UNIVERSITÀ DI PARMA
DIPARTIMENTO DI INGEGNERIA E ARCHITETTURA
CORSO DI LAUREA IN ARCHITETTURA E CITTA' SOSTENIBILI

BUILDING INFORMATION MODELING:
DIGITAL MODELING OF ARCHITECTURE
DIGITAL VISUALIZATION OF PROJECT

A.A. 2022-2023, Prof. Sandra Mikolajewska
02/05/2023

THE SLIDES PRESENTED IN THE CLASSROOM ARE INTENDED ONLY AS A REFERENCE FOR THE LECTURE.

THE CONTENT OF THESE SLIDES IN NO WAY REPLACES THE RECOMMENDED REFERENCE BIBLIOGRAPHY**.**

RENDERINGS PLAY A DECISIVE ROLE IN THE COMMUNICATION OF PROJECT.

BUT WHAT DOES THE WORD **RENDERING** MEAN?

Nasce a Castrovillari nel 1982, si laurea con lode in Architettura presso la Sapienza Università di Roma e nel 2010 forma con l'arch. Lorena Greco lo studio Atelier Crilo, in cui si occupa di progettazione e comunicazione architettonica.
Nel 2015 Atelier Crilo viene selezionato tra le migliori agenzie di visualizzazione 3D dalla D2 Conference di Vienna. I progetti e le illustrazioni dello studio sono stati pubblicati su riviste internazionali, tra le quali Domus, l'Arca, Evolo, Wallpaper*, e su siti specializzati di computer grafica e visualizzazione architettonica, come Ronen Bekerman, CGsociety, CGarchitect. Il lavoro nell'ambito della rappresentazione, con disegni, progetti e video installazioni, è stato esposto in una mostra personale dal titolo *Paesaggi ibridi* mentre nel 2017 lo studio è premiato tra i *CGarchitect awards* nella categoria *commissioned film*. All'attività professionale l'autore affianca la ricerca e l'insegnamento per università e master, tra i quali il Master in Architettura del Paesaggio e del Giardino dello IUAV, mentre nell'ambito del Dottorato di Ricerca in Storia Disegno e Restauro dell'Architettura svolge attività di tutoraggio e di assistenza nei corsi di Disegno per la Comunicazione, Rappresentazione Digitale e Cultura Visuale, tenuti dal prof. Fabio Quici.

SAPIENZA
UNIVERSITÀ DI ROMA

Dipartimento di Storia, Disegno e Restauro dell'Architettura

Dottorato in Storia, Disegno e Restauro dell'Architettura
Coordinatrice prof.ssa Donatella Fiorani

Sezione B - Disegno dell'Architettura
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Scuola Nazionale di Dottorato in Scienze della Rappresentazione e del Rilievo

Sede centrale di coordinamento
Sapienza Università di Roma

Direttrice
Prof.ssa Laura Carnevali

CRISTIAN FARINELLA
L'immagine costruita
La formazione, il ruolo e le tecniche del CG artist nella visualizzazione architettonica

Scuola Nazionale di Dottorato in Scienze della Rappresentazione e del Rilievo

Cristian Farinella

L'immagine costruita

La formazione, il ruolo e le tecniche del CGartist nella visualizzazione architettonica

Abstract

The research focuses on the cultural background of the computer graphics artist (CG artist) and on the primary methods by which computer-generated imagery (CGI) is created within architectural visualization (archviz), to highlight the leading role of visual arts and visual culture in the development process of rendering.
The increase of computer representation possibilities led the architect to outsource the project communication employing professionals and visualization companies.
In the current period, the discussion of tools, techniques, and disciplines at the base of architectural rendering is not very accurate, despite the high demand for images and architectural illustrations.
Furthermore, to be overlooked is the relationship with the tradition of painting and architecture drawing, where the rendering is in historical continuity. The current CG artist shares with the perspectivist painter — or renderer from the past — much of the compositional strategies underpinning a compelling and persuasive visual communication.
This research adopts the historical parallel between the two figures to understand how, despite differences in the tools and technologies used, the links between the pictorial image construction and architectural rendering are now merged in the techniques of digital processing, compositing, matte painting and in the phenomenon here defined as natural visualization.

In copertina
Oteiza House (2015), progetto di Atelier Crilo, illustrazione a cura dell'autore.

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UNIVERSITÀ DI ROMA

TESI DI DOTTORATO DI RICERCA - CICLO XXXI - 2015/2018
Dipartimento di Storia, Disegno e Restauro dell'Architettura
Dottorato in Storia, Disegno e Restauro dell'Architettura
Sezione B - Disegno dell'Architettura - settore scientifico disciplinare ICAR 17

Crilo

Work

Studio

Research

Contact

Co-founders

We are a design duo — partners in work and in life — committed to creating high-end CG imagery and artistic illustrations of architecture. We work with the same enthusiasm of the first day, bringing with us, in every project, the passion for drawing and visual arts.

To the professional activity we connected the academic research, coming up to teach and lecture in universities, masterclasses, and academies, read more...

Recently Lorena became director of ViDI, a dedicated Master to Visual Design and 3D

CRISTIAN FARINELLA — cristian@ateliercrilo.com

LORENA GRECO — lorena@ateliercrilo.com

GIULIA ♥ — meow@ateliercrilo.com

TODAY, IN MANY CASES, PROJECT COMMUNICATION IS OFTEN HANDLED BY EXTERNAL PROFESSIONALS, SUCH AS **CG ARTIST**. OFTEN, THE AUTHORS OF THE RENDERING ARE NOT THE AUTHORS OF THE PROJECT.

A COMPUTER GRAPHICS ARTIST, ALSO KNOWN AS *ARCHVIZ ARTIST, 3D ARTIST, 3D VISUALIZER, 3D VISUALIZATION ARTIST, 3D ILLUSTRATOR*; SOMETIMES *GRAPHIC DESIGNER*, IS A PROFESSIONAL WHO CREATES MOVING IMAGES, STILL IMAGES OR VISUAL EFFECTS WITH COMPUTERS, DIGITAL TOOLS AND SOFTWARE PROGRAMS.
IN THE FIELD OF ARCHITECTURAL VISUALIZATION, IS A PROFESSIONAL WHO PRODUCES 3D GRAPHICS RELATED TO ARCHITECTURAL PROJECTS.

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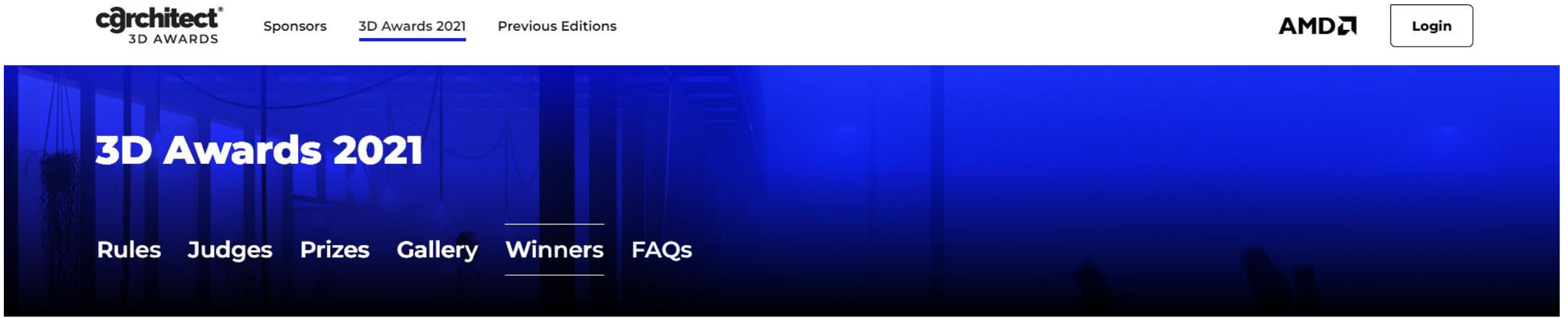
RENDERING IS THE PROCESS OF GENERATING BITMAP IMAGES (2D) FROM 3D MODELS VIEWS (IT BASICALLY MEANS TAKING A PHOTOGRAPH OF THE SCENE WITH A VIRTUAL CAMERA).
RENDERING CAN BE DEFINED AS THE PROCESS THAT LEADS FROM THE DIGITAL REPRESENTATION OF A THREE-DIMENSIONAL SCENE, DEFINED IN THE MODELLING PHASE, TO A TWO-DIMENSIONAL PROJECTION OF THE VIEW OF THE SCENE [Bartolomei et al., 2021]

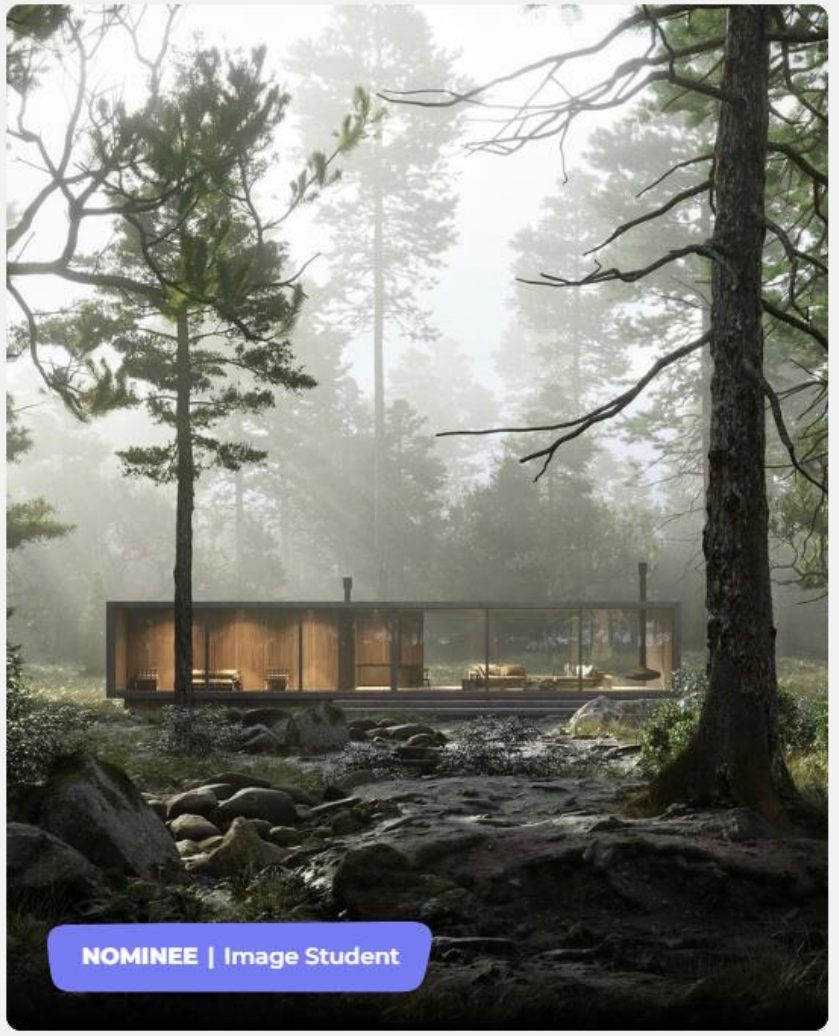


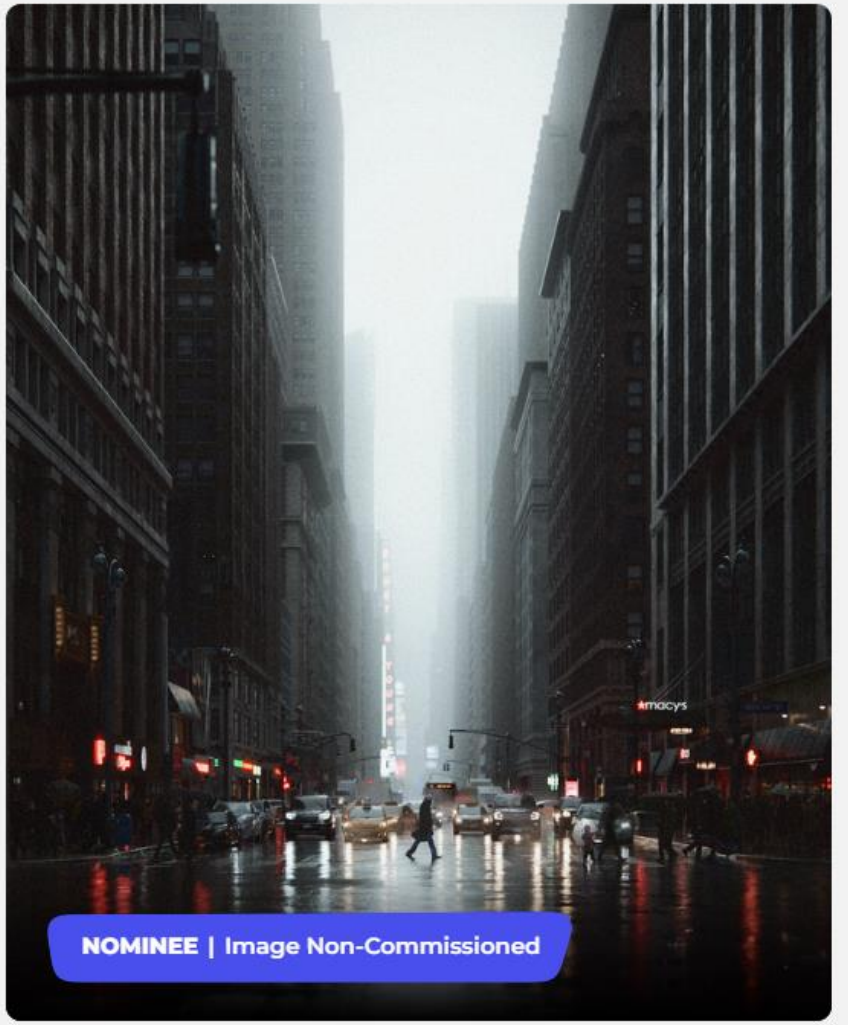
Winners

"This year we had some amazing winners, check them out!

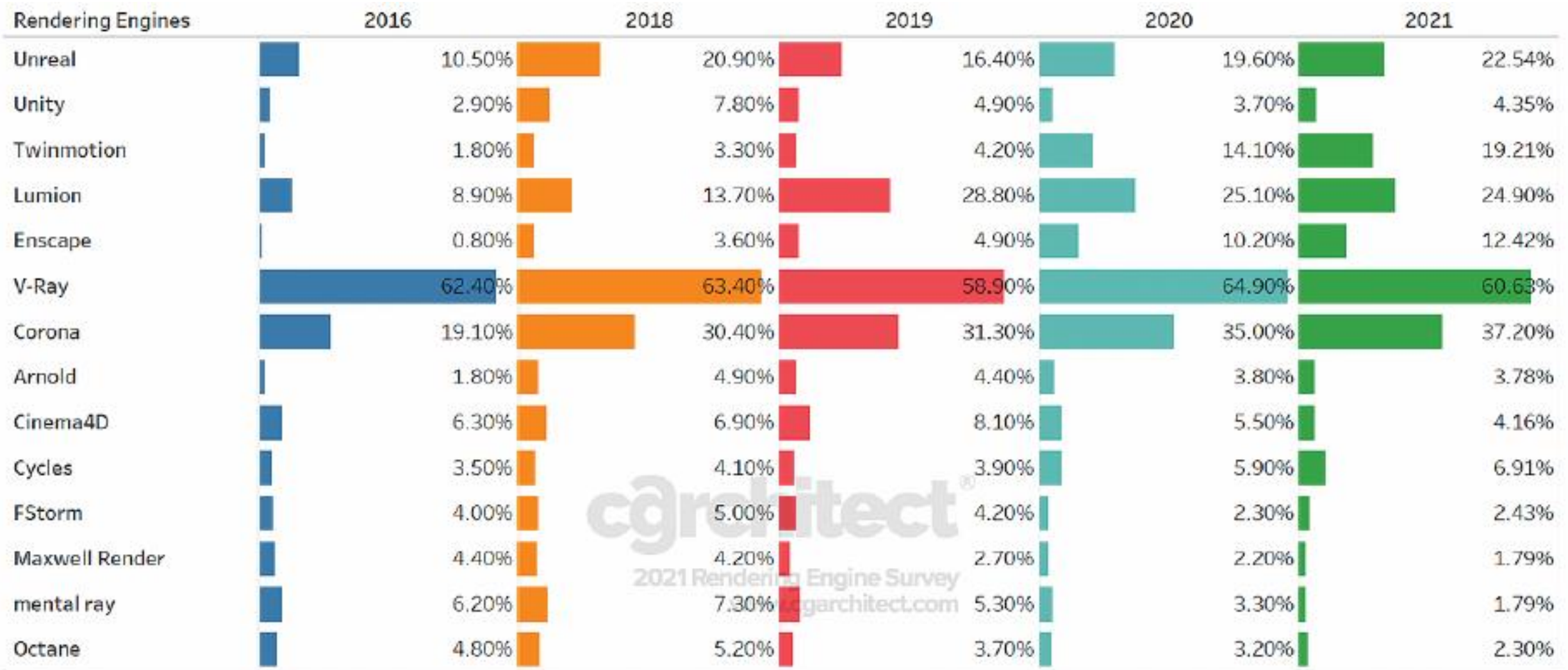
All Image Film Interactive

Commissioned Non-Commissioned Student


NOMINEE | Image Student


NOMINEE | Image Non-Commissioned

TOP RENDERING ENGINE MARKET SHARE TRENDS



Rendering Engines	2016	2018	2019	2020	2021
Unreal	10.50%	20.90%	16.40%	19.60%	22.54%
Unity	2.90%	7.80%	4.90%	3.70%	4.35%
Twinmotion	1.80%	3.30%	4.20%	14.10%	19.21%
Lumion	8.90%	13.70%	28.80%	25.10%	24.90%
Enscape	0.80%	3.60%	4.90%	10.20%	12.42%
V-Ray	62.40%	63.40%	58.90%	64.90%	60.63%
Corona	19.10%	30.40%	31.30%	35.00%	37.20%
Arnold	1.80%	4.90%	4.40%	3.80%	3.78%
Cinema4D	6.30%	6.90%	8.10%	5.50%	4.16%
Cycles	3.50%	4.10%	3.90%	5.90%	6.91%
FStorm	4.00%	5.00%	4.20%	2.30%	2.43%
Maxwell Render	4.40%	4.20%	2.70%	2.20%	1.79%
mental ray	6.20%	7.30%	5.30%	3.30%	1.79%
Octane	4.80%	5.20%	3.70%	3.20%	2.30%

THE PROCESS OF CREATING A RENDERING IS SIMILAR TO THE DESIGN PROCESS OF AN ARCHITECTURE; IT REQUIRES SPECIFIC **CHOICES** AND **PREPARATORY STUDIES** (ON COMPOSITION, SETTINGS, ATMOSPHERE, ETC.).

