



LIGHT  
&  
SHADOW

YUE HU

ALL MATERIAL IN NATURE, THE MOUNTAINS AND THE STREAMS AND THE AIR AND WE,  
ARE MADE OF LIGHT WHICH HAS BEEN SPENT, AND THIS CRUMPLED MASS CALLED  
MATERIAL CASTS A SHADOW, AND THE SHADOW BELONGS TO LIGHT.

--LOUIS I. KAHN

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## Introduction

My project is about " Light and Shadow".

If we can see this world, it is because of light, when we see the light, we also can see the shadow with it. Light and shadow let us to perceive everything around us.

Hundreds years ago, the light is natural light, and then, with the bulb was invented, artificial light used by people by many ways.

When Chinese built gardens thousands years ago, there is no artificial light, but Chinese attach importance to artistic conception, they used many ways to utilize natural light to create light and effect.

And when we study the famous architecture, the designers are good at using light and shadow to create space. Also the interior design, they use natural light and artificial light to achieve different effects. But, when we make a general survey of landscape, the light and shadow haven't grabbed people's attention.

So what I want to do is finding the method designers always used in architecture, interior design and Chinese traditional gardens, and then try to use the method in landscape.

# NO LIGHT

## Natural Light

In nature, the natural light we can use are the sun and moon.

Because of the natural is tonal unity, uniform brightness distribution, it is widely applied to indoor design.

Because people have dependence on natural light, if long time living in a space without any light, it will have great impact on people's psychology, and may even suffer from mental illness.

So buildings will remain a large area makes natural light in the room. In interior design, the designer will use light and shadow effect which was produced by natural light to create space stereo feeling and sense of depth.

However, because natural light is not stable, the weather change can cause the change of the light, build up the space of stereo feeling and sense of depth also can be changed.



## Artificial light

Artificial light is the artificial lighting as we seen in our daily life, such as lamps, candles, etc.

Relative to natural light, artificial light is more controllable and immobility, because the natural light is controlled by various element, such as weather, people can't control natural

light easily, but artificial light can be changed by people's purpose because the artificial light is created by people.

When designers in the design process, they don't need consider about the change of light can change the design intent, you just need to know the characteristics of each lighting.



"MOMENTUM"  
UVA SENSATIONAL VISUAL ART TEAM  
LONDON'S BARBICAN ART MUSEUM

There is no light without shadow. The interaction of these two unequal brother has been described in ways as different as the notion that shadow are "holes in the light" through to the opposite idea that they are "the remaining represent actives on earth of the cosmic darkens, otherwise torn by light."

5

--Louis I. Kahn

The Treasury of the Shadow, lying in ambiance, Light to Silence. Silence to Light. Light, the giver of presence, casts its shadow with belongs to Light, what is made belongs to Light and Desire.

Light is the one resource that can be easily and cheaply exploited by any photographer with any camera to produce a beautiful photo.

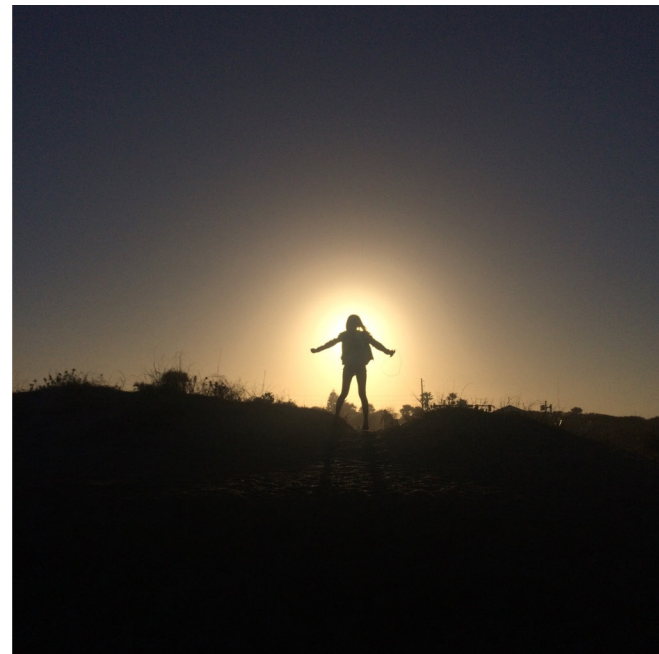


It's amazing how photographers can travel to the same place at the same time and come away with completely different photographs.

Play with light and shadows to sublimate reality. Change bodies into anonymous silhouettes, sometimes into threatening shadows.

Attenuate the depth of field with darkness to get graphic and mysterious photographs.

Day photography, with strong back lighting, looks like night photography.



LADY WITH AN ERMINE  
LEONARDO DA VINCI

Because of the light and shadow, the artists can create the oil painting, and by using the light and shadow, the artists conveys a variety of means, show a variety of forms, and give aesthetic value to persons.

The first master who pay attention to the effect of light and shadow in oiling painting is Leonardo Da Vinci.

Leonardo Da Vinci made the research about light and shadow was on the base of natural science, he explained the necessary meaning of the light and shadow on modeling, he thought "every solid are coated by light and shadow. No opaque material without the light and shadow. Without the light and shadow, nothing can be observed.

THE CALLING OF SAINT MATTHEW  
MICHELANGELO MERISI DA CARAVAGGIO



People paid little attention to the light changes in our daily life, but in the painting, the change of light can cause people's attention, even decide people's emotions.

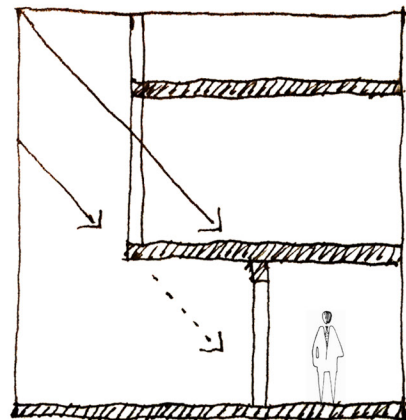
So to speak, to a certain extent, light and shadow is the soul of the painting. Light directly involved in the conception of the whole process of artistic creation such as painting composition, image modeling, atmosphere foil, prompted the artist's imagination, conceive and design by reasonable lighting, creatively use light color, brightness and contrast, in this way, let artist to think and explore how to deal with light and shadow.

One of the most powerful aspects of Louis I. Kahn's architectural space is his handling of natural light. Kahn believed that architecture began with the "making of a room," and that "a room is not a room without natural light." Throughout his career he endeavored to bring his interiors to light in the most imaginative ways. Kahn used passionate light and functional light, glaring light and indirect light, warm light and cold light, each working differently in his architecture.

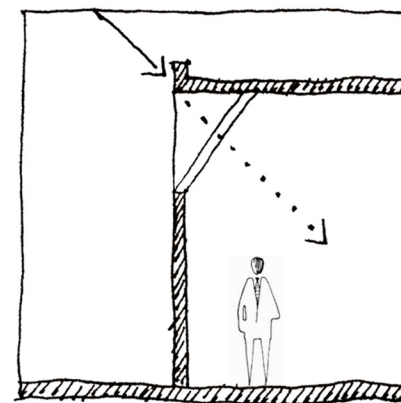
Louis I. Kahn's projects Analysis

"Material lives by light," wrote Louis I. Kahn. "You're spent light, the mountains are spent light, the trees are spent light, the atmosphere is spent light. All material is spent light."

