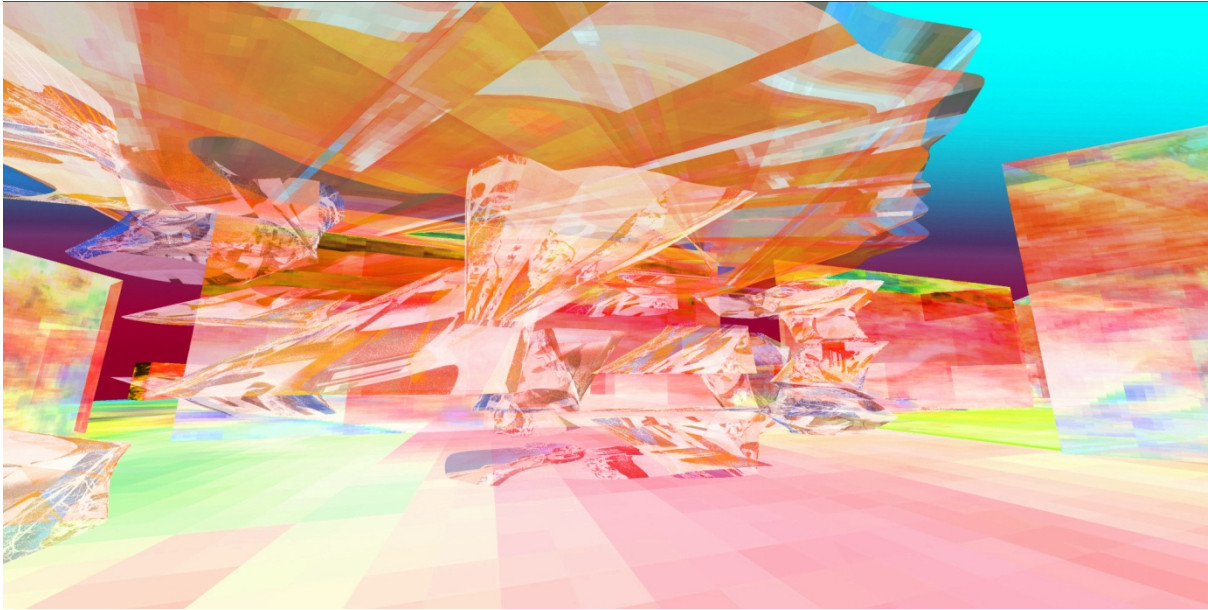


Fig.11

*Architecture for Virtual Reality – Interpretation of A. Gaudí's Casa Mila and I. Cerda's urban plan Example in Barcelona into Architecture for Virtual Reality.*

I wrote during the visiting research at School of Architecture ETSAB Barcelona in 2018 the Manifest how to design Architecture for Virtual Reality, there are some parameters that seem to be constant. During the studies, I used books about urban plan of Barcelona and about Gaudí's architecture [12,13,14,15]. It is the confrontation between the real city, real architecture and my project:

1. Spacetime: Find a place on Earth (the real city) and copy real time on Earth and connect it with the virtual 3D model. If it is for ex. Barcelona, it will have the same time, day, night like on Earth.
2. Context: Observe and study contemporary conditions in this place (the real city), but also historical urban plans and architecture, find unrealized and urban utopian plans for that place and architectural visions. Find out about more about local art.
3. Observe Virtual functions in that 3D model of the virtual city: new functions in VR, meeting of avatars, communication of avatars, relaxation of avatars, work of avatars, shopping, trade.
4. Interpretation of architecture and art of the locality (the real city) in 3D for VR: Be inspired by existing sources like plans, sections, experiences from this real place, photos.
5. Delete from the plans the function that does not exist in VR or they are not needed: Space for sleeping, toilets, bathrooms, lifts, stairs, corridors. Delete bearing construction of the building. Transport in streets by cars, bus, bikes. Delete from architecture in VR doors, windows, ceilings, chimneys, technical support of the building. Create openings that are needed.
6. Create 3D space, that reflects those new virtual function, use textures from the real place (the real city). For example, various areas in Barcelona would require similar approaches to designing architecture in VR. It is similar problem when we built architecture in the real city, it depends on the selected area in the real city and how we can derive the architecture in VR from that. I didn't try various locations in Barcelona, but I tested many variants in the

same area. My perception of my research goals/problem changed when I made the VR models for Barcelona.