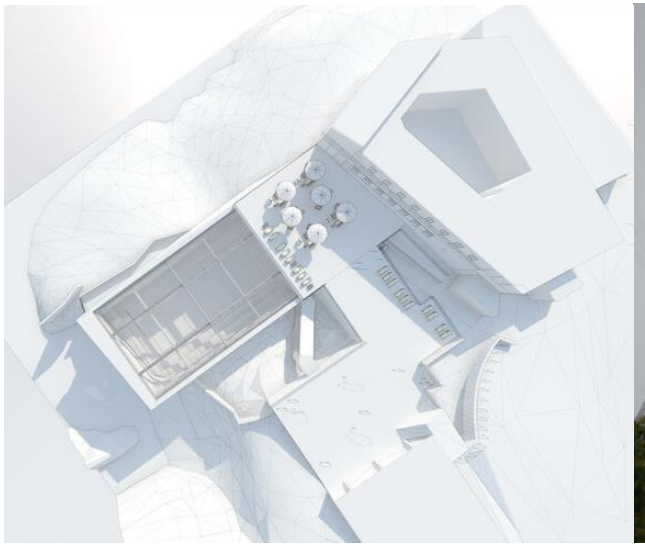
THE RENDERING IMAGE **NEEDS TO BE "CONSTRUCTED"**.

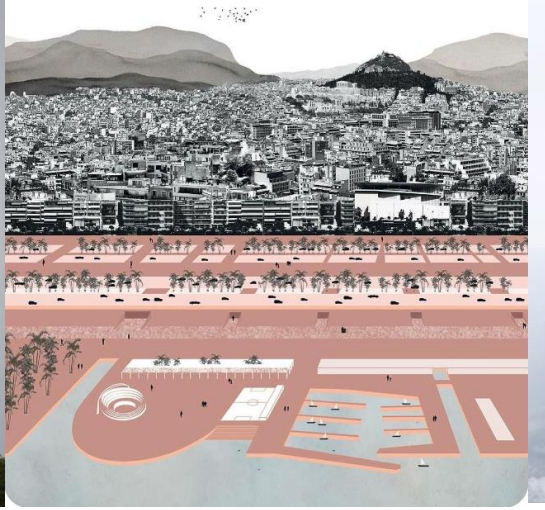
WHY DO WE CREATE RENDERINGS?
- RENDERINGS ALLOW TO PREFIGURE AND TO CONTROL DESIGN CHOICES;
- RENDERINGS ALLOW THE PROJECT TO BE BETTER COMMUNICATED TO CLIENTS;
- RENDERINGS ALLOW THE PROJECT TO BE ILLUSTRATED AT DIFFERENT SCALES OF REPRESENTATION (FROM GENERAL TO PARTICULAR);
- RENDERINGS ALLOW VISUALIZATION OF BUILDINGS BELONGING TO THE PAST;
- …

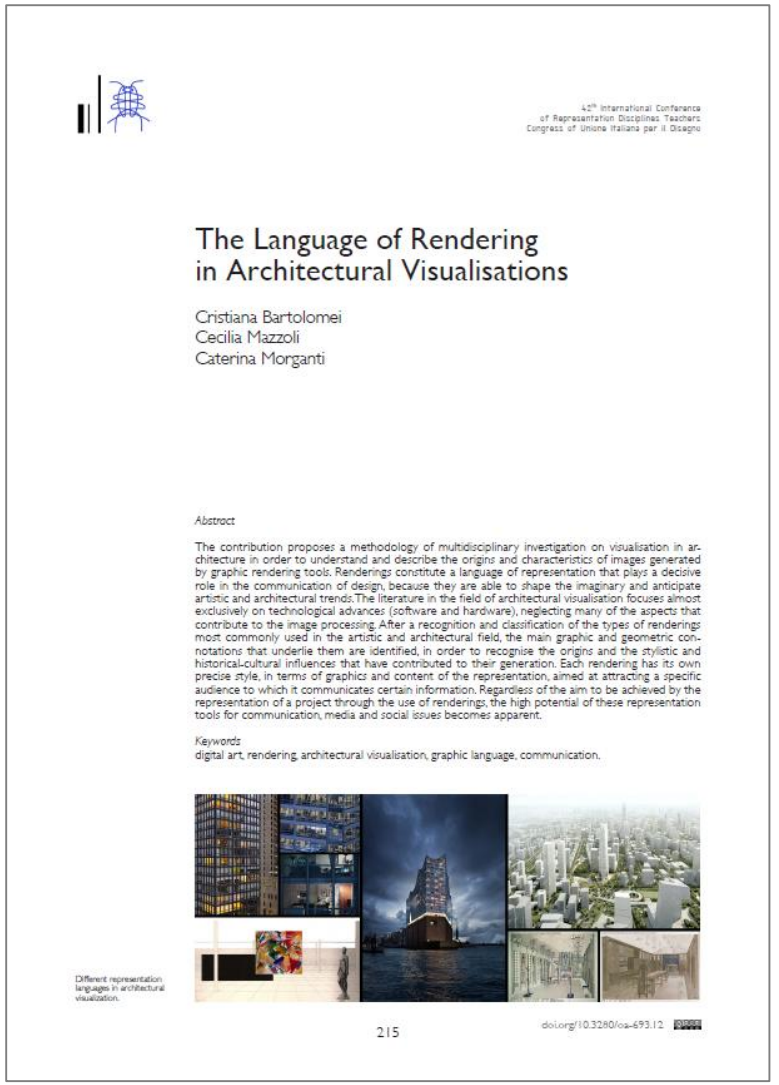
RENDERING IS THE PROCESS OF GENERATING BITMAP IMAGES FROM 3D MODELS VIEWS (IT BASICALLY MEANS TAKING A PHOTOGRAPH OF THE SCENE WITH A VIRTUAL CAMERA).

THERE ARE SEVERAL TYPES OF RENDERING:

- **CLAY RENDER** [UNTEXTURED RENDERING];
- **PHOTOREALISTIC RENDERING**;
- **NON-PHOTOREALISTIC RENDERING [COLLAGE RENDERING; DIGITAL PAINTED RENDER, etc.]**





42th International Conference
of Representation Disciplines Teachers
Congress of Unione Italiana per il Disegno

The Language of Rendering in Architectural Visualisations

Cristiana Bartolomei
Cecilia Mazzoli
Caterina Morganti

Abstract

The contribution proposes a methodology of multidisciplinary investigation on visualisation in architecture in order to understand and describe the origins and characteristics of images generated by graphic rendering tools. Renderings constitute a language of representation that plays a decisive role in the communication of design, because they are able to shape the imaginary and anticipate artistic and architectural trends.The literature in the field of architectural visualisation focuses almost exclusively on technological advances (software and hardware), neglecting many of the aspects that contribute to the image processing. After a recognition and classification of the types of renderings most commonly used in the artistic and architectural field, the main graphic and geometric connotations that underlie them are identified, in order to recognise the origins and the stylistic and historical-cultural influences that have contributed to their generation. Each rendering has its own precise style, in terms of graphics and content of the representation, aimed at attracting a specific audience to which it communicates certain information. Regardless of the aim to be achieved by the representation of a project through the use of renderings, the high potential of these representation tools for communication, media and social issues becomes apparent.

Keywords
digital art, rendering, architectural visualisation, graphic language, communication.

Different representation languages in architectural visualisation.

doi.org/10.3280/oa-693.12

BARTOLOMEI ET AL. DEFINES **SEVERAL TYPES OF RENDERINGS**:

- CONCEPTUAL RENDERING,
- VISIONARY RENDERING;
- UNTEXTURED RENDERING;
- SCHEMATIC RENDERING;
- PHOTOREALISTIC RENDERING.

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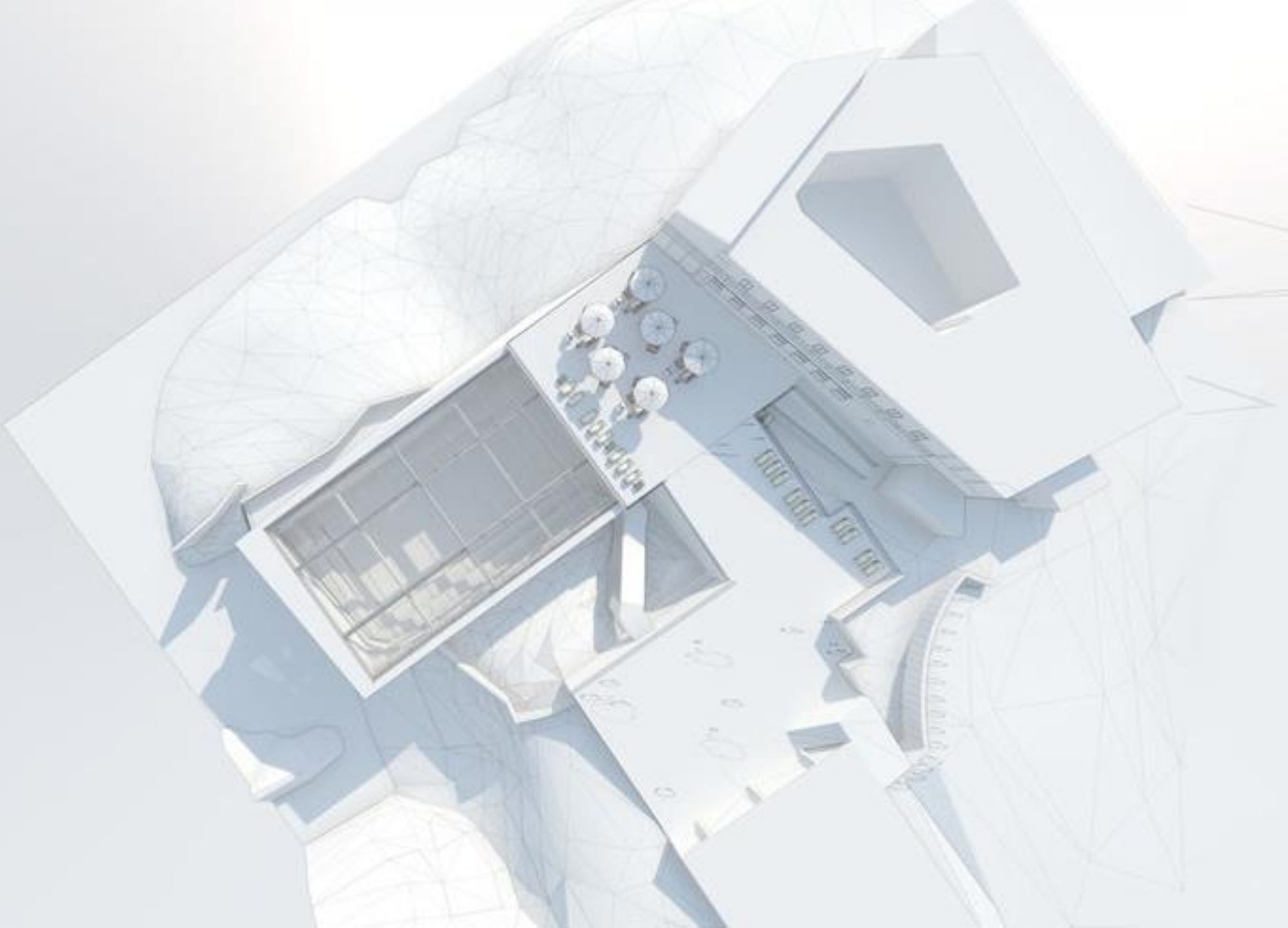
THERE ARE SEVERAL TYPES OF RENDERING:

- **CLAY RENDER –** MONOCHROME STUDIO IMAGE; RENDERING IN WHICH EACH 3D OBJECT DOES NOT CONTAIN ANY TEXTURES OR MATERIALS (WE ONLY HAVE WHITE OR GREY MATERIAL). IT CAN BE CONSIDERED A **DRAFT RENDERING**. SOMETIMES IT IS A QUICKER WAY TO APPROVE THE LIGHT AND THE COMPOSITION, SINCE THE MATERIALS AND THEIR PHYSICAL PROPERTIES DO NOT HAVE TO BE COMPUTED IN THE PREVIEW RENDER.



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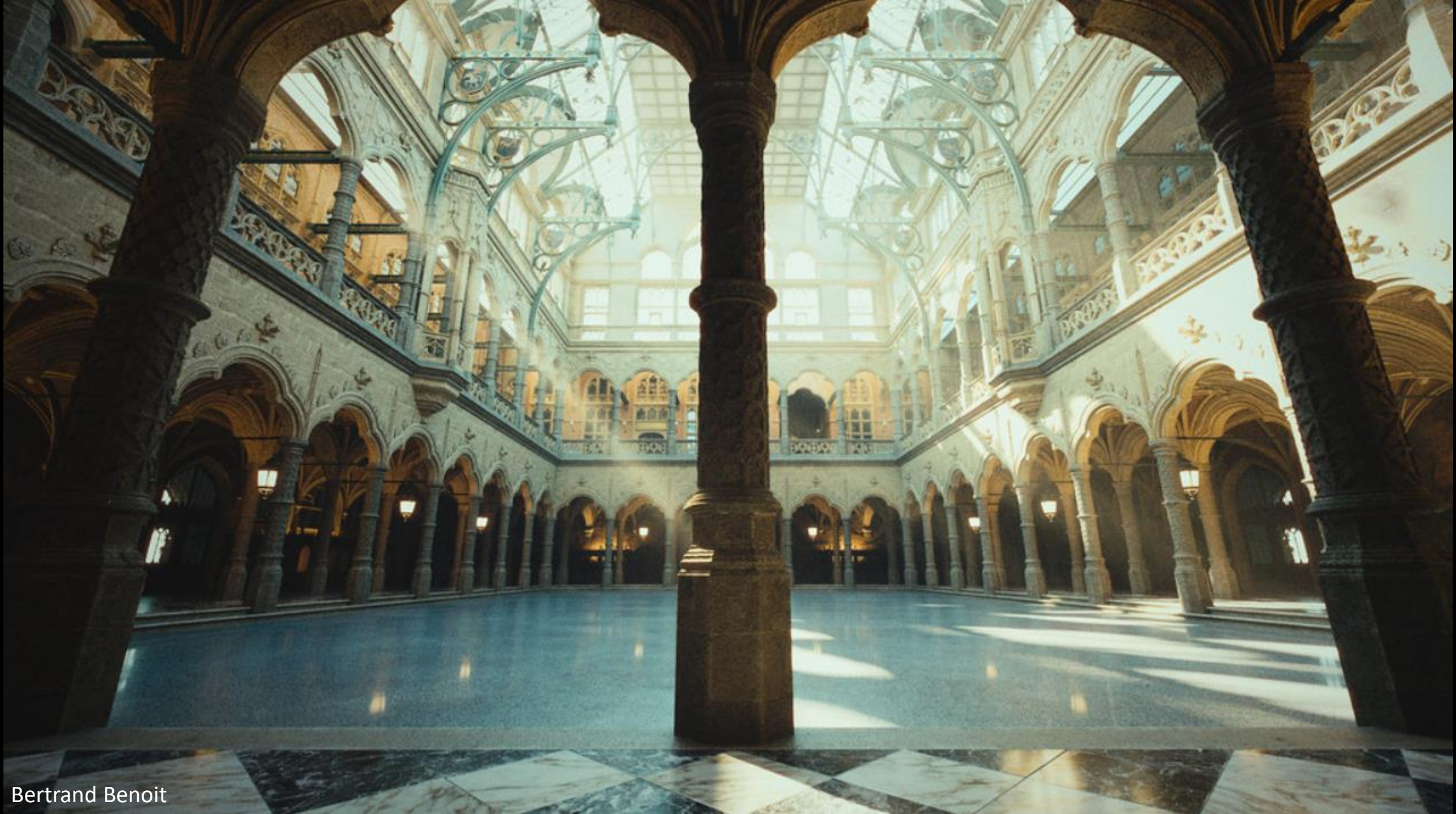
- **PHOTOREALISTIC RENDERING** – IMAGE THAT AIMS TO ACHIEVE THE MAXIMUM REALISTIC IMITATION OF SOMETHING THAT EXISTS IN REAL LIFE AND DISPLAYS IT SO CLEARLY AS TO BE INDISTINGUISHABLE FROM AN ACTUAL PHOTOGRAPHY OF THE OBJECT. THE PHOTOREALISTIC RENDERING APPEARS LIKE A PHOTOGRAPH AND IS THE MOST WIDESPREAD TYPE OF REPRESENTATION IN THE FINAL PHASE OF THE COMMUNICATION PROJECT PROCESS.


The Boundary


The Boundary


The Boundary


Bertrand Benoit

Bertrand Benoit

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RENDERING IS THE PROCESS OF GENERATING BITMAP IMAGES FROM 3D MODELS VIEWS (IT BASICALLY MEANS TAKING A PHOTOGRAPH OF THE SCENE WITH A VIRTUAL CAMERA).