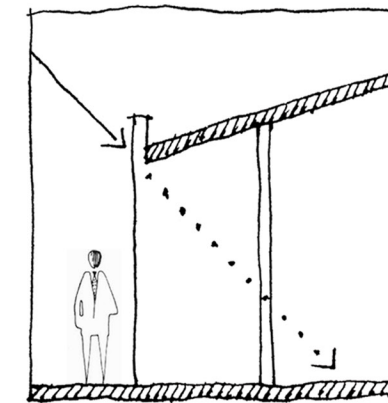
STUDENT WORK  
SHOPPING CENTER  
1924



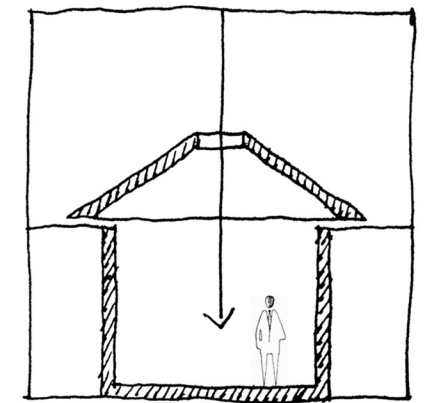
PHILADELPHIA PSYCHIATRIC HOSPITAL  
1944-46; UNBUILT  
WITH O. STONOROV



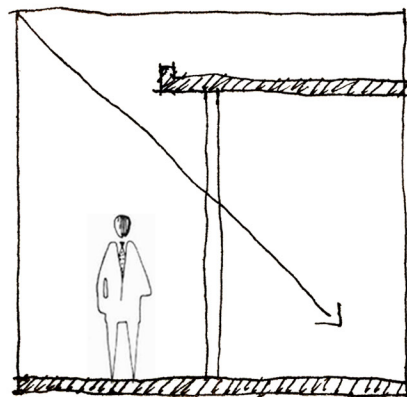
Q. ROCHE HOUSE  
1947-49; BUILT  
CONSHOHOKEN, PENNSYLVANIA  
WITH O. STONOROV



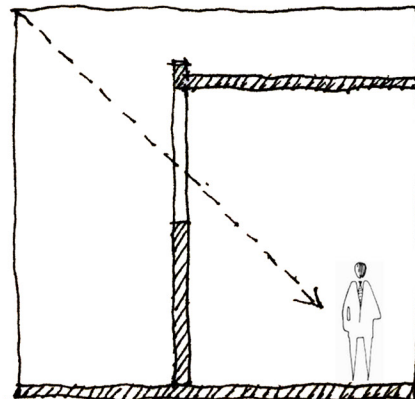
JEWISH COMMUNITY CENTER  
1954-59; BATH HOUSE AND DAY CAMP BUILT  
EWING TOWNSHIP, TRENTON, NEW JERSEY



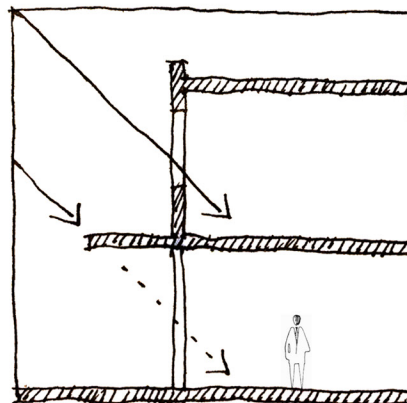
JERSEY HOMESTEADS  
1935-37; BUILT  
ROOSEVELT BOROUGH, NEW JERSEY  
WITH A. KASTNER



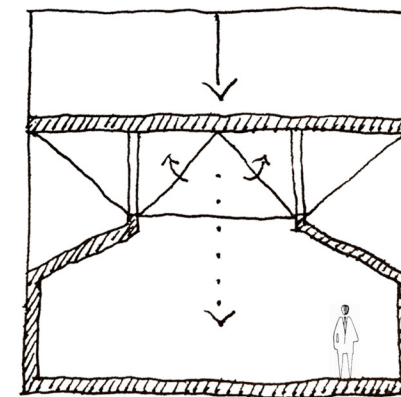
AHAVATH ISRAEL SYNAGOGUE  
1935-37; BUILT  
PHILADELPHIA, PENNSYLVANIA



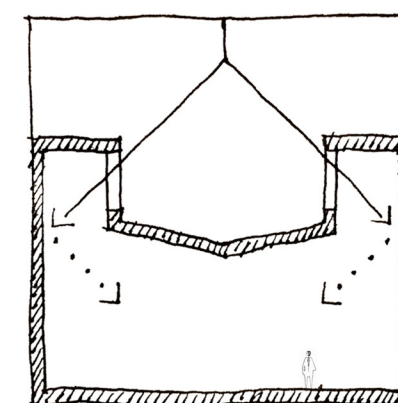
PREFABRICATED HOUSE STUDIES  
1937-38; UNBUILT  
WITH L. MAGAZINER AND H. KLUMB



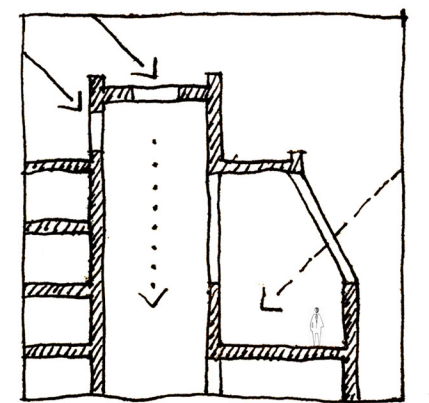
C. CLEVER HOUSE  
1957-62; BUILT  
CHERRY HILL, NEW JERSEY



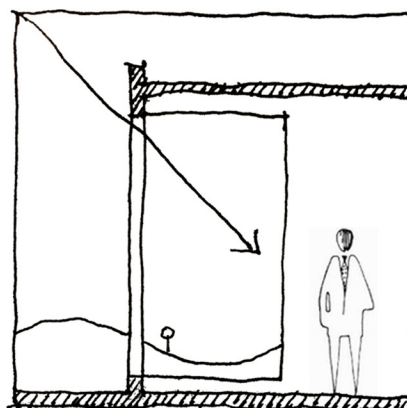
FIRST UNITARIAN CHURCH AND SCHOOL  
1959-69; BUILT  
ROCHESTER, NEW YORK



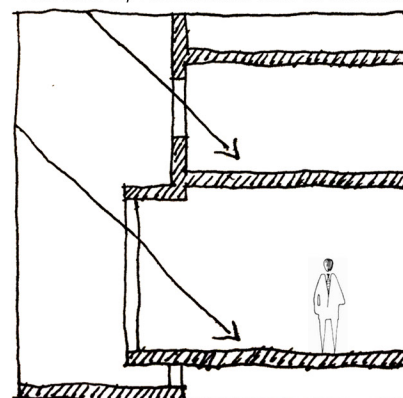
PHILADELPHIA COLLEGE OF ART  
1960-66; UNBUILT  
PHILADELPHIA, PENNSYLVANIA



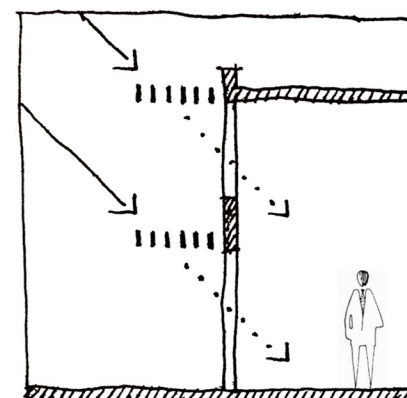
J. OSER HOUSE  
1940-42; BUILT  
ELKINS PARK, PENNSYLVANIA