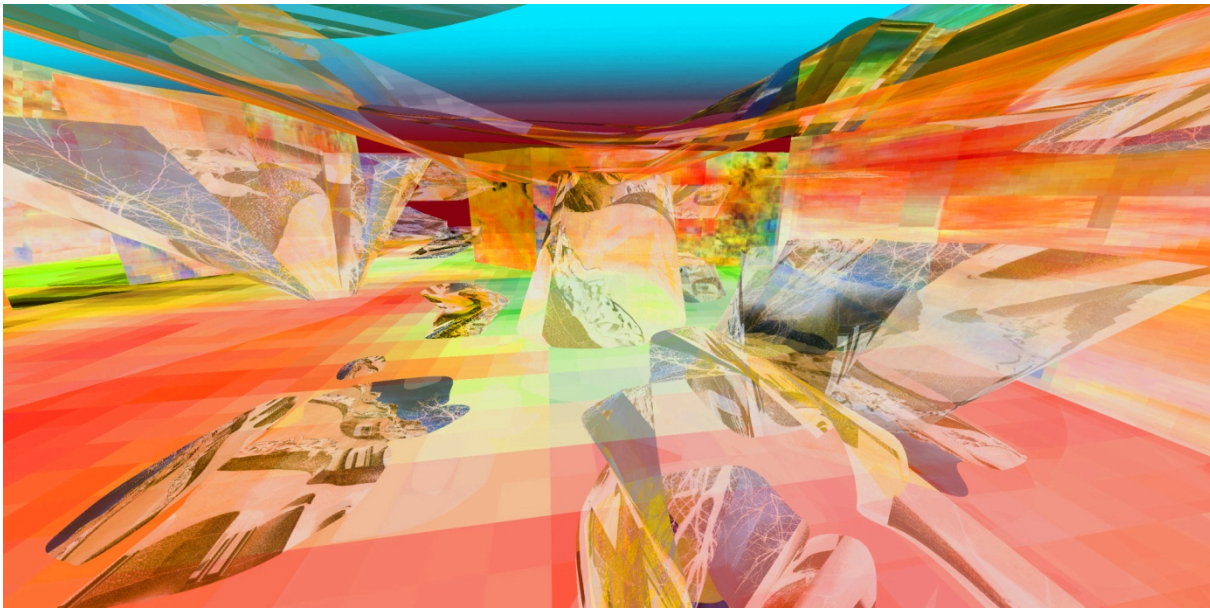


Fig.12

*Architecture for Virtual Reality – Interpretation of A. Gaudí's Casa Mila and I. Cerda's urban plan Eixample in Barcelona into Architecture for Virtual reality, day summer.*