IN THE CONTEXT OF ARCHITECTURAL VISUALIZATION, THERE ARE SEVERAL TYPES OF RENDERING:

- **CLAY RENDER –** MONOCHROME STUDIO IMAGE; RENDERING IN WHICH EACH 3D OBJECT DOES NOT CONTAIN ANY TEXTURES OR MATERIALS (WE ONLY HAVE WHITE OR GREY MATERIAL). IT CAN BE CONSIDERED A DRAFT RENDERING. SOMETIMES IT IS A QUICKER WAY TO APPROVE THE LIGHT AND THE COMPOSITION, SINCE THE MATERIALS AND THEIR PHYSICAL PROPERTIES DO NOT HAVE TO BE COMPUTED IN THE PREVIEW RENDER.
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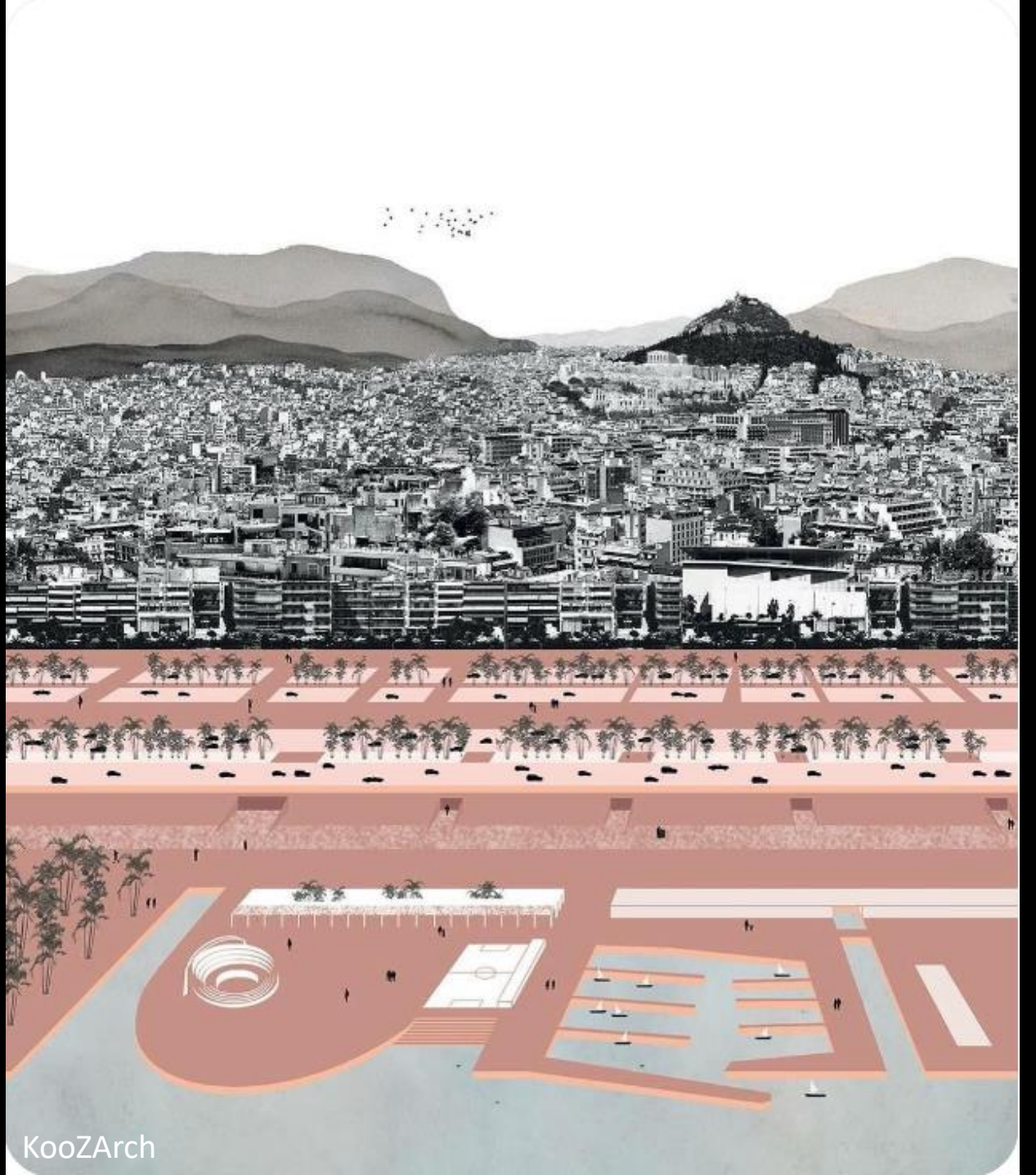
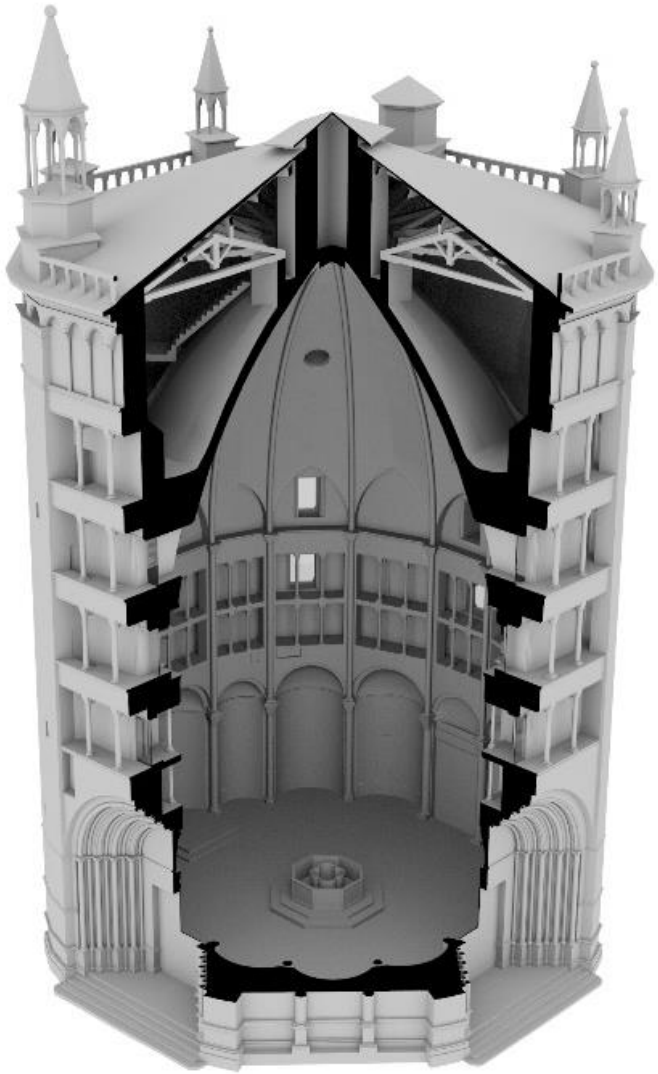
- **NON-PHOTOREALISTIC RENDERING** - IMAGE THAT DOES NOT AIM TO ACHIEVE PHOTOREALISM, OBTAINED ADOPTING MORE ABSTRACT AND ARTISTIC APPROACH AND USING TECHNIQUES THAT HAVE STRONG EXPRESSIVE CAPACITY. THESE RENDERINGS ARE HIGHLY APPRECIATED BY DESIGNERS BUT DIFFICULT TO UNDERSTAND BY NON-SPECILISTIC PUBLIC;

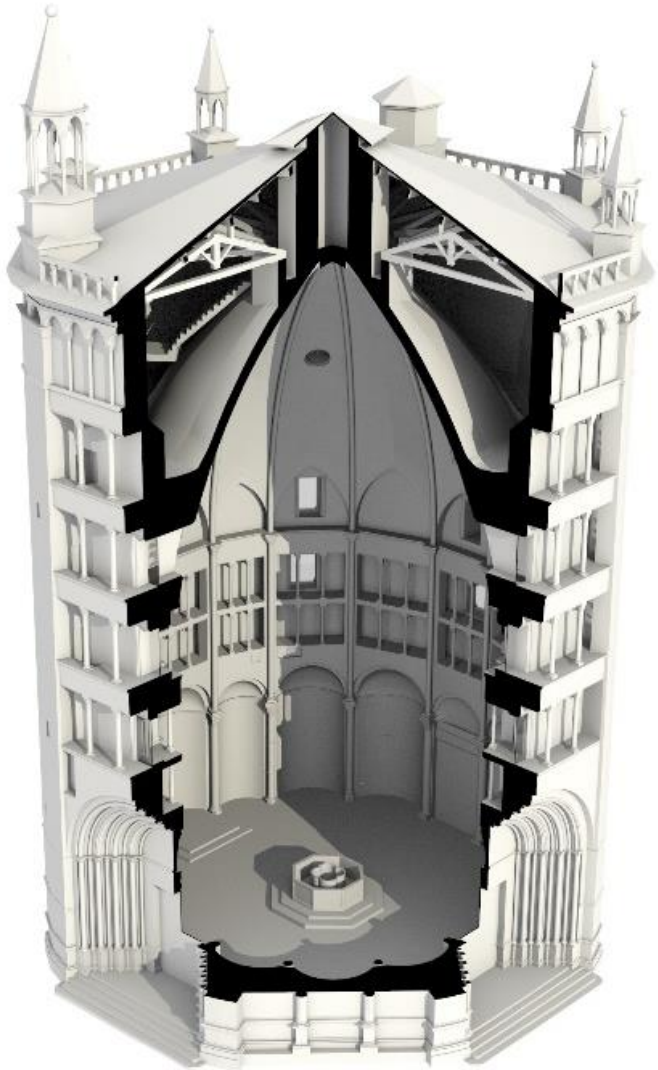
Schmidt Hammer Lassen Architects

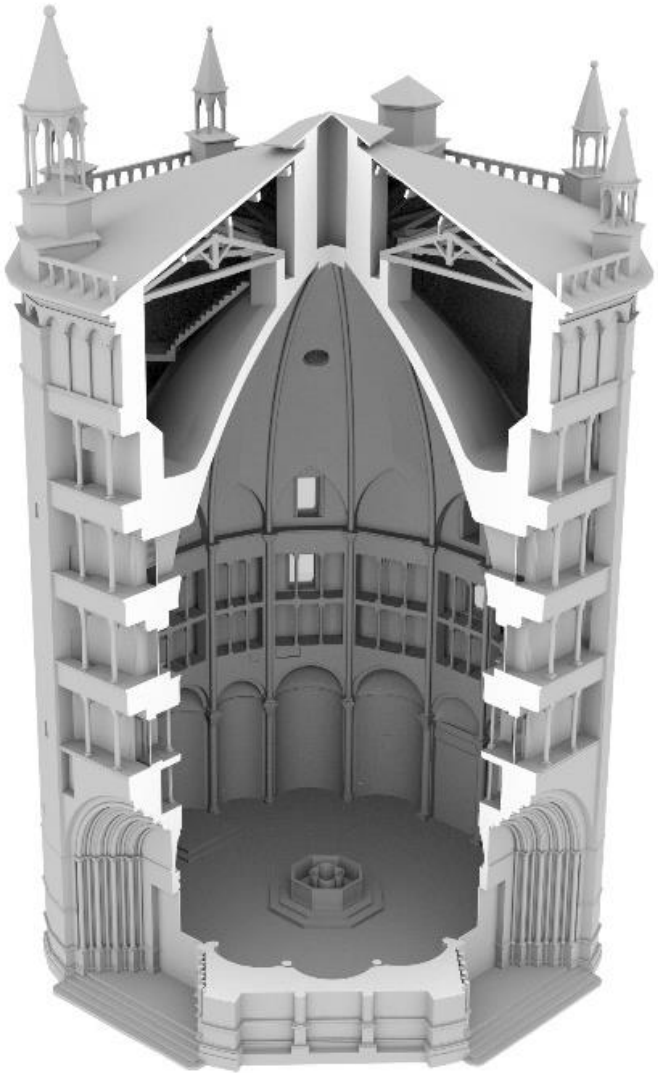

Georgi Aleksanyan

Michele Durazzi


KooZArch



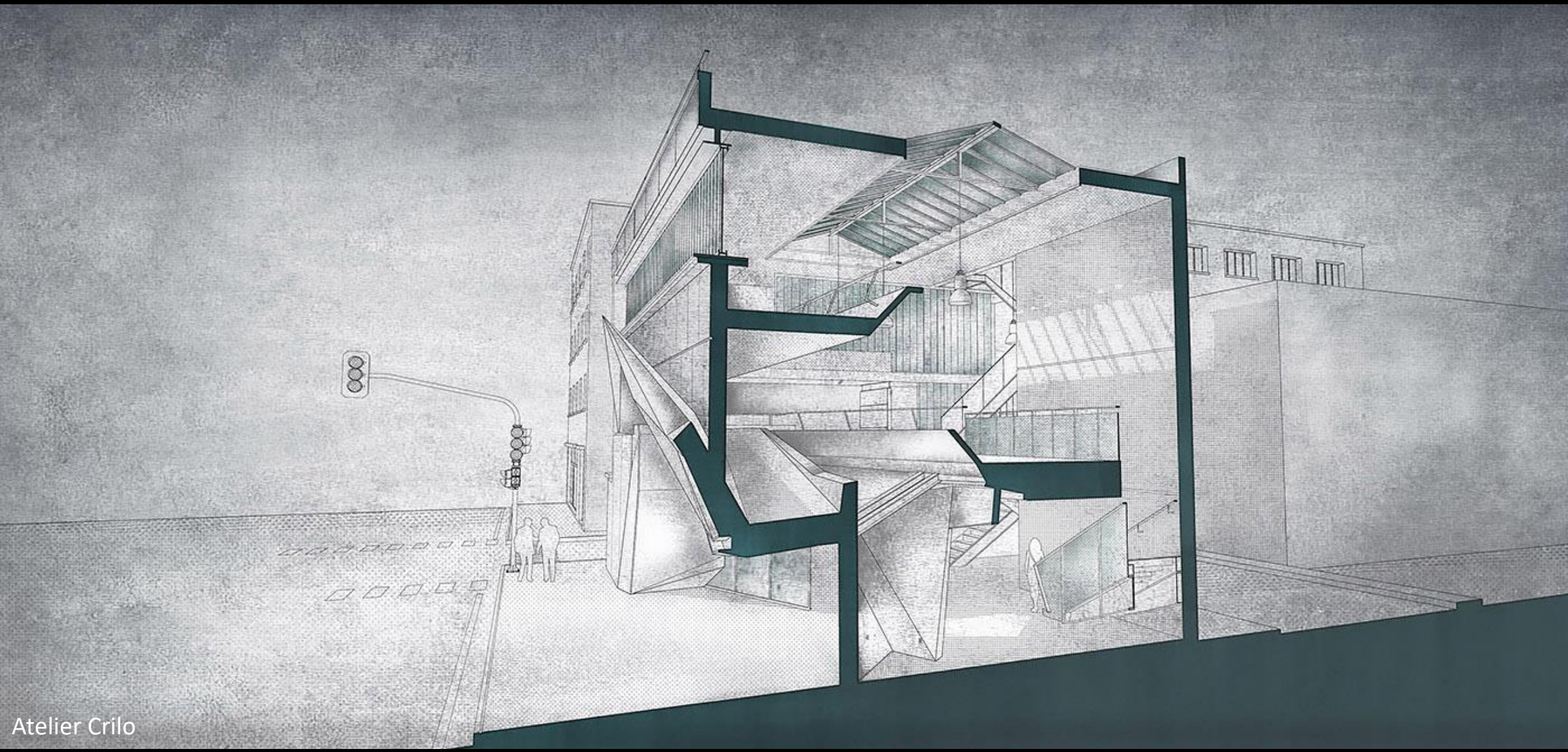




UNIPR, DIA, S. Mikolajewska, A. Zerbi

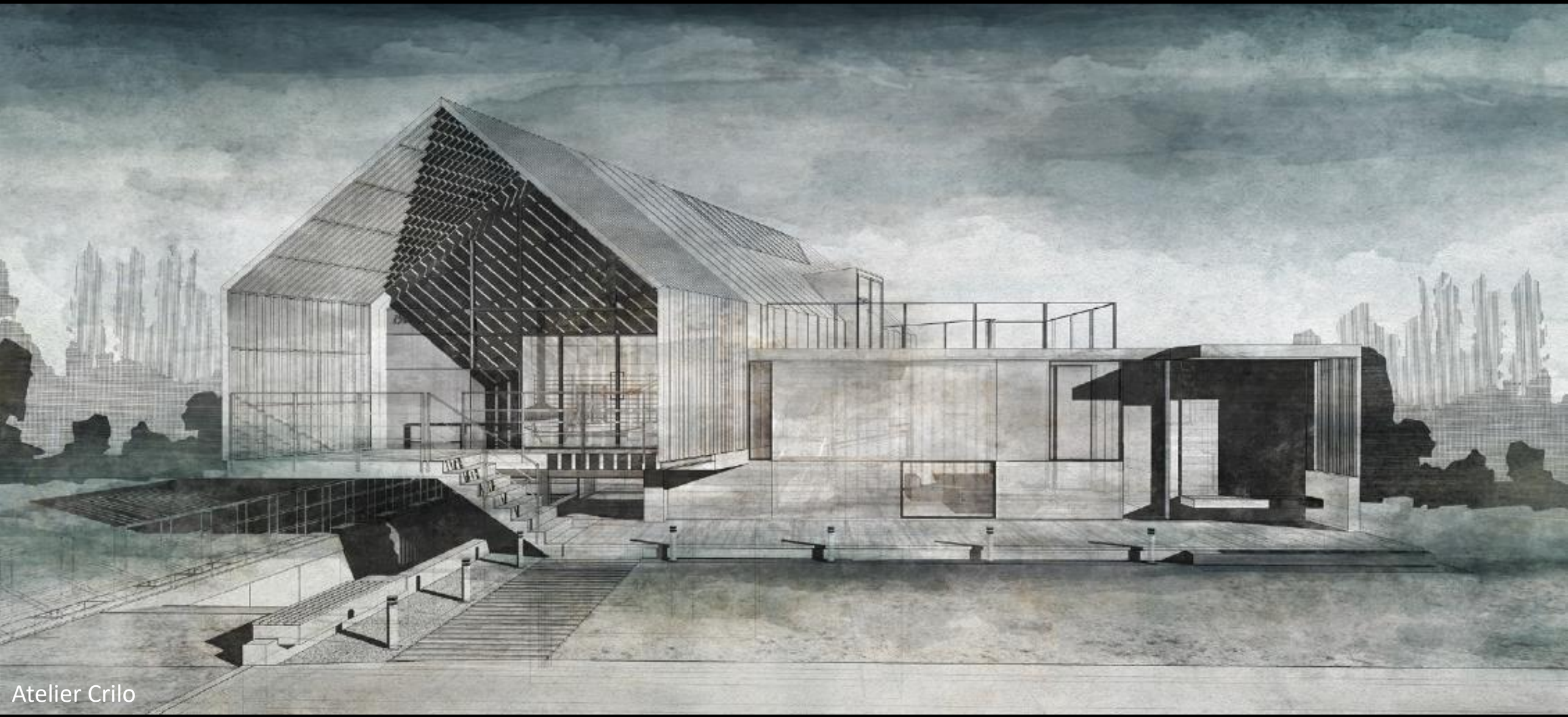
DIGITAL PAINTED RENDER – IMAGE THAT PREFIGURES THE TRADITIONAL HAND-MADE RENDERING OBTAINED BY COMBINING DIFFERENT TECHNIQUES OF REPRESENTATION FOR ARCHITECTURAL VISUALIZATION, INCLUDING, FOR EXAMPLE, WATERCOLOUR.