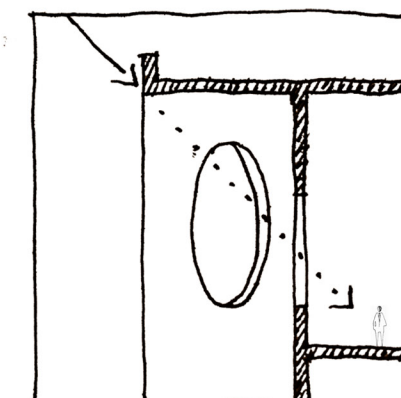
INTERNATIONAL LADIES GARMENT WORKERS  
UNION HEALTH CENTER  
1943-45; UNBUILT  
PHILADELPHIA, PENNSYLVANIA WITH O. STONOROV



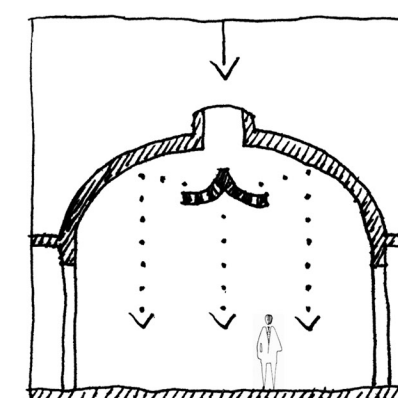
PARASOL HOUSES  
1944; UNBUILT  
WITH O. STONOROV



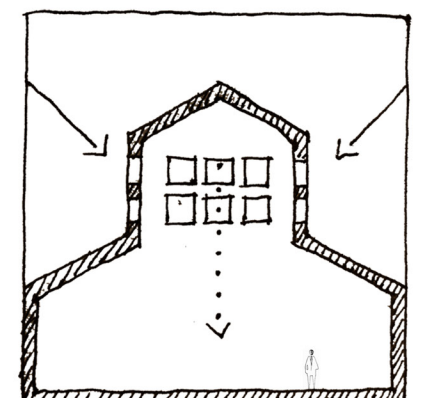
INDIAN INSTITUTE OF MANAGEMENT  
1962-74; BUILT  
AHMEDABAD, INDIA



KIMBELL ART MUSEUM  
1966-72; BUILT  
FORT WORTH, TEXAS



TEMPLE BETH-EL SYNAGOGUE  
1966-72; BUILT  
CHAPPAQUA, NEW YORK

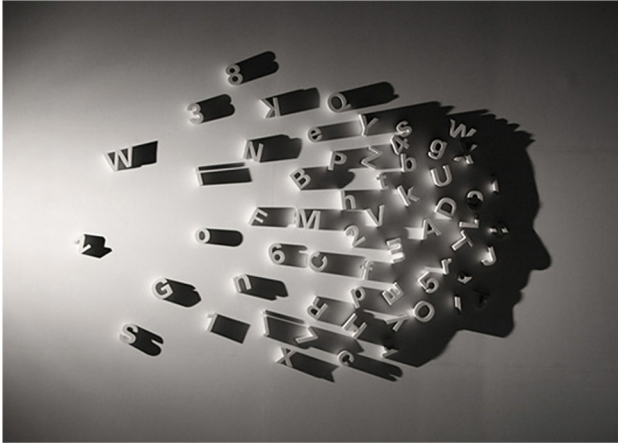


Light and shadow is widely used in interior design, to produce different effects. From the aspects of bright and color, when the natural light in the illuminate indoor at the time of the strongest , it must be bright, vibrant visual effect and psychological feelings. Light and shadow is an integral part in interior design, it makes indoor's environment beautification, indispensable to make interior atmosphere condition. The change of light and shadow directly affects the color, texture, shape of each element indoor, and then the light and shadow can affect the visual effect and people's psychological.

One of the most obvious reflecting of light and shadow in the interior is on the wall, because the walls are the most irradiation area of light, to maximize the designer's lighting and shading.

With the gradually development of interior design and improvement of people's aesthetic standards. In the procession of building space atmosphere, the use of light and shadow play a more and more important role.

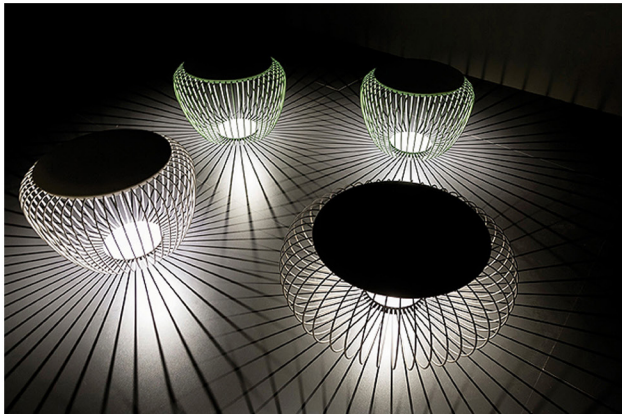
Modern interior design is using the adornment, decorate to change people's aesthetic view, improve the environment of human's life and people's aesthetic standard. Interior decoration is according to people's life habit and life requirements to do the design, to make people's living environment more reasonable, beautiful and comfortable, to rational distribution of interior space. And light and shadow can let indoor design become more abundant, more sense of depth.