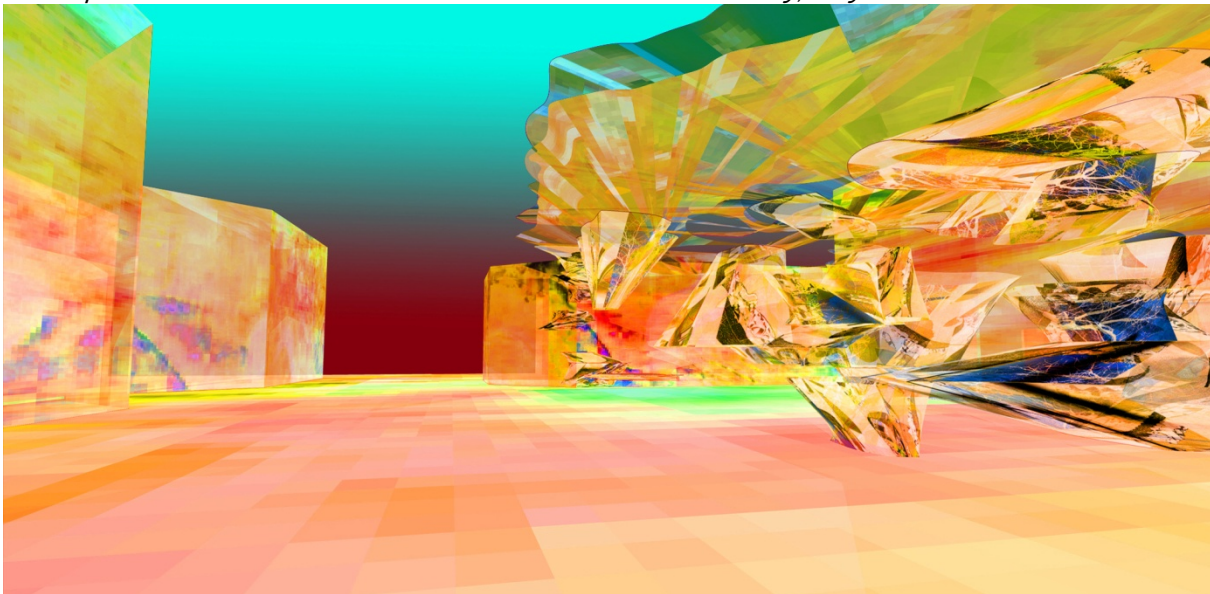


Fig.13

*Architecture for Virtual Reality – Interpretation of A. Gaudí's Casa Mila and I. Cerda's urban plan Eixample in Barcelona into Architecture for Virtual reality, day, summer.*

According to my Manifest Architecture for Virtual Reality, I designed and interpreted area in Eixample in Barcelona with the Casa Milá building. I was thinking about the different light condition and different temperatures that should be also interpreted into a 3D model in virtual reality. I used 3 textures for the 3D model and I changed colours in renderings afterwards. I used warm colours for warm days in summer and during the daytime. I also used different a palette of colours for night time.

I figured during the designing case study Barcelona Architecture for Virtual Reality, that almost half of my design process was the architectural way of thinking and the rest was my artistic approach.

Another question was how the **avatar should look like?** I wanted to delete differences between people. Avatars would have no visible: sex, age, race, occupation, identity in virtual public spaces.