Atelier Crilo



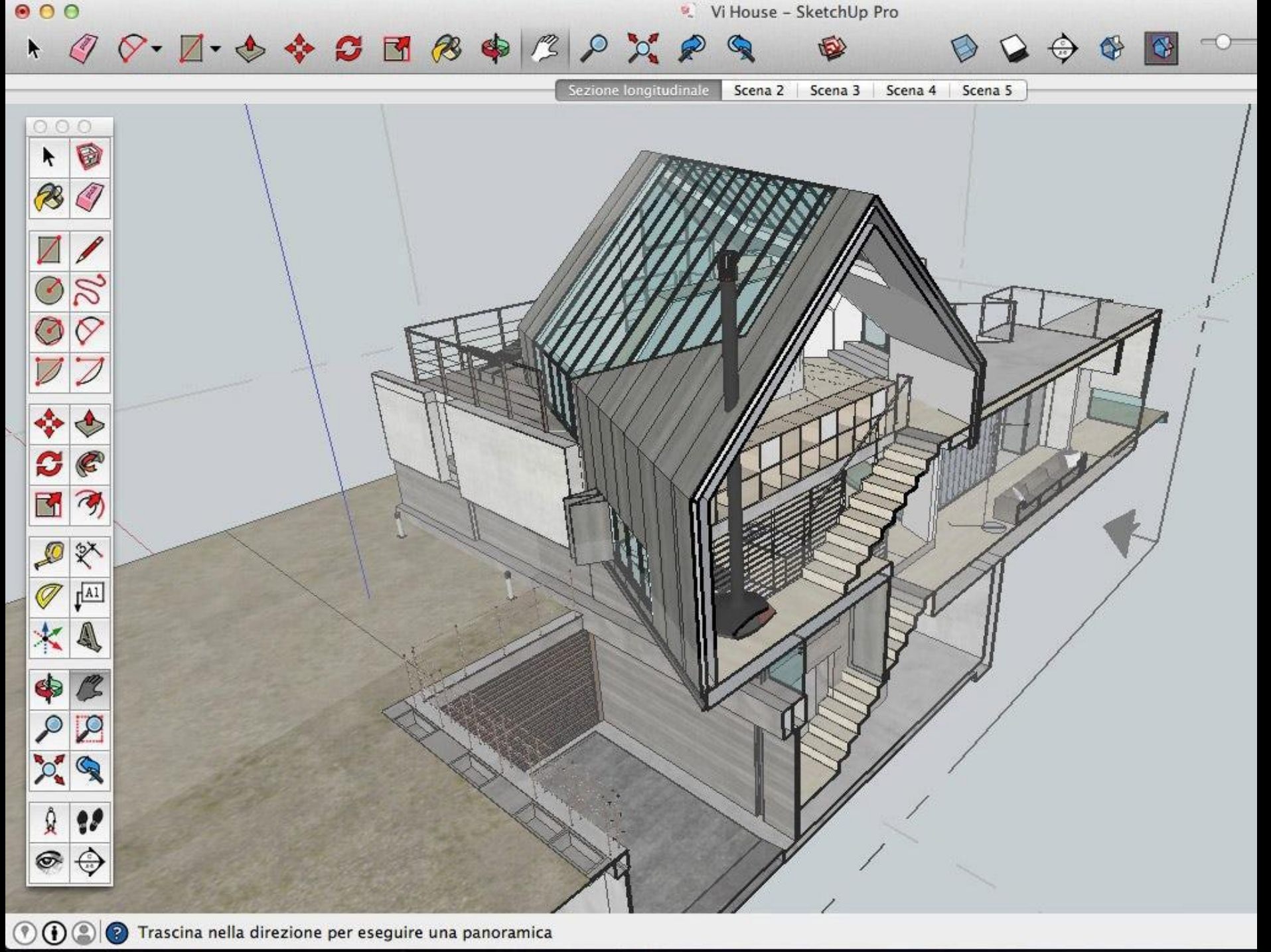
Atelier Crilo

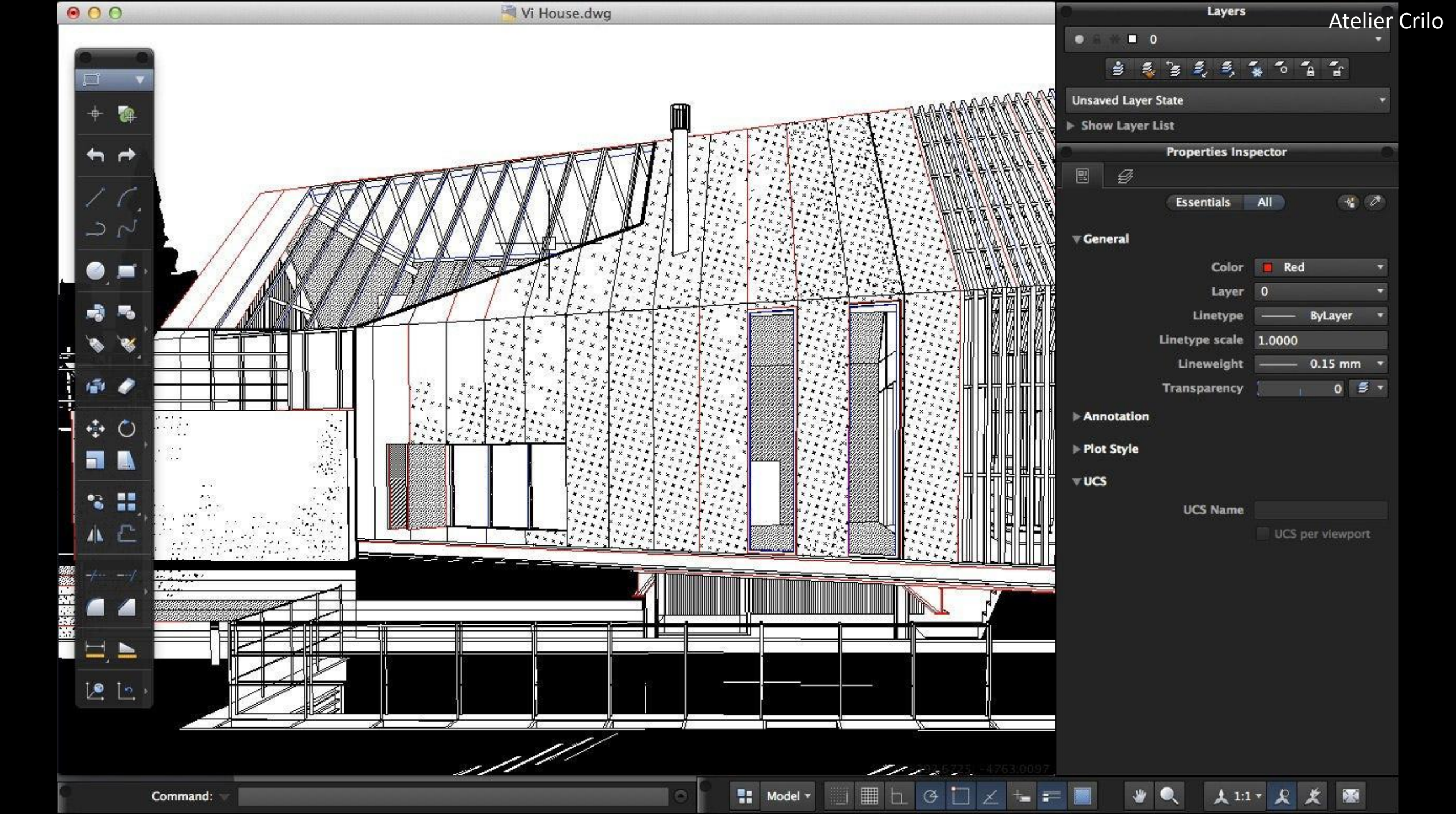
Atelier Crilo



Atelier Crilo

https://architizer.com/blog/practice/details/the-art-of-rendering-watercolor/


Vi House – SketchUp Pro
Sezione longitudinale
Scena 2
Scena 3
Scena 4
Scena 5
Trascina nella direzione per eseguire una panoramica



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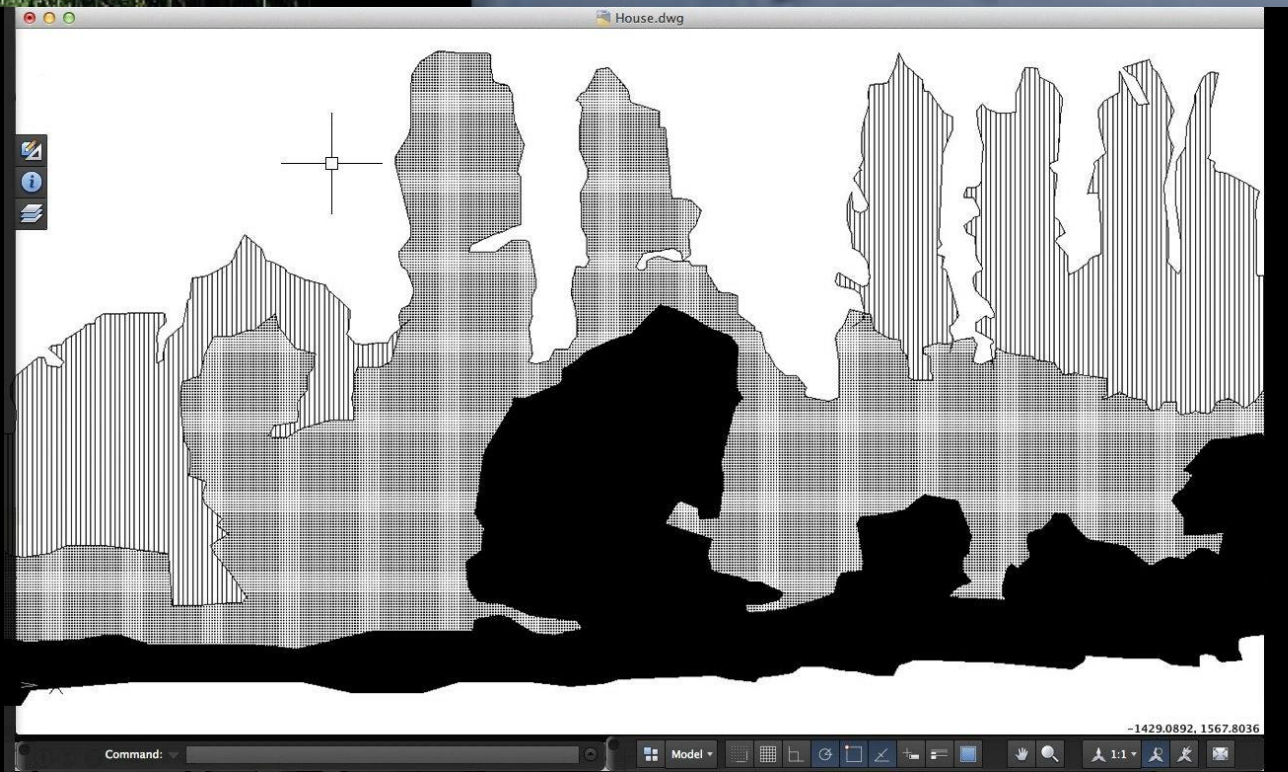
House.dwg
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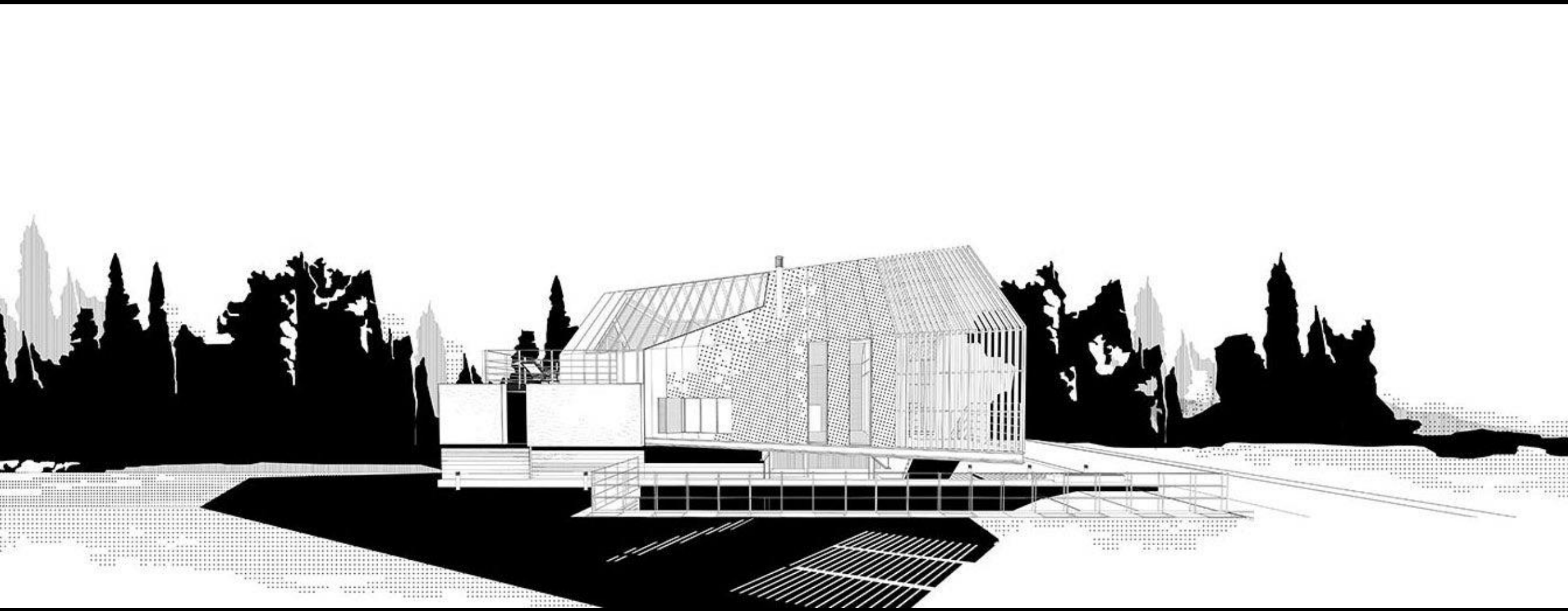
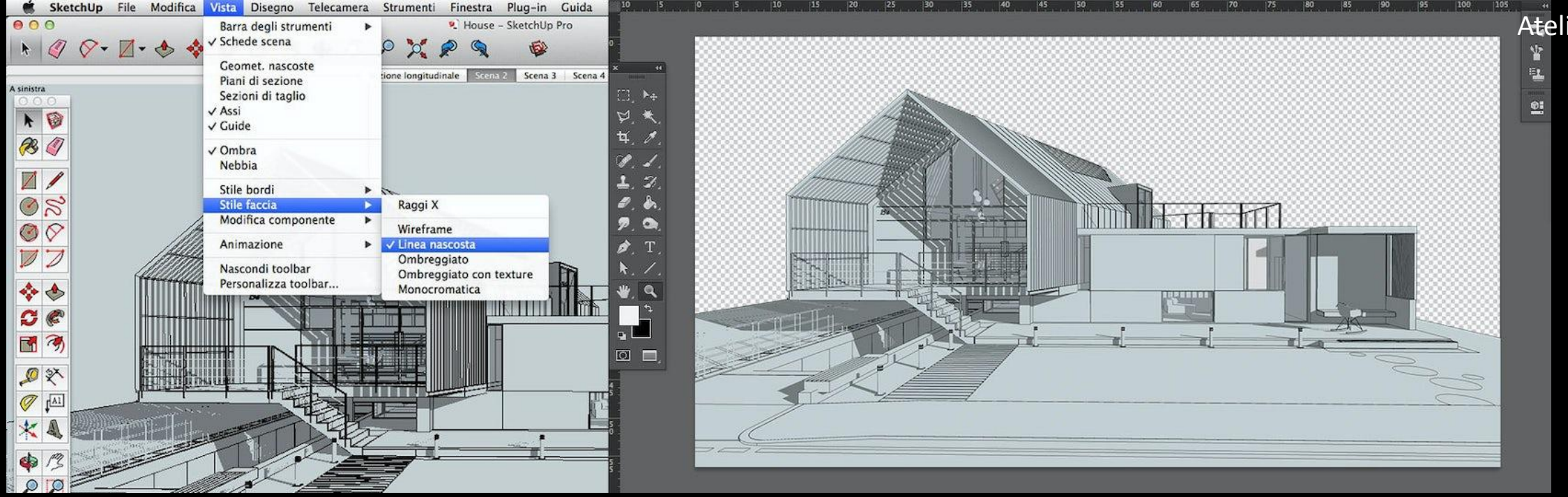
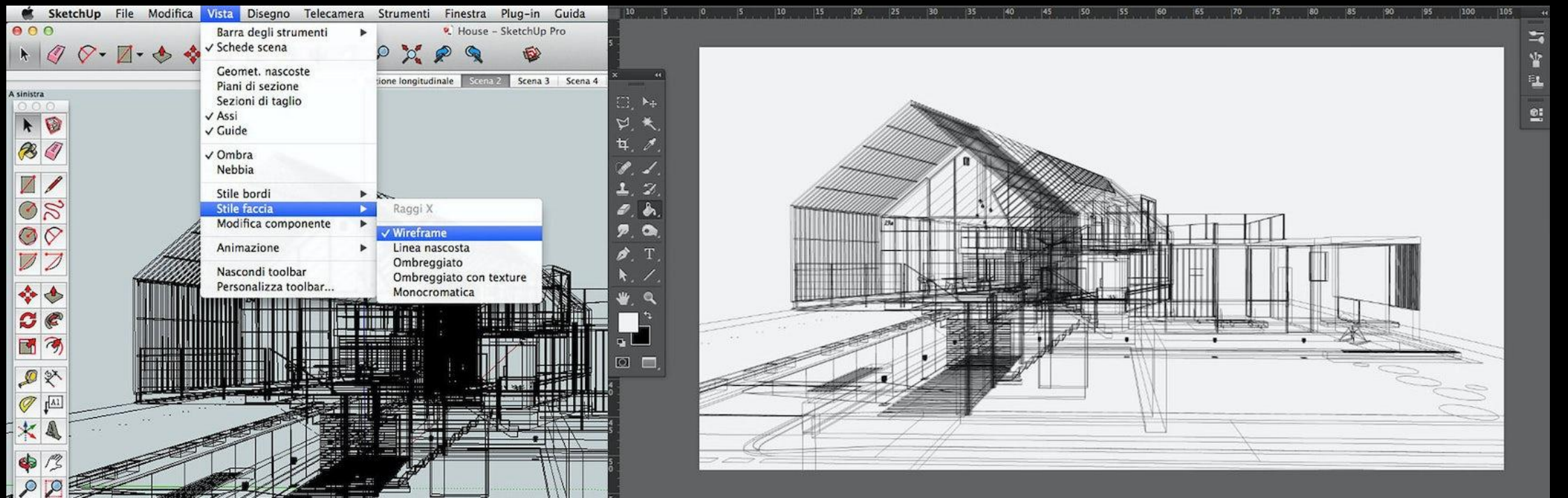
Model
1:1