KUMI YAMASHITA



PHILLIP K SMITH III, LOS ANGELES – CALIFORNIA



MERIDIANO LUMINAIRE BY JORDI VILARDELL & MERITXELL VIDAL

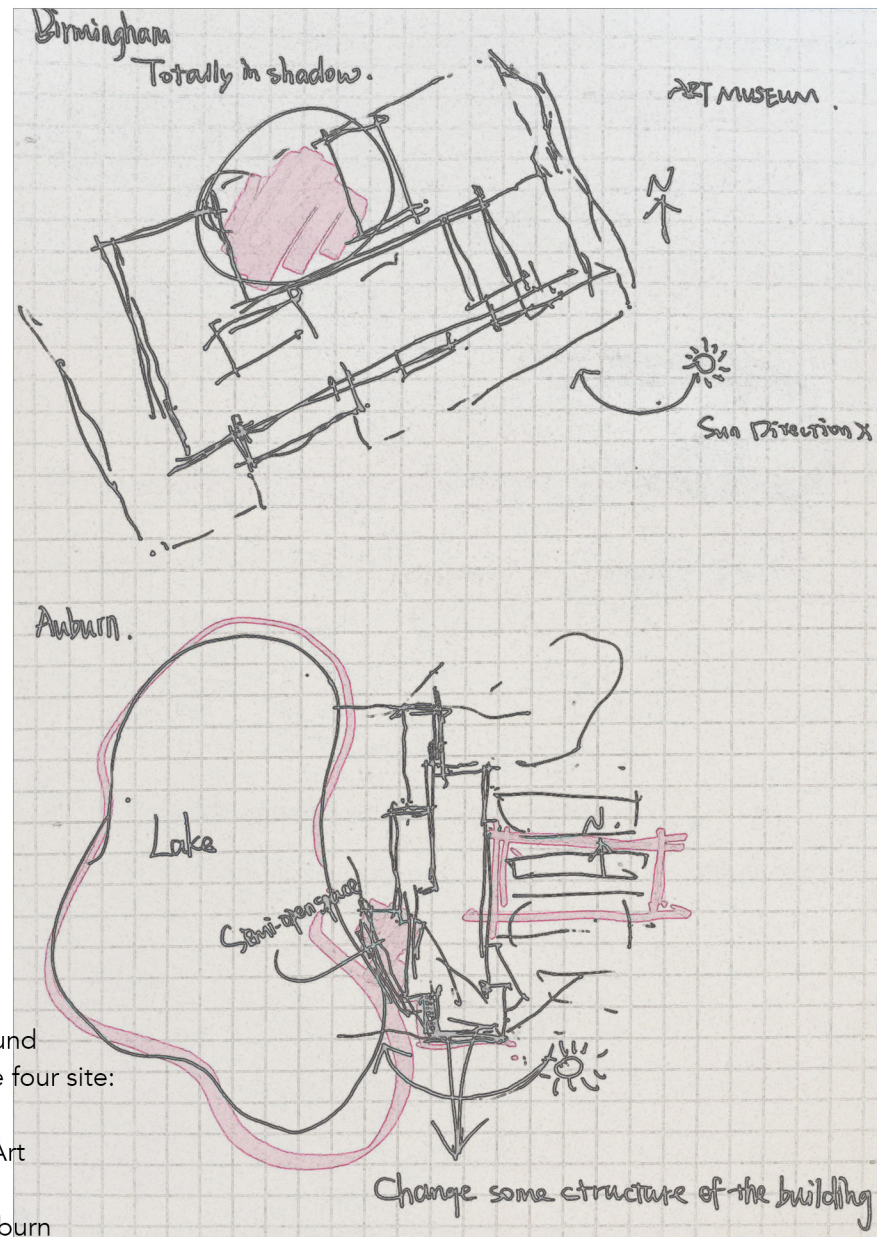
We know, the photography, painting, architecture, interior design, the Chinese traditional garden all attach great important to the light and shadow effect, even rely on the light and shadow to build the space. In the landscape, most design know create the shady and cool space for people, but the light and shadow doesn't get as much attention as the photography, painting, architecture, interior design or Chinese traditional garden. But if the landscape which was focus on light and shadow received people's affect.

HOW CAN WE USE LIGHT AND SHADOW AS MATERIALS IN DESIGNING LANDSCAPE, SIMILAR TO HOW THEY ARE USED IN ARCHITECTURE, INTERIOR DESIGN AND CHINESE TRADITIONAL GARDENS ?



# Site Selection & Test Design

Because most methods are based on study of architecture use of light and shadow. So, I want to choose a site and do design around the building, extend the method from architecture and interior design to landscape. Building the semi-open spaces, to show how the light and shadow extend from indoor to outdoor. Additionally, thinking about the feeling and emotion of the light and shadow. I decide to select an Art Museum. Making the arts are not only show in the building, but also the structure, the surrounding environment. People can feel art everywhere.



I searched some Art Museum around Alabama, and finally choose these four site:

1. Birmingham Museum of Art
2. Montgomery Museum of Fine Art
3. Huntsville Museum of Art
4. Jule Collins Smith Museum, Auburn

Then I do some research of these site.

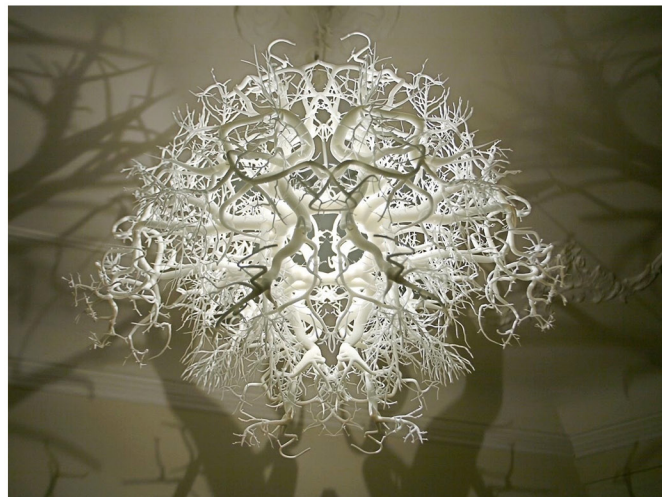
At the first three site, building's orientation is not suit to create light and shadow space here. The open space around building stay in shadow all the time.

But the Jule Collins Smith Museum is a good place, the shadow changes all time a lot around the building.

"We knew that the museum would always be full of surprise. The blues would be one thing one day; the blues would be another thing another day, depending on the character of the light. Nothing static, nothing static as an electric bulb, which can only give you one iota of the character of light. So the museum has as many moods as there moments in time, and never as long as the museum remains as a building will there be a single day like the other."

-- Louis I. Kahn

In interior design, the artificial light can enlarge things, give people a different unreal feeling of the shadow, not from the object indoor.



This is one of those elements of Interior Design that one never thinks of...light shadows on the wall creating another texture and surprise to a room.

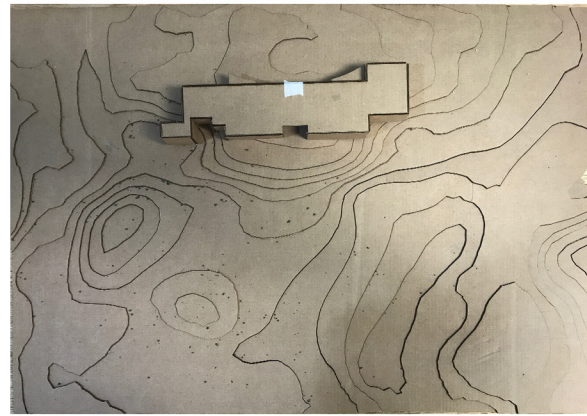
From that, I remember an art I have seen some month ago. The art idea is about " Miniature Street Art".