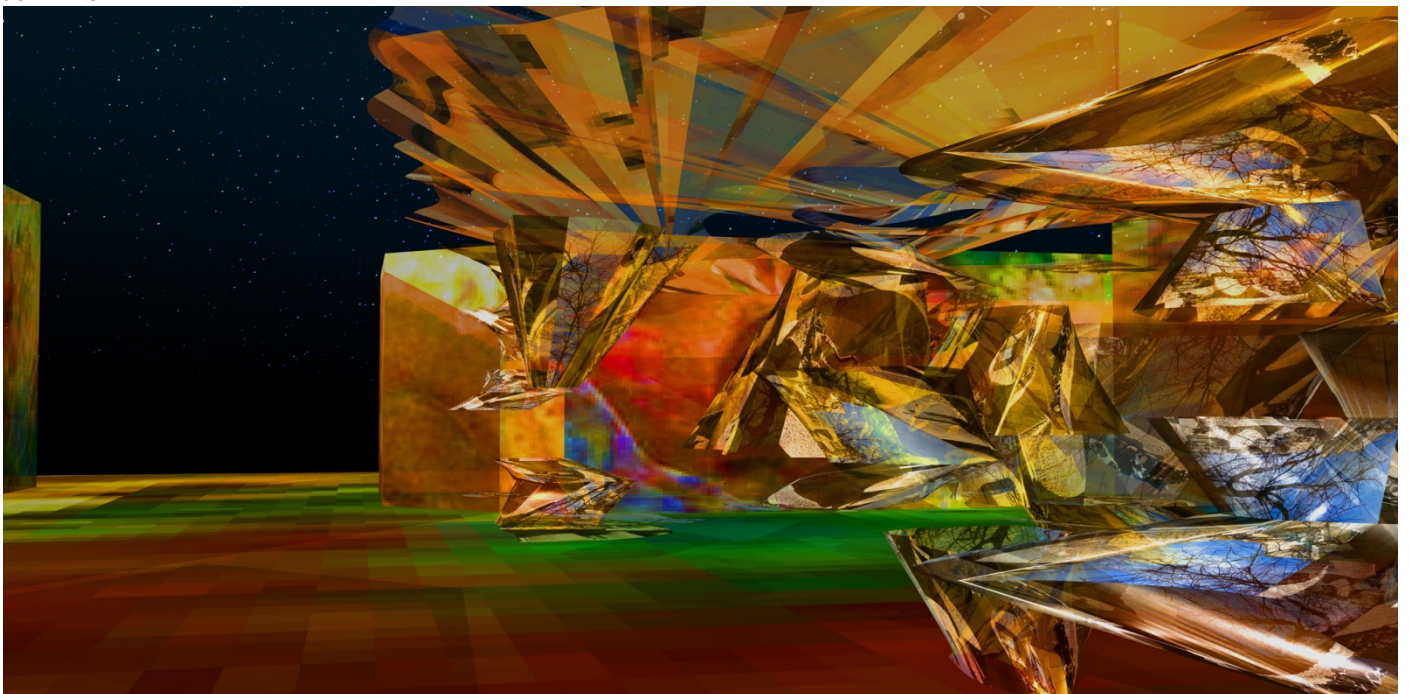


Avatars should have the human figure with green colour because green is not associated with male or female. Avatars would be able to reveal their identity and a 3D scan of their real personality if they wanted, in private spaces or even in public spaces.



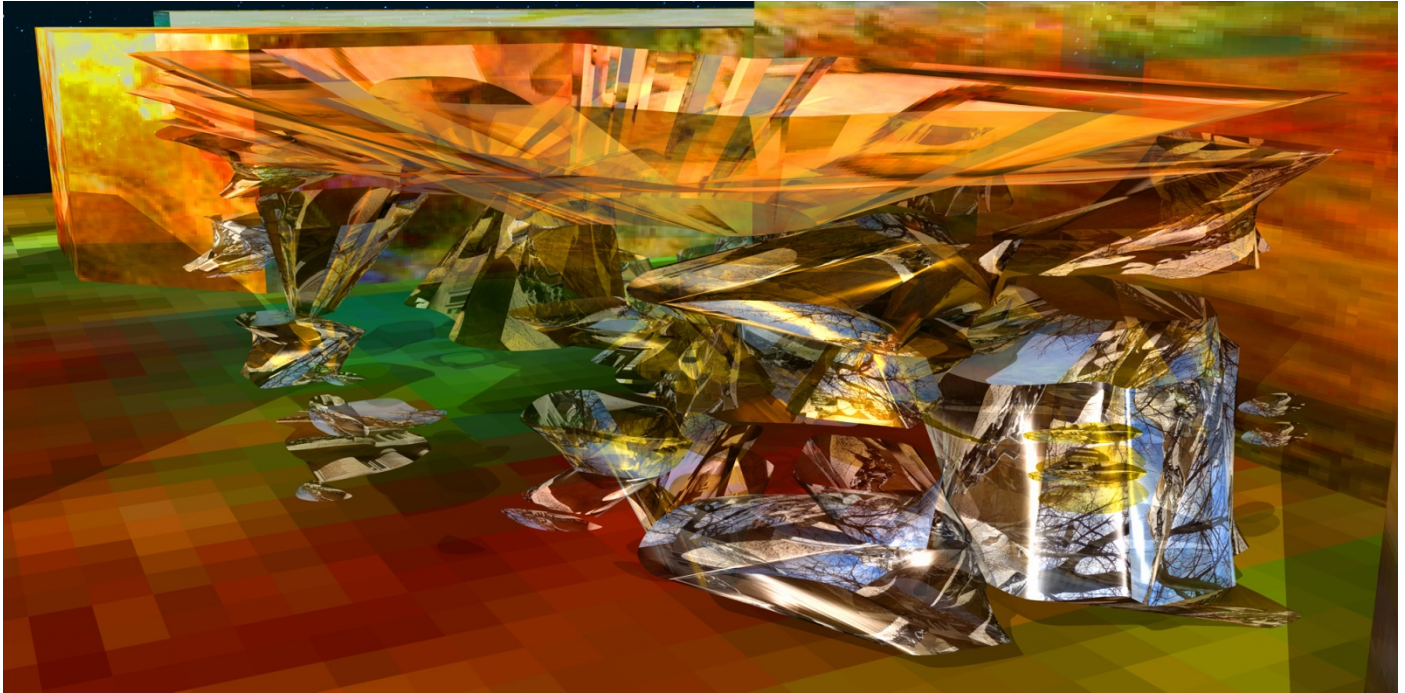
*Fig.14 Architecture for Virtual Reality – Interpretation of A. Gaudí's Casa Mila and I. Cerda's urban plan*