SketchUp File Modifica Vista Disegno Telecamera Strumenti Finestra Plug-in Guida
House - SketchUp Pro
Barra degli strumenti
Schede scena
Geomet. nascoste
Piani di sezione
Sezioni di taglio
Assi
Guide
Ombra
Nebbia
Stile bordi
Stile faccia
Modifica componente
Animazione
Nascondi toolbar
Personalizza toolbar...
Raggi X
Wireframe
Linea nascosta
Ombreggiato
Ombreggiato con texture
Monocromatica
Scena 2
Scena 3
Scena 4
A sinistra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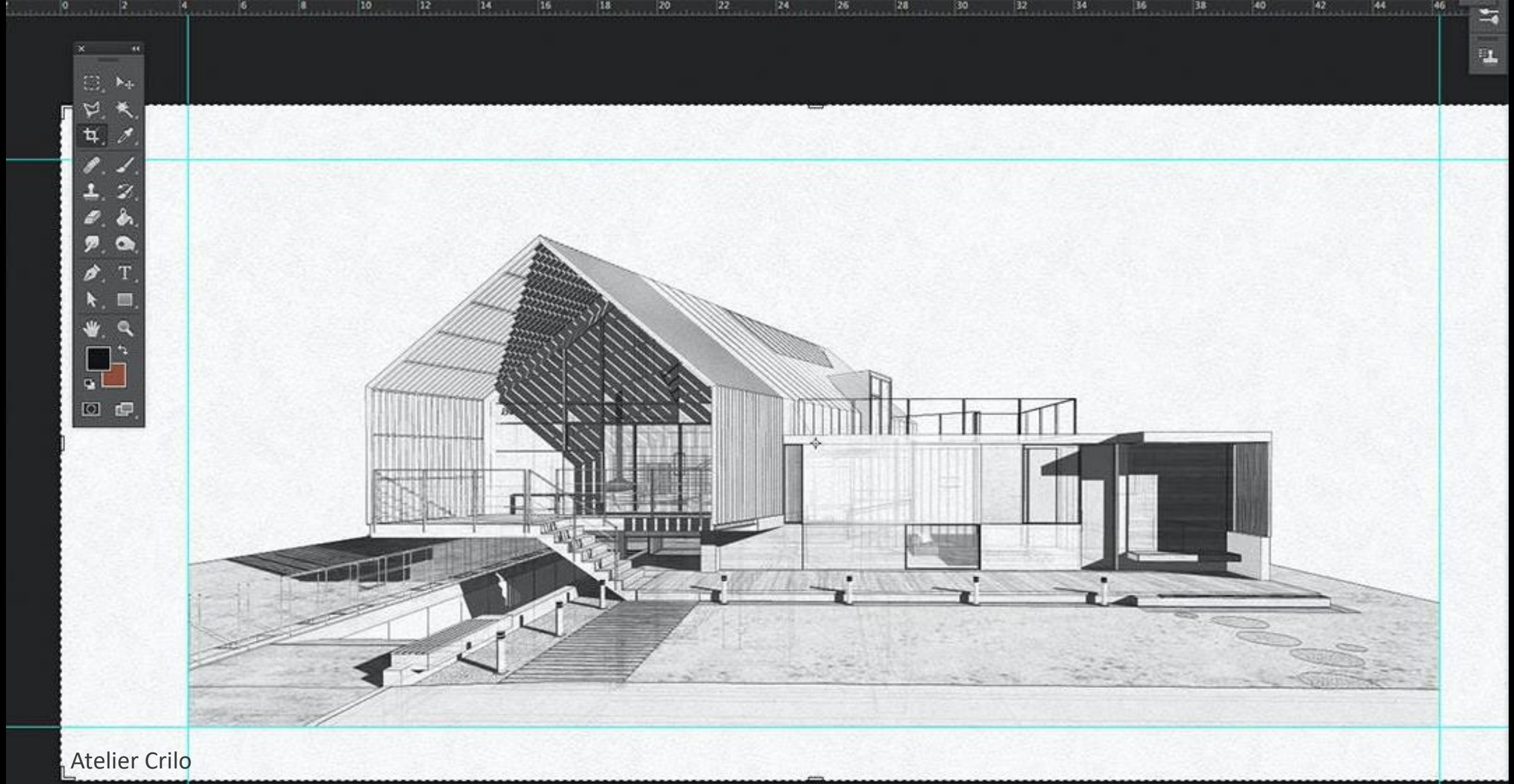

Atelier Crilo

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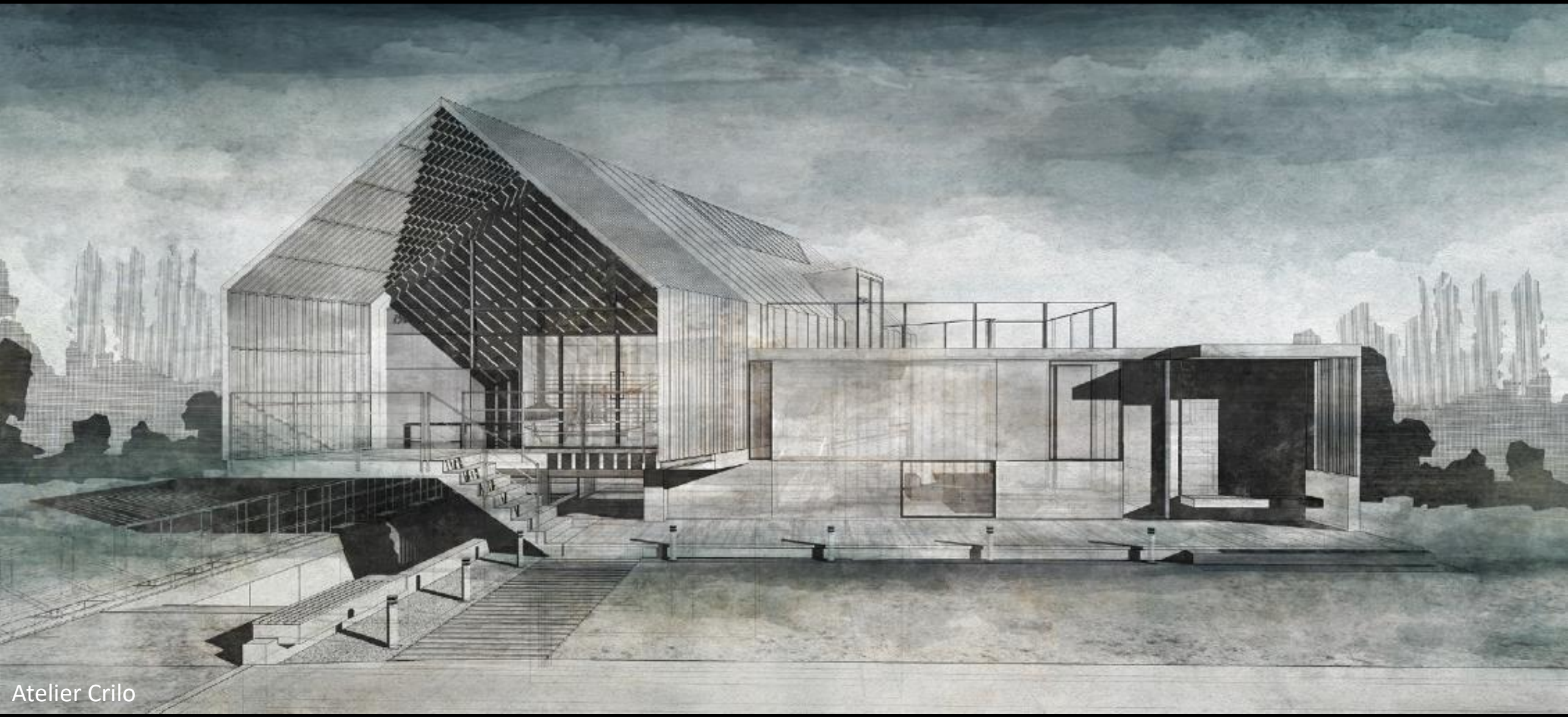
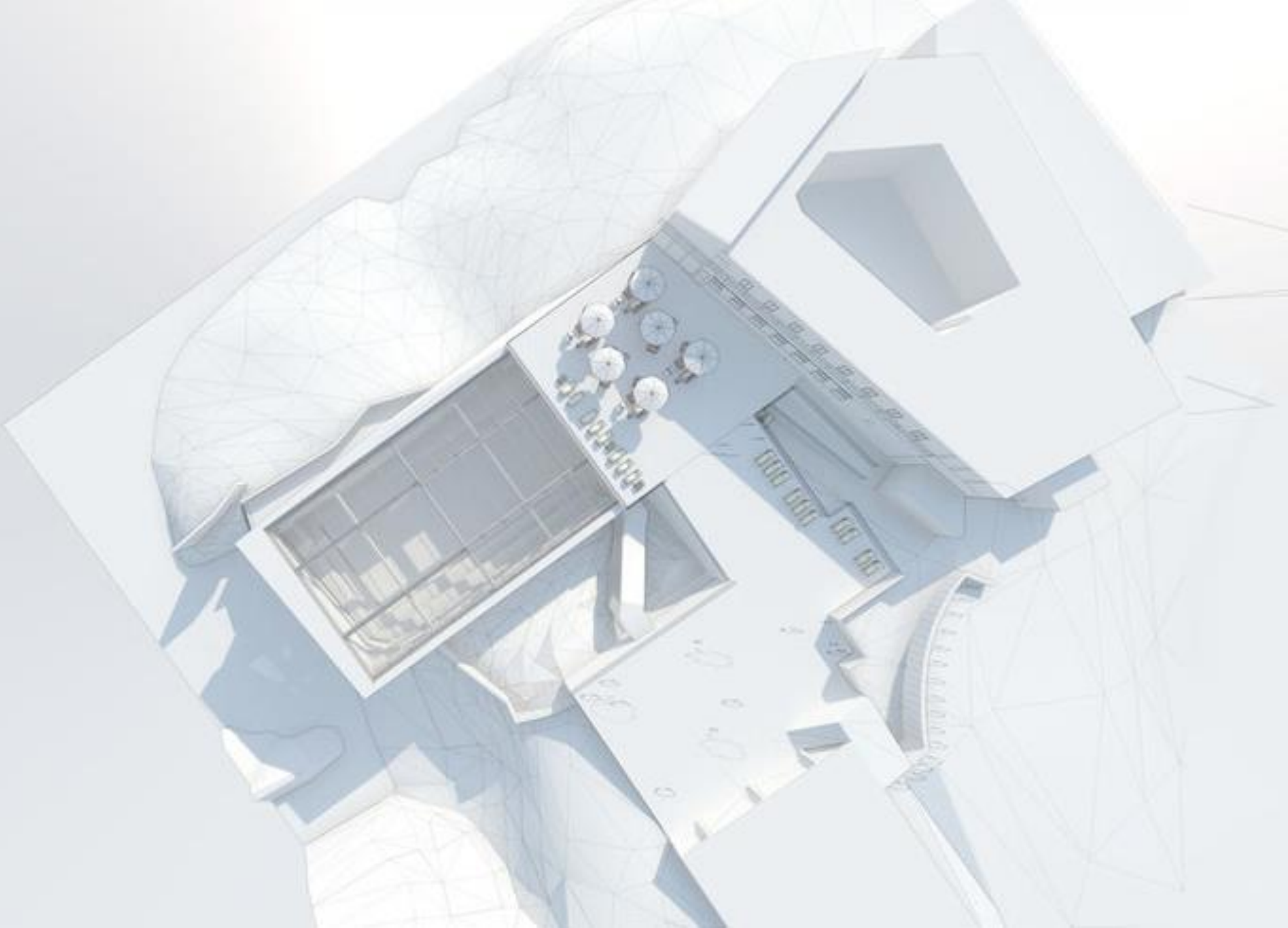

Atelier Crilo



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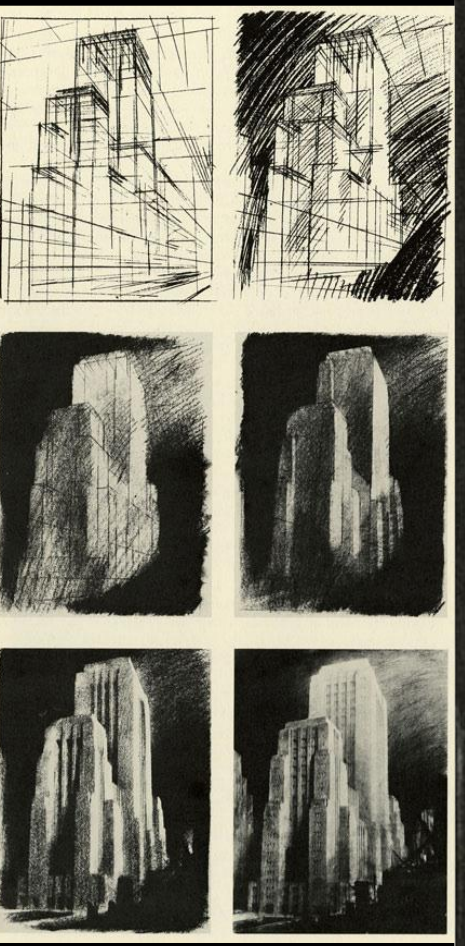
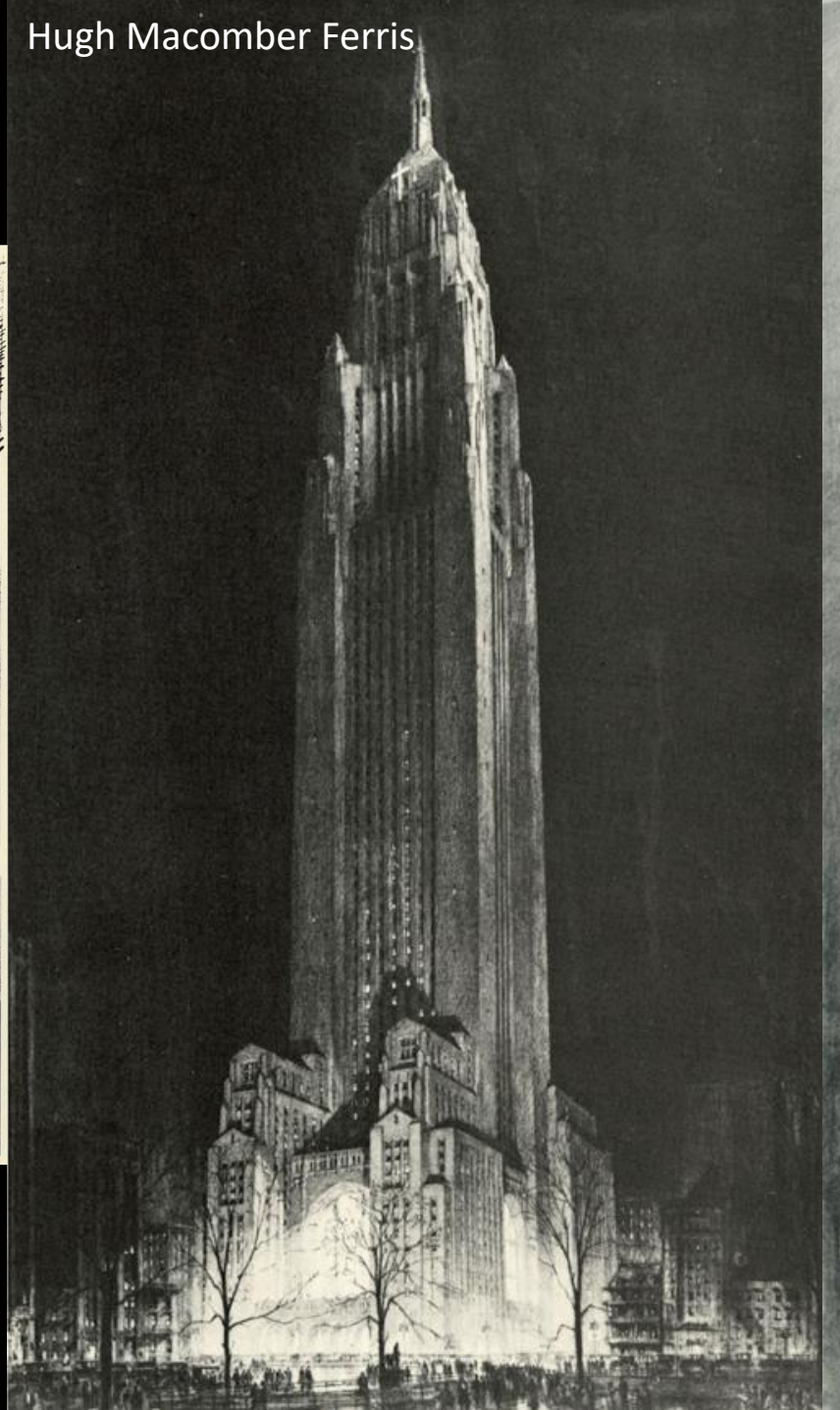
Hugh Macomber Ferris