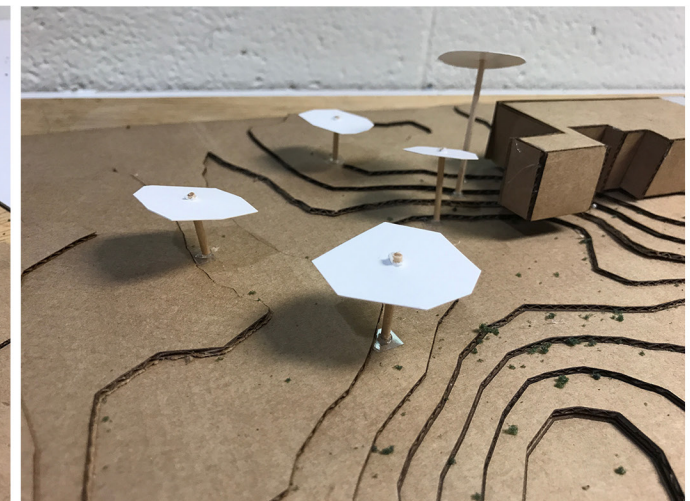
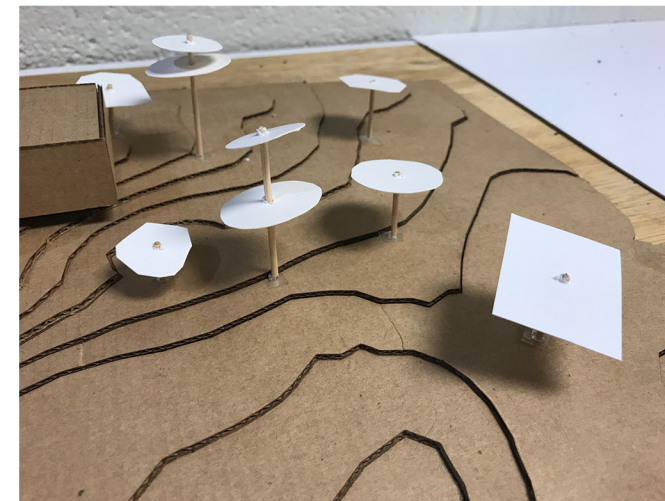
The mini structures can't be found by people very easily, but the light can enlarge the visual effect, so I want to use artificial light to show it for human, I want to make some mini structures under the walls, using the artificial light project the shadow on the walls, that people can see the shadow and structures

But in test design, these mini thing in the real environment, scattering is an important thing, the shadows can't show very clearly on the huge walls.

At first time, I want to create space by light and shadow only on the outside area. Using the vegetation and structures to building more flexible shadow. I made a physical model with the existing topography and building, I make some removable tree with various shape, size and height, try to put them on the model to find the difference with the location and density of the plant.



It can be some difference with the plants layout, but actually, because the light is natural light, the orientation of the shadow is same, the overall movement is like a stable change, if don't consider about the texture of the trees, the change are boring. So I need to seek more ways, make the design wider, using the light and shadow by different ways and build this whole site.



I don't like to see space nailed down. If you could move it and change it every day, fine.  
--Louis I. Kahn

After this unsuccessful design, I returned to the case study to do more specific research and categorize of the light and shadow effects which are widely used in architecture, interior design and Chinese traditional garden.

## CREATE VIRTUAL SPACE/ REFLECTING EFFECT

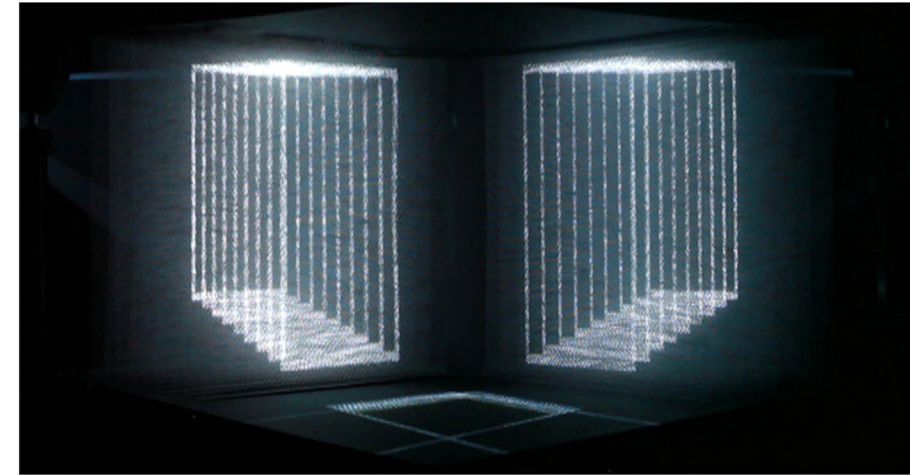
Using natural light with materials or using artificial light can from an visionary world for people.

CLOUD-GATE  
CHICAGO  
ANISH KAPOOR



This mirrored surface reflects the Chicago skyline, but its elliptical shape distorts and twists the reflected image. As visitors walk around the structure, its surface acts like a fun-house mirror as it distorts their reflections.

DAYDREAM  
NONOTAK  
LUMINA FESTIVAL CASCAIS/ PORTUGAL



It is an audiovisual installation that generates space distortions. Relationship between space and time, accelerations, contractions, shifts and metamorphosis have been the lexical field of the project. This installation aimed at establishing a physical connection between the virtual space and the real space, blurring the limits and submerging the audience into a short detachment from reality.

Lights generate abstract spaces while sounds define the echoes of virtual spaces. Daydream is an invitation to contemplation. The frontality of the installation leads the visitors to a passive position.

## BE THE EDGE/ THRESHOLD

The edge and threshold can not only be formed by walls, light and shadow can be the edge in people vision.

HOLES



In Chinese traditional garden, designers always use the door and window and enlarge the light and shadow effect to draw an edge of a view, it's like a beautiful painting in a frame.

SERGE NAJJAR CAPTURES THE ARCHITECTURE OF LIGHT



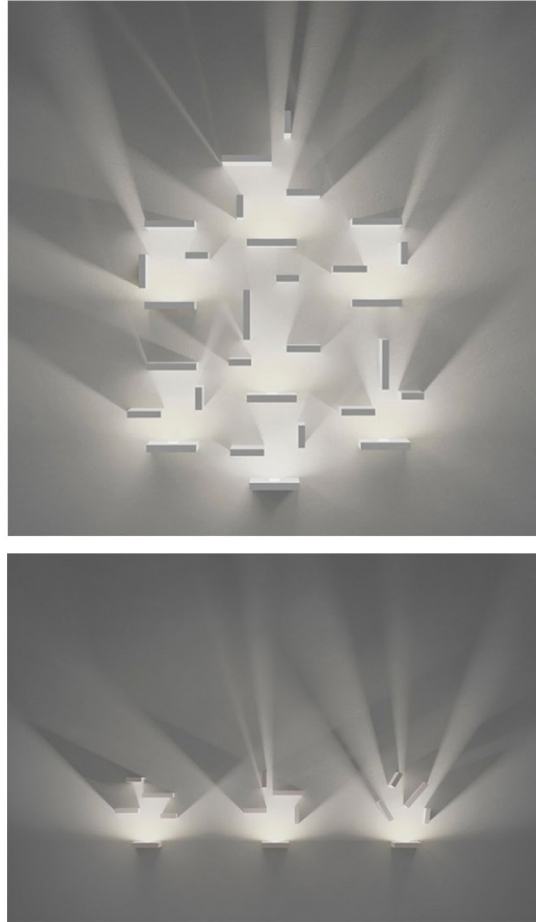
Lebanese photographer Serge Najjar's series "The Architecture of Light" explores the natural illumination of buildings around his native Beirut. His high-contrast black and white photos focus on the geometric shapes, lines and patterns cast upon the walls of concrete structures around the city.