*Eixample in Barcelona into Architecture for Virtual reality, day, summer.*



*Fig.15 Architecture for Virtual Reality – Interpretation of A. Gaudí's Casa Mila and I. Cerda's urban plan Eixample in Barcelona into Architecture for Virtual reality, night, winter.*





*Fig.16 Architecture for Virtual Reality – Interpretation of A. Gaudí's Casa Mila and I. Cerda's urban plan Eixample in Barcelona into Architecture for Virtual reality, night, winter.*

#### **4. Conclusion, Findings.**

After so many tests with digital art, I have to say it would be easy to say that it is not enough for me to present the digital artwork only in 2D renders. I was searching for a long time the right medium to transform digital models into 3D, so you can experience them as a virtual space. With the technology of virtual reality is all that possible and I tried to define a new direction in architecture and that is Architecture for Virtual Reality. I also I formulated also a new manifest for architecture in VR:

1. Architecture in VR can float in space, can exist without gravity.
2. Architecture in VR can have no bearing structure or structure that has not connected parts.
3. Architecture in VR can change shapes, colours and can move.
4. Architecture in VR can exist without project documentation.
5. Architecture in VR can be made without many pieces.
6. Architecture in VR architecture can disappear.

Celestino Soddu [16] wrote in his paper for Generative Art Conference in 2017:

“My generative approach in the early eighties, ***I defined my aim: representing my vision in architecture with codes, following the Renaissance cultural approach: art and science together as a logical interpretation of existing and possible worlds.*** This changed my design approach from forming to transforming, from shapes to processes, from drawings to algorithms. But I didn't change the structure of my creativity that continues to follow the structure of mosaic: rhythm, riffs, and melody. This approach had a chance: the possibility to directly design my vision, my idea of



architecture and Ideal cities before carrying out any possible result, together with the possibility to directly managing the complexity.

***The Idea is performed by constructing something like an artificial DNA, a generative code able to generate endless variations of 3D models of cities and architectures, all characterized by my vision but all different, unique and unpredictable, as in Nature."***

I think that we as architects, we are constantly working on different approaches how to design architecture and we are redefining what architecture embraces. I hope that media like virtual reality will bring other possibilities how to creatively develop the new direction in architecture, Architecture for Virtual Reality.

Just like in the past the invention of computers influenced how architects design architecture by design computing methods.

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