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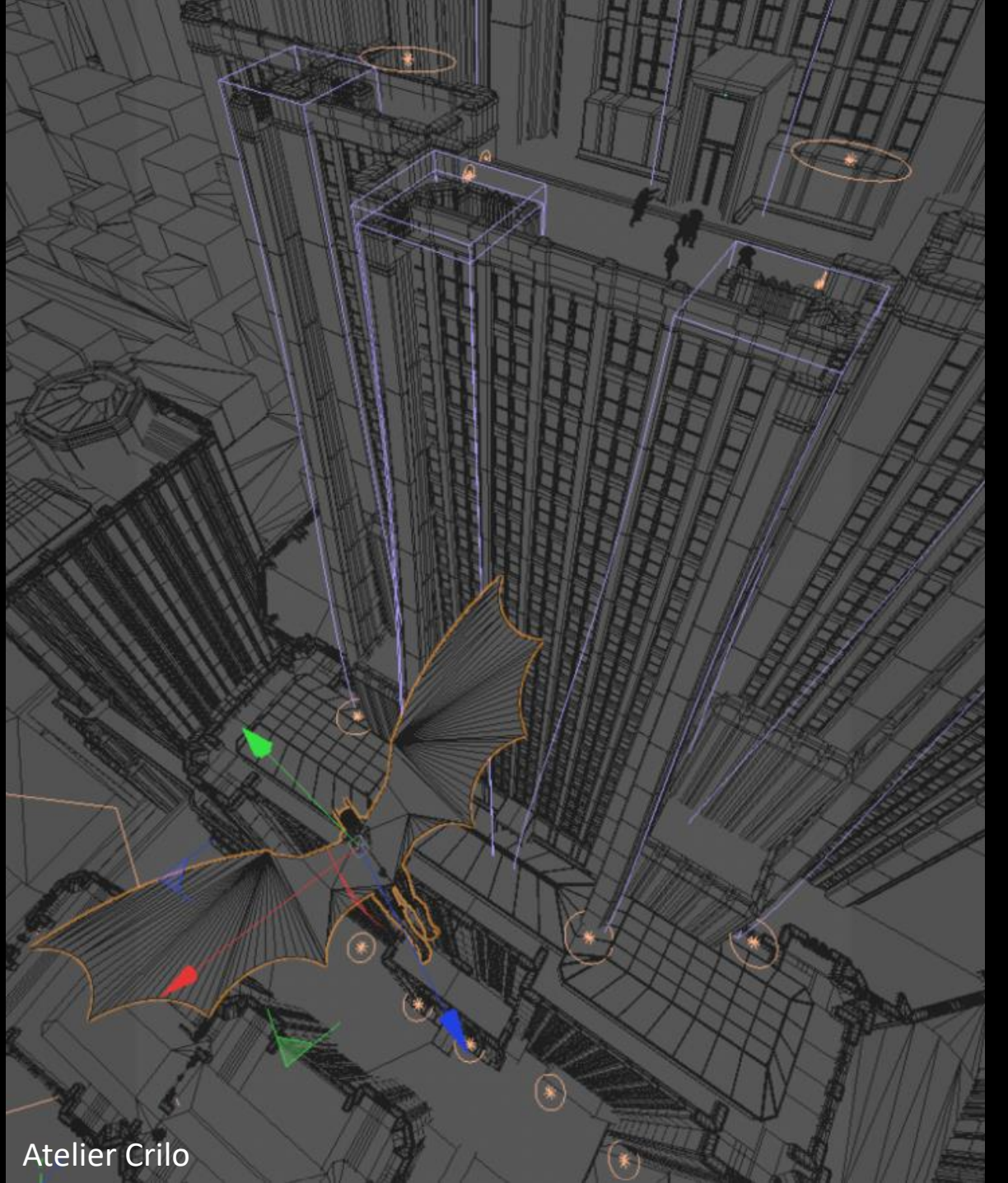
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DEPENDING ON THE CONTEXT IN WHICH THE ARCHITECTURE IS PLACED, IT IS POSSIBLE TO TALK ABOUT **NATURALISTIC** RENDERING, **URBAN** RENDERING, etc.

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IN GENERAL, THE FOLLOWING **PHASES** CAN BE IDENTIFIED IN THE **RENDERING PROCESS**:

PHASE 1. **3D MODEL** DEFINITION.

PHASE 2. **COMPOSITION** AND VIEW DEFINITION.

PHASE 3. DETAILED DEFINITION OF THE ENVIRONMENT.

- CREATION AND ASSIGNMENT OF **MATERIALS** TO BE ATTACHED.
- CREATION AND PLACEMENT OF **LIGHT SOURCES**.
- ASSIGNMENT OF THE **BACKGROUND.**
- ADDITIONAL ELEMENTS DEFINITION (PEOPLE, VEGETATION, ETC.).

PHASE 4. SET THE RENDERING **SETTINGS**.

PHASE 5. **POST-PRODUCTION** PROCESS [optional phase].

IT IS IMPORTANT TO STRESS THAT **THESE PHASES ARE NOT NECESSARY CONSEQUENTIAL**.

THE **MODELING PHASE** IS THE MOST COMPLEX, LABORIOUS AND TIME-CONSUMING PROCESS AND OBVIOUSLY DEPENDS ON WHAT IS TO BE ACHIEVED AND THE TYPE OF OBJECT/ARCHITECTURE TO BE MODELED.

IN GENERAL, THE MORE **DETAILS** WE ADD, THE MORE **TRUTHFUL** THE SCENE WILL BE.

HOWEVER, IT IS VERY IMPORTANT TO MAKE **CAREFUL CHOICES** ABOUT THE MODELED ELEMENTS IN ORDER TO OPTIMIZE WORK TIME AND **AVOID UNNECESSARY TIME LOSS**.

ONCE THE MODEL IS FINISHED, IT IS NECESSARY TO MAKE A **CAREFUL STUDY OF THE COMPOSITION** AND VIEW TO BE CREATED.

IN THIS PHASE IT IS USEFUL TO REFER TO THE PRINCIPLES OF **PHOTOGRAPHIC COMPOSITION** IN ORDER TO VALORIZE YOU PROJECT.

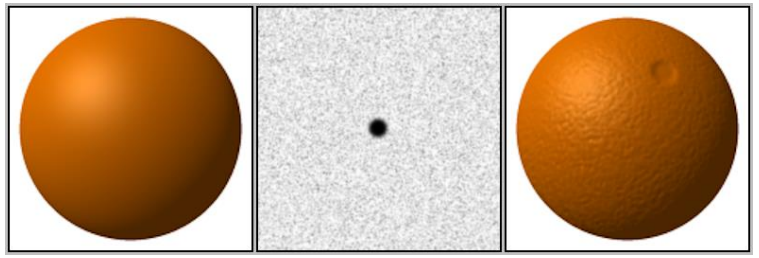
THESE CONSIDERATIONS ARE CRUCIAL TO OPTIMIZE THE FOLLOWING PHASES.

THE VISUAL APPEARANCE OF OBJECTS AND ENVIRONMENTS ALSO DEPENDS ON THE **MATERIALS** ASSIGNED TO THE 3D OBJECTS AND THEIR **PROPERTIES**.

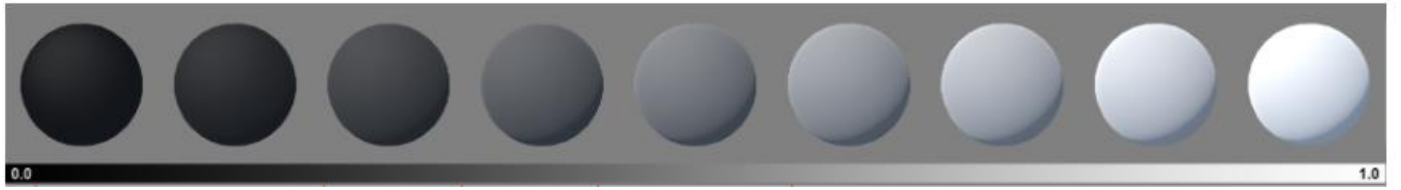
BASIC ISSUES TO MANAGE DURING RENDERING PHASE:

- **ROUGHNESS** IS A PARAMETER THAT CONTROLS THE IRREGULARITIES ON THE SURFACE. A POLISHED SURFACE WILL HAVE VERY FEW OF THEM, RESULTING IN A MIRROR-LIKE REFLECTION, WHILE A ROUGH, UNFINISHED OR FINISHED TO SATIN OR MATTE, WILL REFLECT LIGHT ON A WIDE SPREAD.
- **TRANSPARENCY** IS A PARAMETER THAT CONTROLS THE TRANSPARENCY LEVEL FOR THE MATERIAL [0.0-TRANSPARENT OBJECT - 1.0 NON-TRASPARENT OBJECT]
- **ALBEDO COLOR** IS A PARAMETER THAT CONTROLS THE BASE COLOR OF THE SURFACE [0.0-BLACK OBJECT - 1.0-WHITE OBJECT]
- **BUMP MAPPING** IS A TECHNIQUE TO MAKE A SURFACE LOOK MORE REALISTIC BY SIMULATING BUMPS AND WRINKLES ON THE SURFACE OF AN OBJECT.

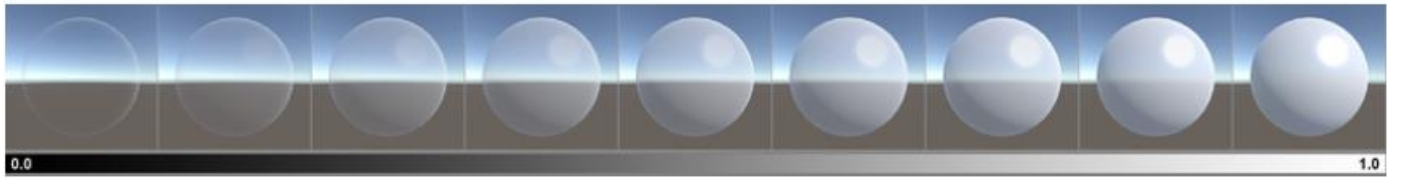
ON THE LEFT: **SMOOTH** GLOSSY SURFACE,
ON THE RIGHT: **ROUGH** MATTE SURFACE.



ON THE LEFT: A SPHERE WITHOUT **BUMP MAPPING**.
IN THE MIDDLE: A BUMP MAP TO BE APPLIED TO THE SPHERE.
ON THE RIGHT: THE SPHERE WITH THE BUMP MAP APPLIED. IT APPEARS AS AN ORANGE.

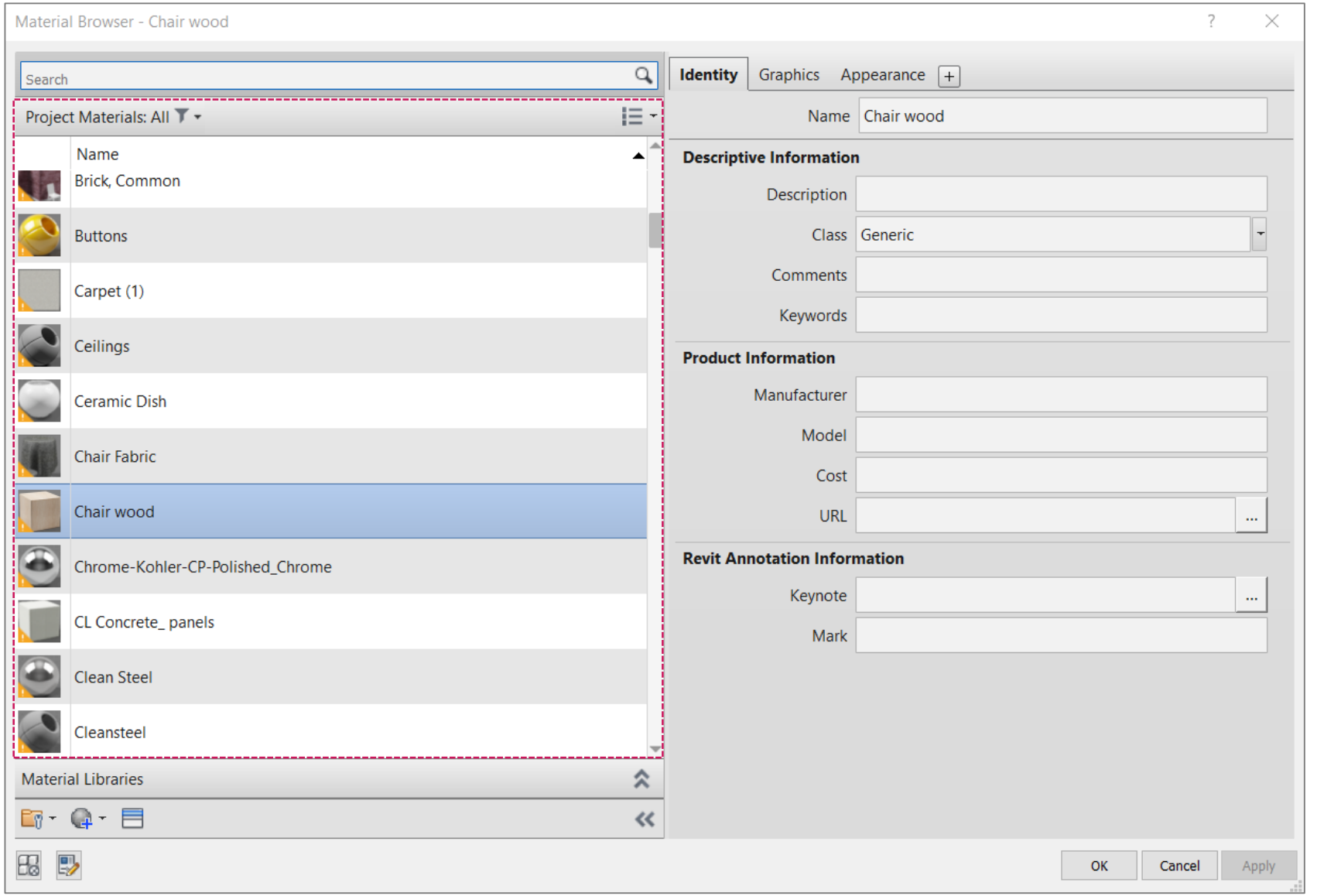


A RANGE OF BLACK TO WHITE **ALBEDO VALUES**, FROM 0.0 TO 1.0.