Playing with negative space and the tension between sunshine and shadow, Najjar's compositions reflect his artistic philosophy that "It's not about what you see, but how you see it." the light and shadow separate the space to different part, the light and shadow like the edge of the space.

## LEADING EFFECT

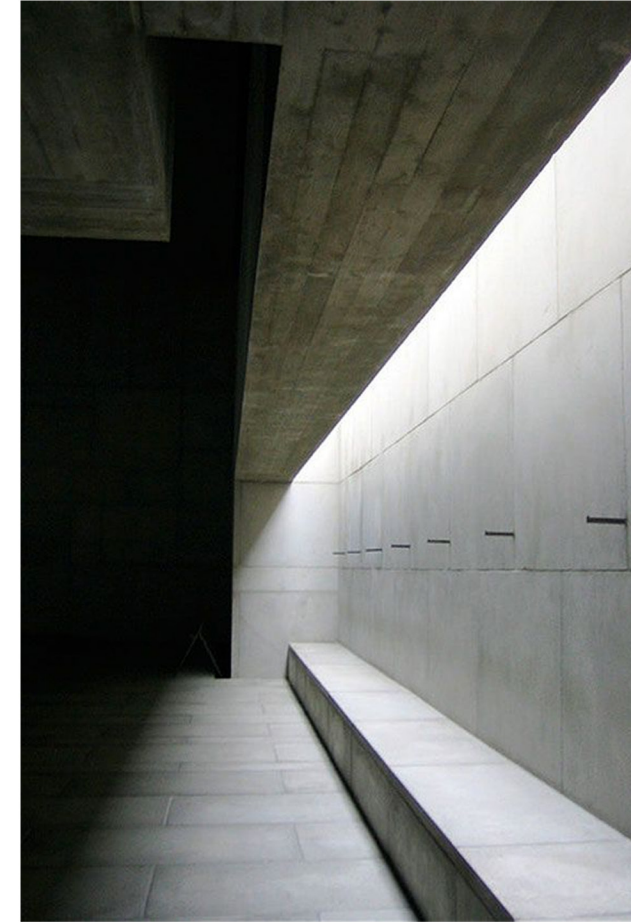
People may follow some space where make them comfortable, may under light, may under shadow.

JOSEP LLUÍS XUCLA



This is an infinitely modular and endlessly configurable wall lighting for Vibia. This wall lighting shows a cleverly uses light and shadow to produce unique illumination effects. You can install it as you like to create your own lighting and shadow effects.

HELGA KORSETS CHAPEL  
PEKKA PITKÄNEN



the light leads from the top and from a space, this bright space can leads people to stay here, have a rest or read some books.

## FEELING

Using natural light with materials or using artificial light can from an visionary world for people.

SUZHOU MUSEUM  
I. M. PEI



the shadow of the tree texture on the wall give people a quiet feeling, let people to enjoy the life.

THE ORIENTAL METROPOLITAN MUSEUM  
CHIEN CHUNG PEI

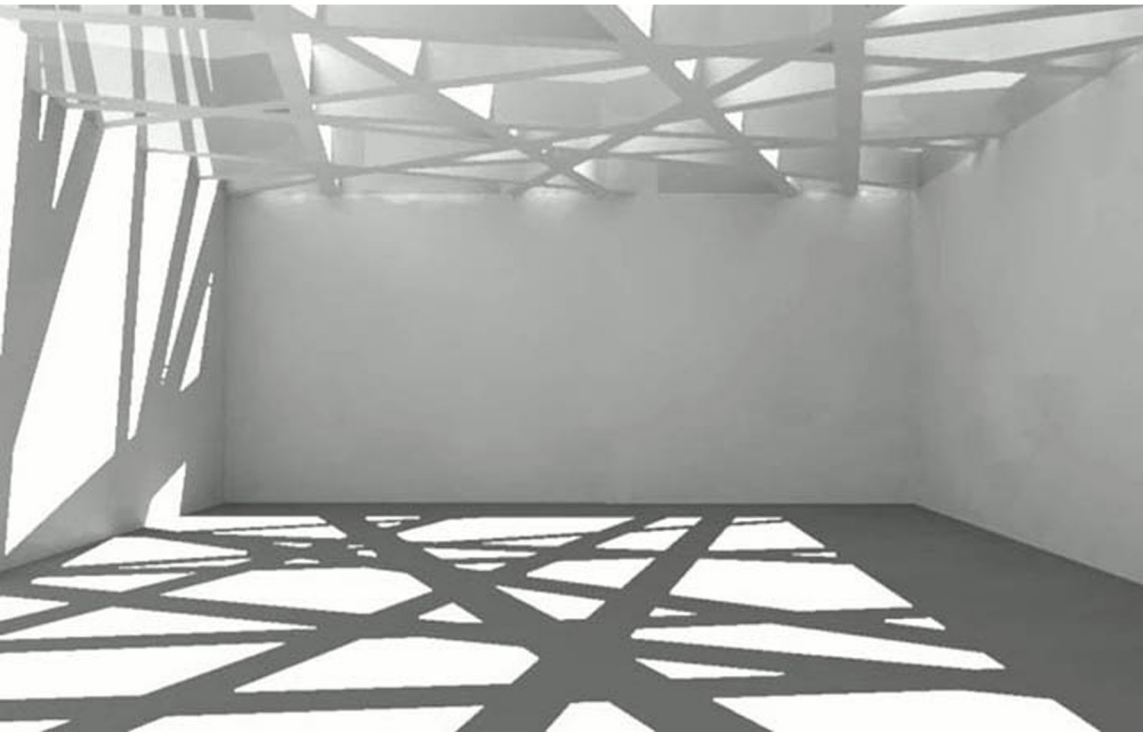


This is a museum in NANJING, china.  
the transparency material with the plants show a hazy feeling and mystery.

# Shadow Studies

Using small models to show the different shadow between construction and plant.