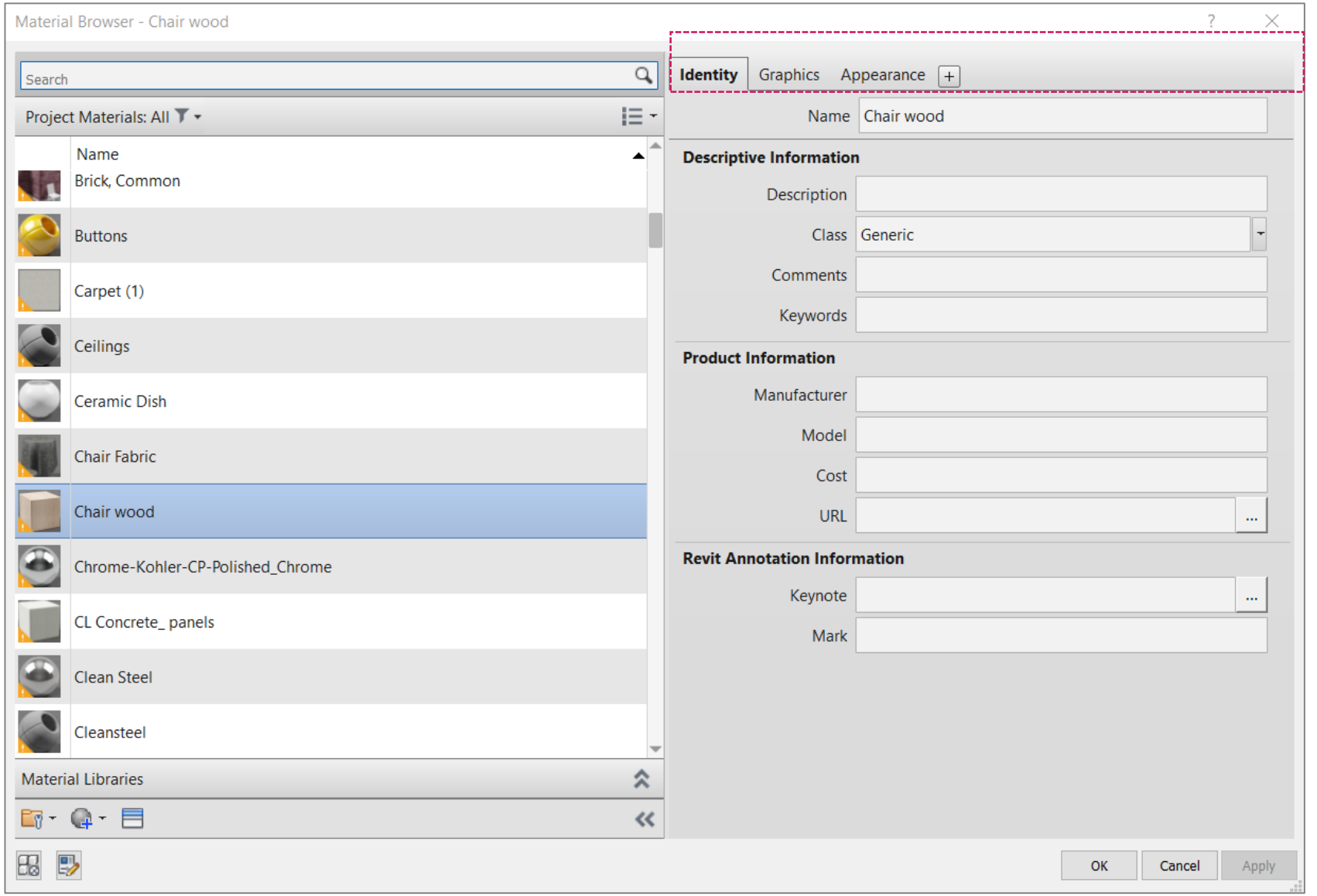


A RANGE OF TRANSPARENCY VALUES, FROM 0.0 TO 1.0.

MATERIAL LIBRARY

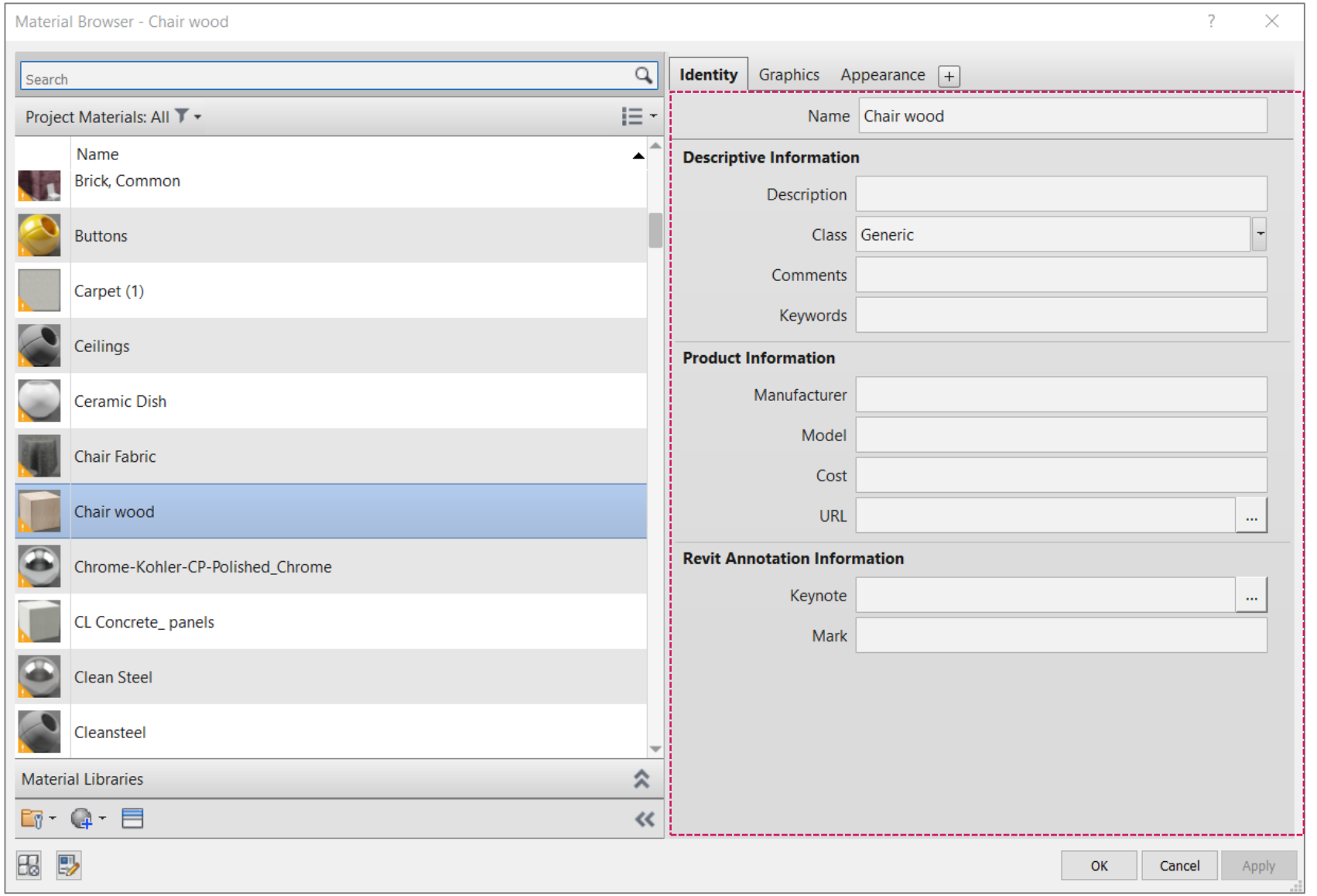


Material dialog in Revit.



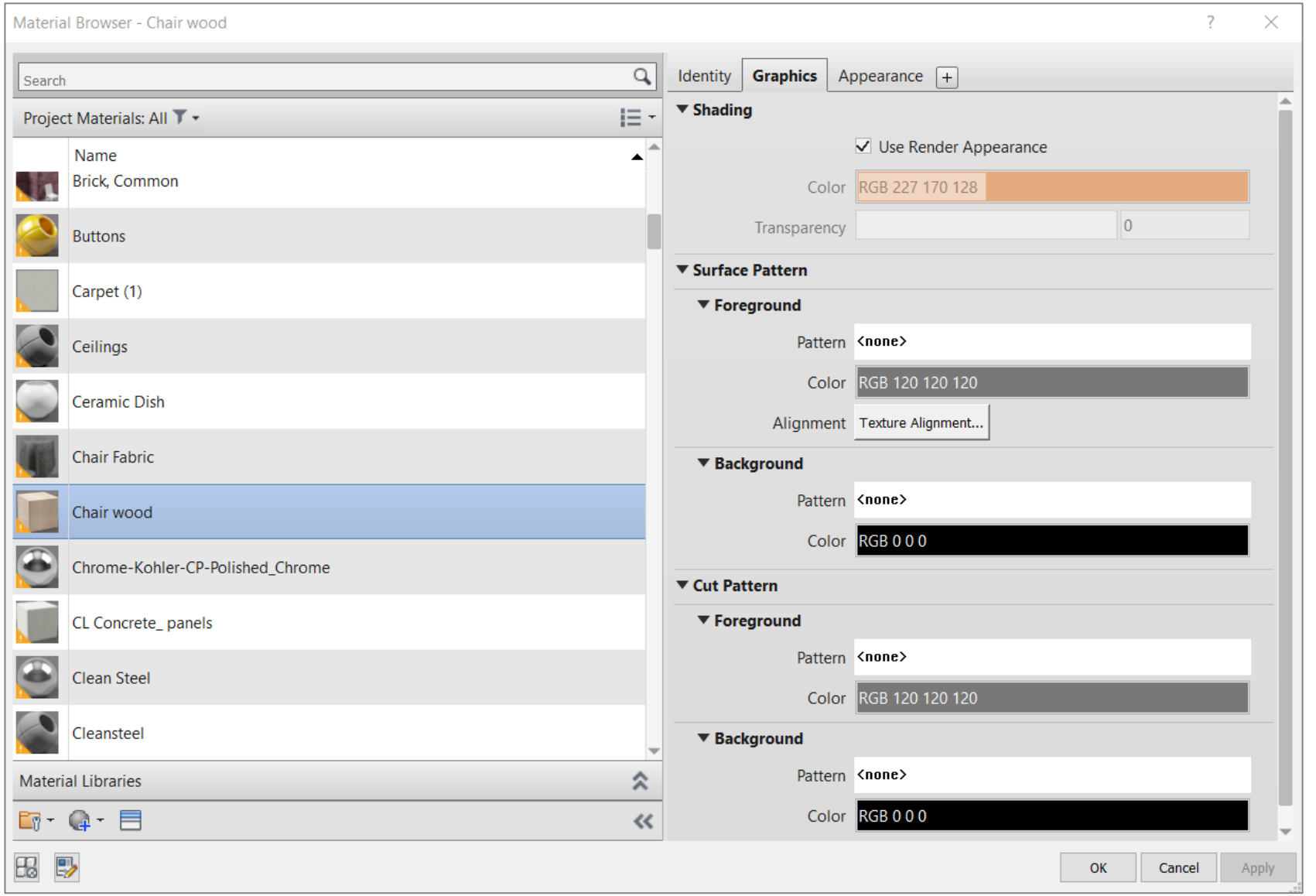
ASSET TABS

Material dialog in Revit.



PROPERTIES PANEL

Material dialog in Revit.



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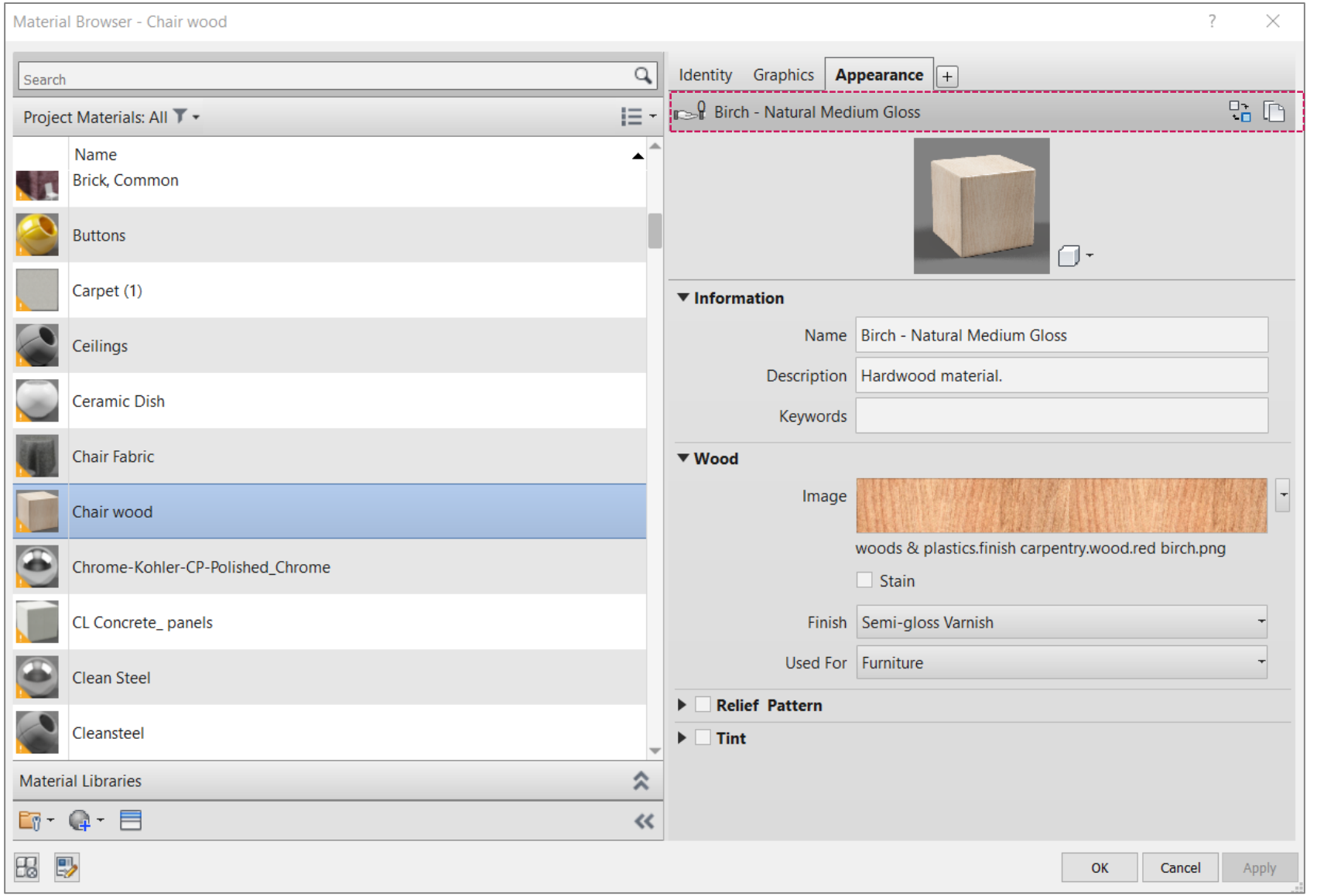

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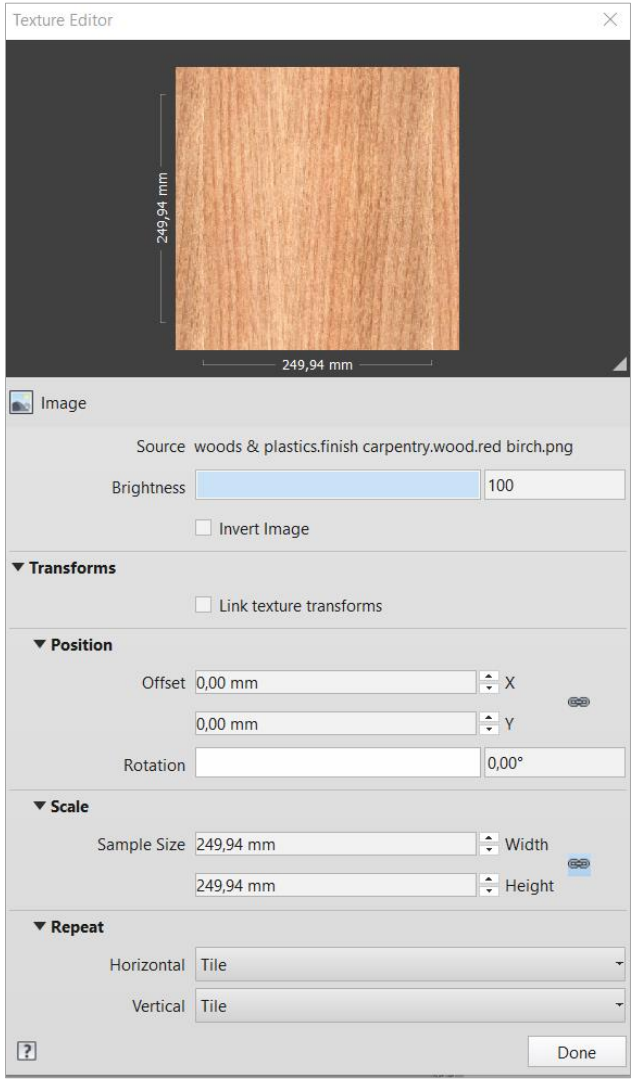