ARCHITECTURE: CONSTRUCTION



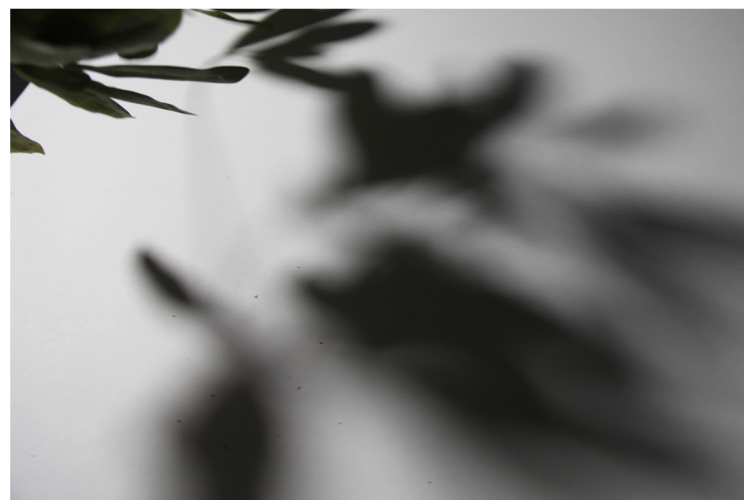
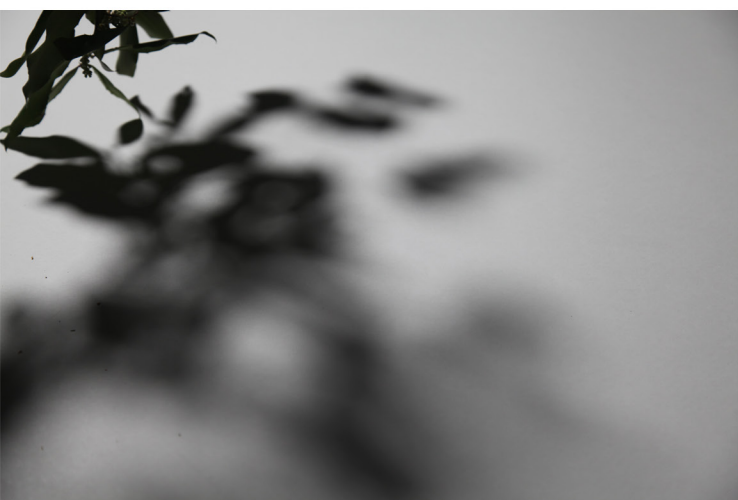
LANDSCAPE: VEGETATION







With the same cardboard, same location to make some holes on them, and change one element each time, under the same light, to show the different shadow between them.  
The shape, size, density of the holes will all affect the effect the shadow.

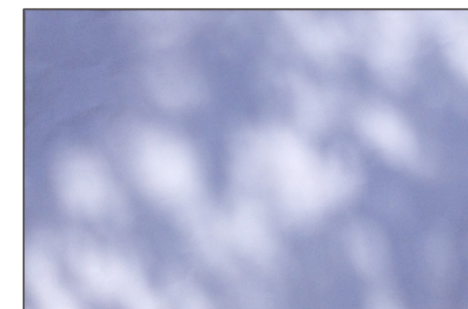
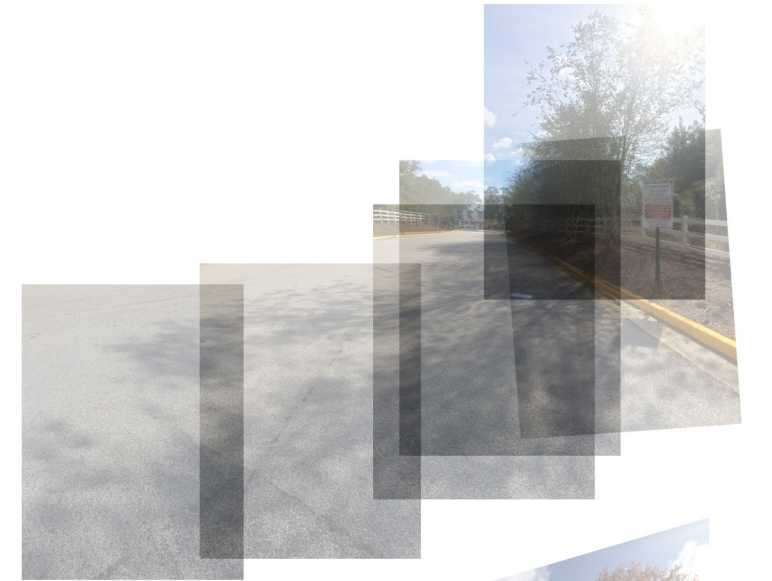
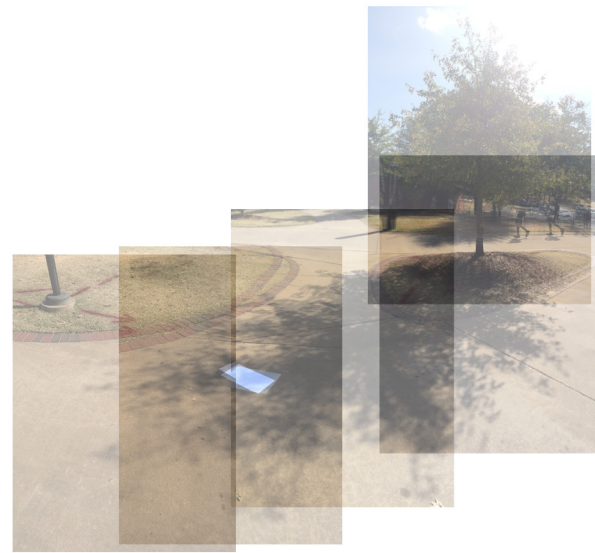
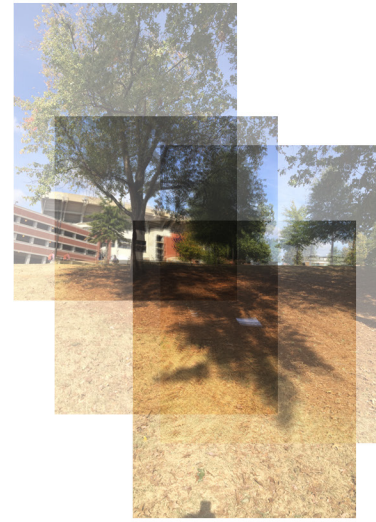


The species of the trees will influence the shadow, the density of the leaves also make the difference. So, even the same species will form different shadow, in the various seasons.

The picture is showing the static state of different trees' shadow, but actually, in the environment, they move with the wind and the shadow depth will depend on the light of the day and how tall of the tree and some other elements.