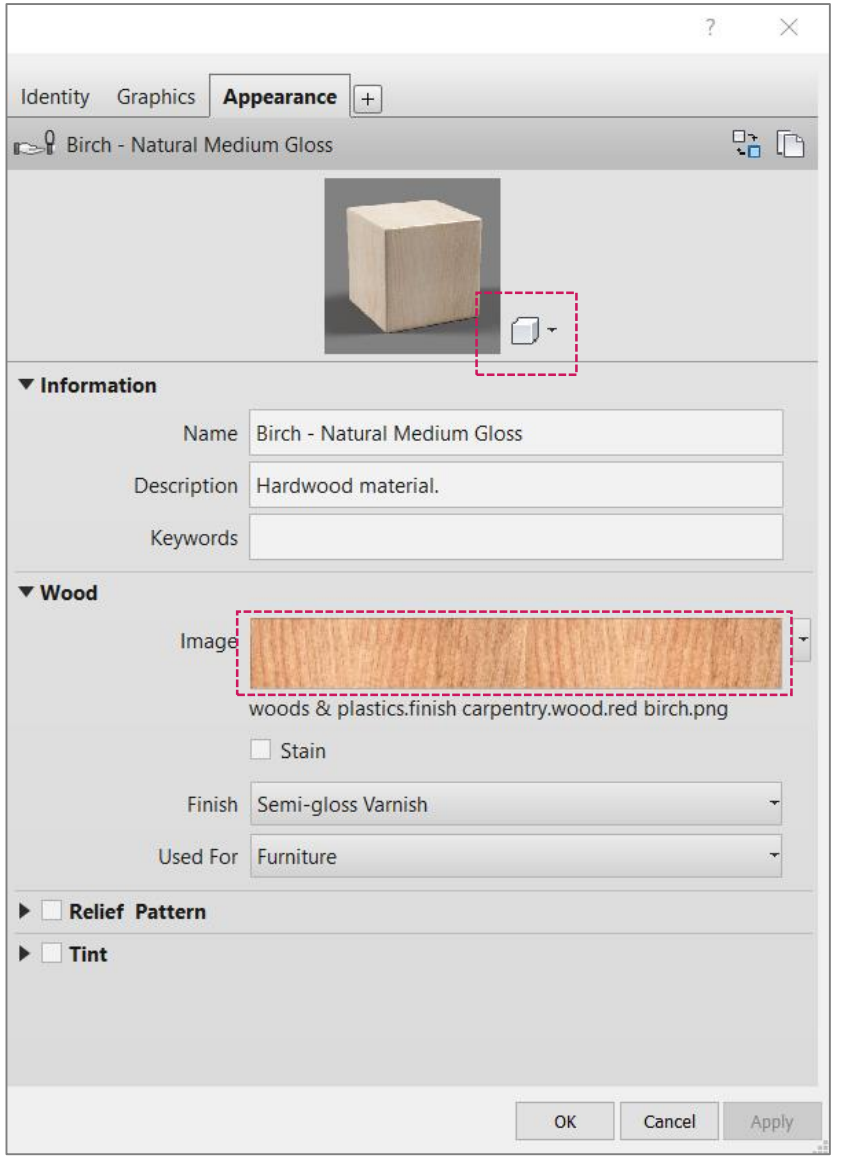

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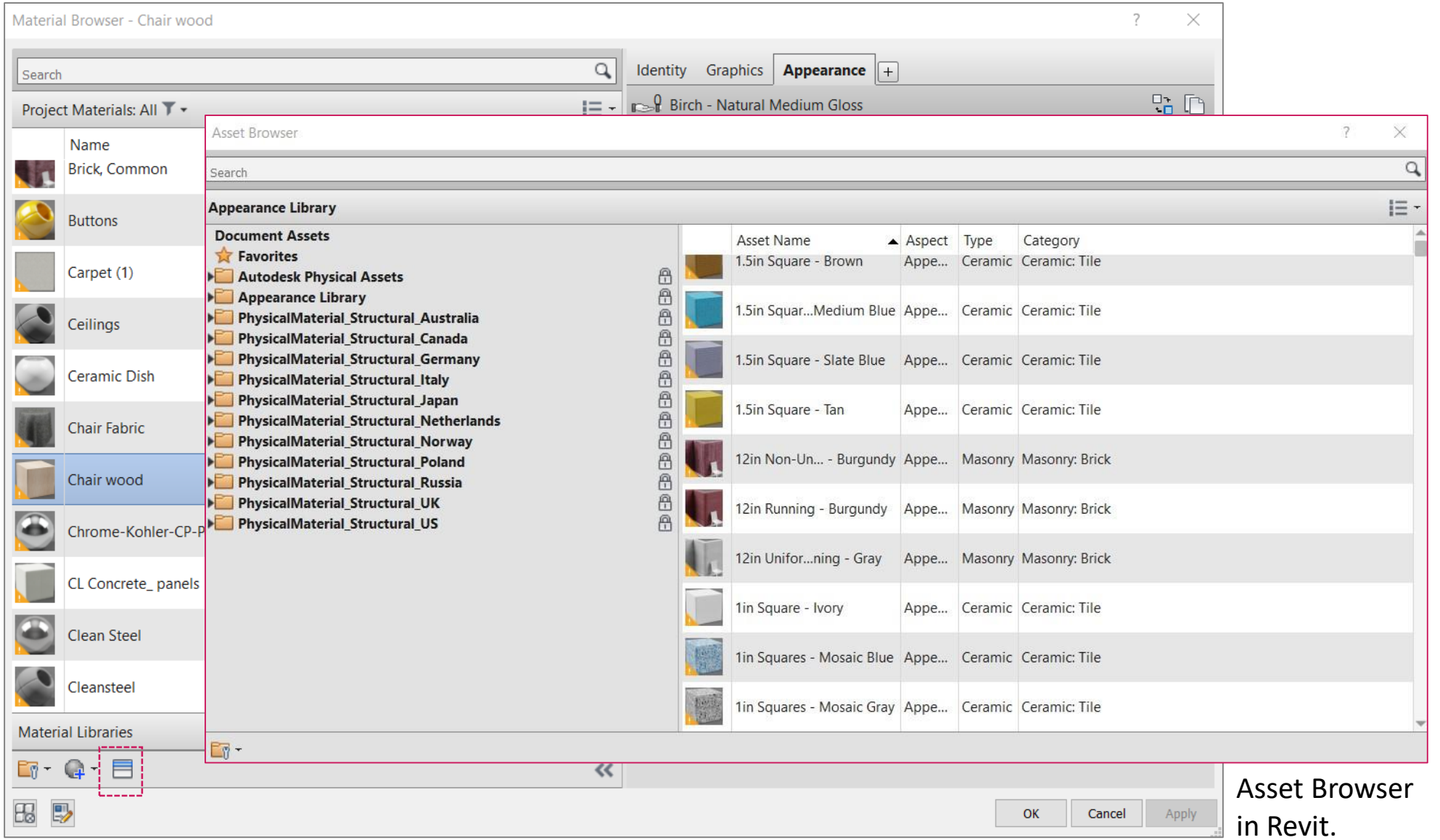
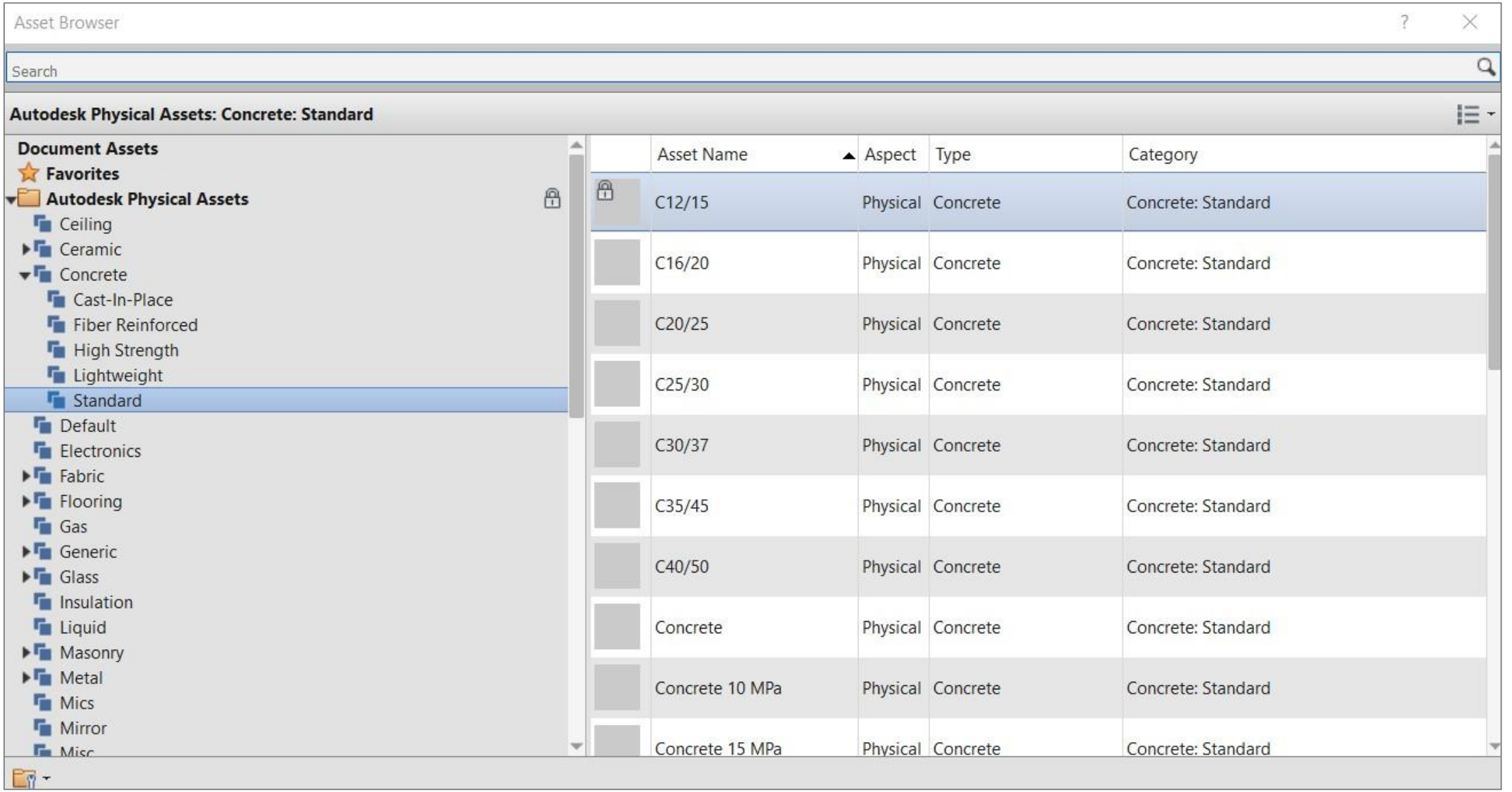


Asset Browser in Revit.


Asset Browser
Search
Autodesk Physical Assets: Concrete: Standard
Document Assets
Favorites
Autodesk Physical Assets
Ceiling
Ceramic
Concrete
Cast-In-Place
Fiber Reinforced
High Strength
Lightweight
Standard
Default
Electronics
Fabric
Flooring
Gas
Generic
Glass
Insulation
Liquid
Masonry
Metal
Mics
Mirror
Misc
Asset Name
Aspect
Type
Category
C12/15 Physical Concrete Concrete: Standard
C16/20 Physical Concrete Concrete: Standard
C20/25 Physical Concrete Concrete: Standard
C25/30 Physical Concrete Concrete: Standard
C30/37 Physical Concrete Concrete: Standard
C35/45 Physical Concrete Concrete: Standard
C40/50 Physical Concrete Concrete: Standard
Concrete Physical Concrete Concrete: Standard
Concrete 10 MPa Physical Concrete Concrete: Standard
Concrete 15 MPa Physical Concrete Concrete: Standard

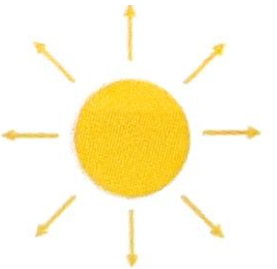
THE VISUAL APPEARANCE OF OBJECTS AND ENVIRONMENTS ALSO DEPENDS ON THE **POSITION** OF LIGHT SOURCES AND THEIR **PROPERTIES**.
THERE ARE MANY DIFFERENT LIGHT TYPES TO CHOOSE AND KNOWING WHICH ONE WORKS BEST FOR YOUR SCENE IS KEY TO CREATING A GOOD QUALITY RENDER.
AN INADEQUATE LIGHTING MODEL GENERATES INADEQUATE ARCHITECTURAL VISUALISATIONS.

PRINCIPAL LIGHT SOURCES IN COMPUTER GRAPHICS:

POINT SOURCE – SOURCE THAT EMITS LIGHT WITH UNIFORM LIGHT INTENSITY IN ALL DIRECTIONS. OBJECTS CLOSER TO THE LIGHT WILL BE BRIGHTER, AND OBJECTS FURTHER AWAY WILL BE DARKER.

SPOT LIGHT – SOURCE IN WHICH THE DIRECTIONS OF LIGHT EMISSION ARE BOUNDED WITHIN A GENERIC CONE WITH ASSIGNABLE ANGLE OF EMISSION (SPOTLIGHTS). OBJECTS CLOSER TO THE SPOT LIGHT WILL BE BRIGHTER, AND DEPENDING ON THE HOW WIDE THE CONE IS THE LIGHT WILL EITHER BE SOFTER OR HARDER.

POINT SOURCE



SPOT LIGHT

AREA LIGHT

AREA LIGHT - AN AREA LIGHT IS A LIGHT THAT CASTS DIRECTIONAL LIGHT RAYS FROM WITHIN A SET BOUNDARY, EITHER A RECTANGLE OR CIRCLE.

DIRECTIONAL LIGHT - DIRECTIONAL LIGHTS EMIT PARALLEL LIGHT RAYS IN A SINGLE DIRECTION AND OF EQUAL INTENSITY. A DIRECTIONAL LIGHT MIMICS THE LIGHTING THAT YOU WOULD GET FROM THE SUN.

AMBIENT LIGHT - AN AMBIENT LIGHT CASTS SOFT LIGHT RAYS IN EVERY DIRECTION. IT HAS NO SPECIFIC DIRECTIONALITY SO DOES NOT CAST ANY SHADOWS OR SHADING, AND SIMULATES MORE OF A SECONDARY LIGHT THAT IS COMING FROM ALL DIFFERENT ANGLES AND IS APPLIED TO ALL OBJECTS IN A SCENE. AMBIENT LIGHTING IS GREAT FOR FILLING IN AREAS ON A RENDER THAT DO NOT HAVE ENOUGH ILLUMINATION.

THREE-POINT LIGHTING

THREE-POINT LIGHTING IS A STANDARD METHOD USED IN VISUAL MEDIA. BY USING THREE SEPARATE POSITIONS, THE PHOTOGRAPHER CAN ILLUMINATE THE SHOT'S SUBJECT HOWEVER DESIRED, WHILE ALSO CONTROLLING (OR ELIMINATING ENTIRELY) THE SHADING AND SHADOWS PRODUCED BY DIRECT LIGHTING.

THE ***KEY LIGHT***, SHINES DIRECTLY UPON THE SUBJECT AND SERVES AS ITS PRINCIPAL ILLUMINATOR. MORE THAN ANYTHING ELSE, THE STRENGTH, COLOR AND ANGLE OF THE KEY DETERMINES THE SHOT'S OVERALL LIGHTING DESIGN.
IN INDOOR SHOTS, THE KEY IS COMMONLY A SPECIALIZED LAMP, OR A CAMERA'S FLASH. IN OUTDOOR DAYTIME SHOTS, THE SUN OFTEN SERVES AS THE KEY LIGHT.

THE ***FILL LIGHT*** ALSO SHINES ON THE SUBJECT, BUT FROM A SIDE ANGLE RELATIVE TO THE KEY AND IS OFTEN PLACED AT A LOWER POSITION THAN THE KEY. IT BALANCES THE KEY BY ILLUMINATING SHADED SURFACES, AND LESSENING OR ELIMINATING CHIAROSCURO EFFECTS. IT IS USUALLY SOFTER AND LESS BRIGHT THAN THE KEY LIGHT (UP TO HALF), AND MORE TO A FLOOD.

THE ***BACKLIGHT*** SHINES ON THE SUBJECT FROM BEHIND, OFTEN TO ONE SIDE OR THE OTHER. IT GIVES THE SUBJECT A RIM OF LIGHT, SERVING TO SEPARATE THE SUBJECT FROM THE BACKGROUND AND HIGHLIGHTING CONTOURS.

IN REVIT, THE FOLLOWING **RENDERING SETTINGS** NEED TO BE DEFINED:

- REGION RENDER;
- RENDER QUALITY;
- LIGHT SETTINGS;
- BACKGROUND;
- EXPOSURE SETTINGS.

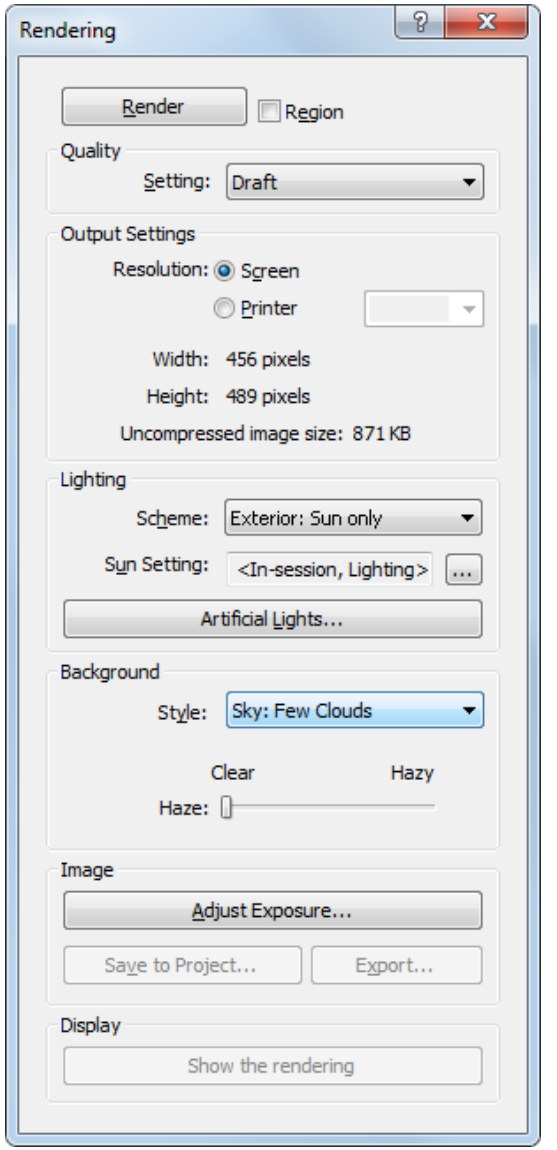
IN GENERAL, FOUR MAIN STEPS ARE GENERALLY SUGGESTED:

1 - RENDER THE VIEW TO TEST THE COMPOSITION (**CLAY RENDER**).

2 - RENDER A **REGION** OF THE 3D MODEL TO **TEST** THE ATTACHED MATERIALS AND LIGHTING.

3 - IF NECESSARY, ADJUST THE MATERIALS AND LIGHTING IN THE SCENE BASED ON THE RESULTS OF THE TEST RENDERING.

4 - SET A RENDER PRESET WITH THE **BEST RENDERING QUALITY** DESIRED CURRENT AND CREATE THE FINAL RENDERED IMAGE.



Rendering dialog in Revit.

Alex Hogrefe

Alex Hogrefe