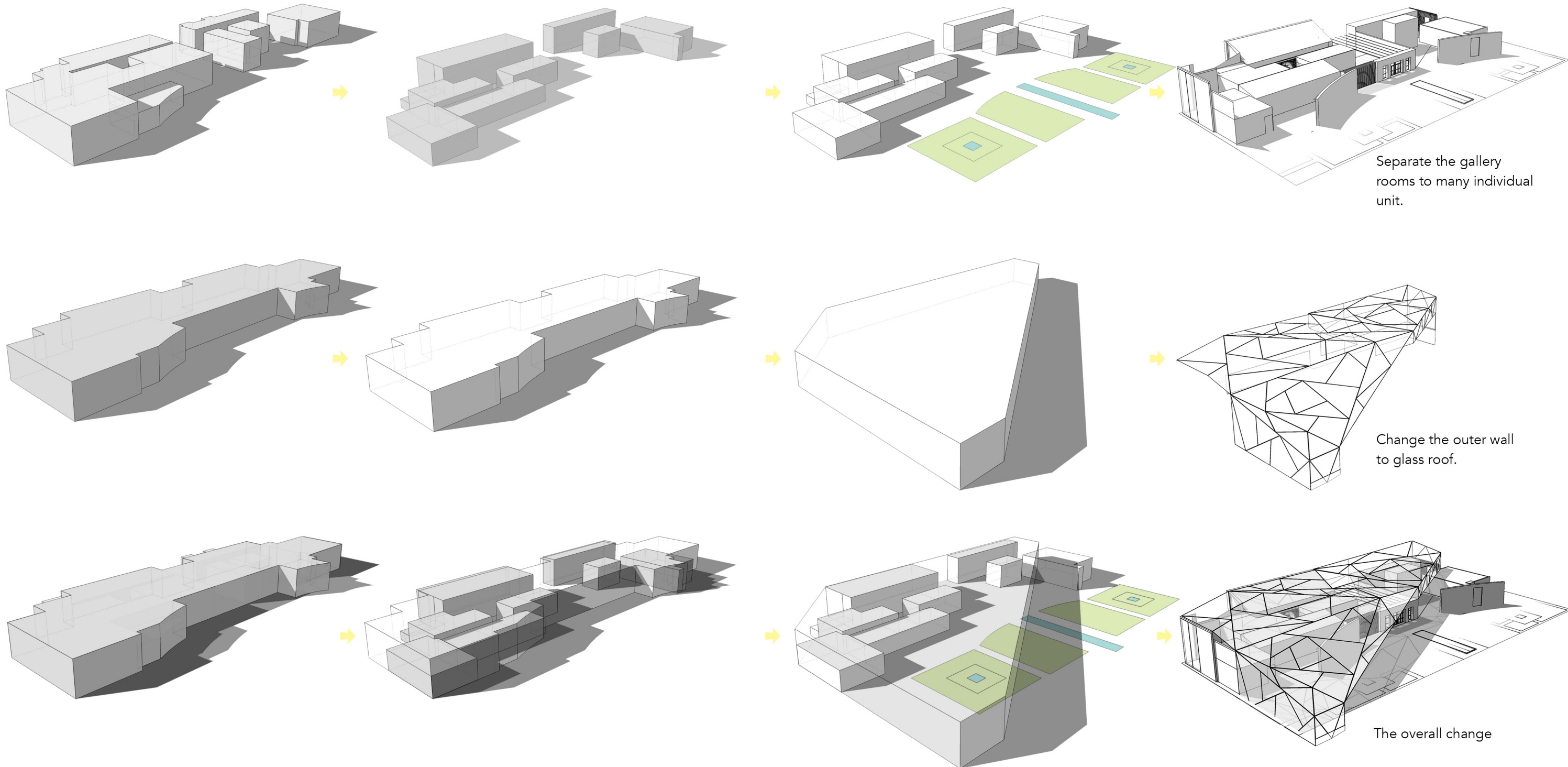
The shadow of the trees is dynamic and changeable.

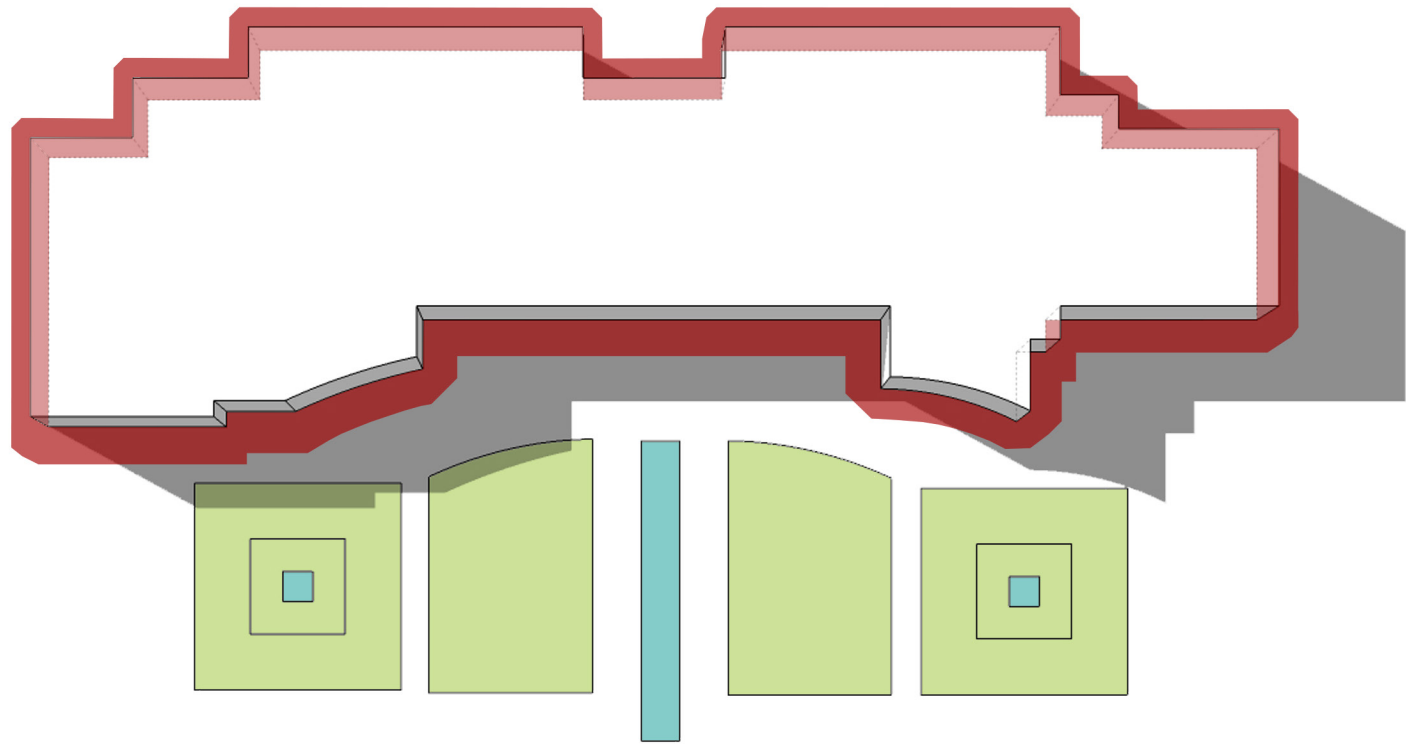
All photos took in same day and near same time(12pm).  
It can shows that different species will have different shadows.



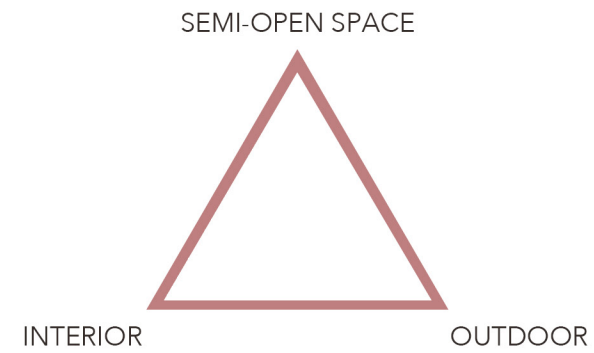
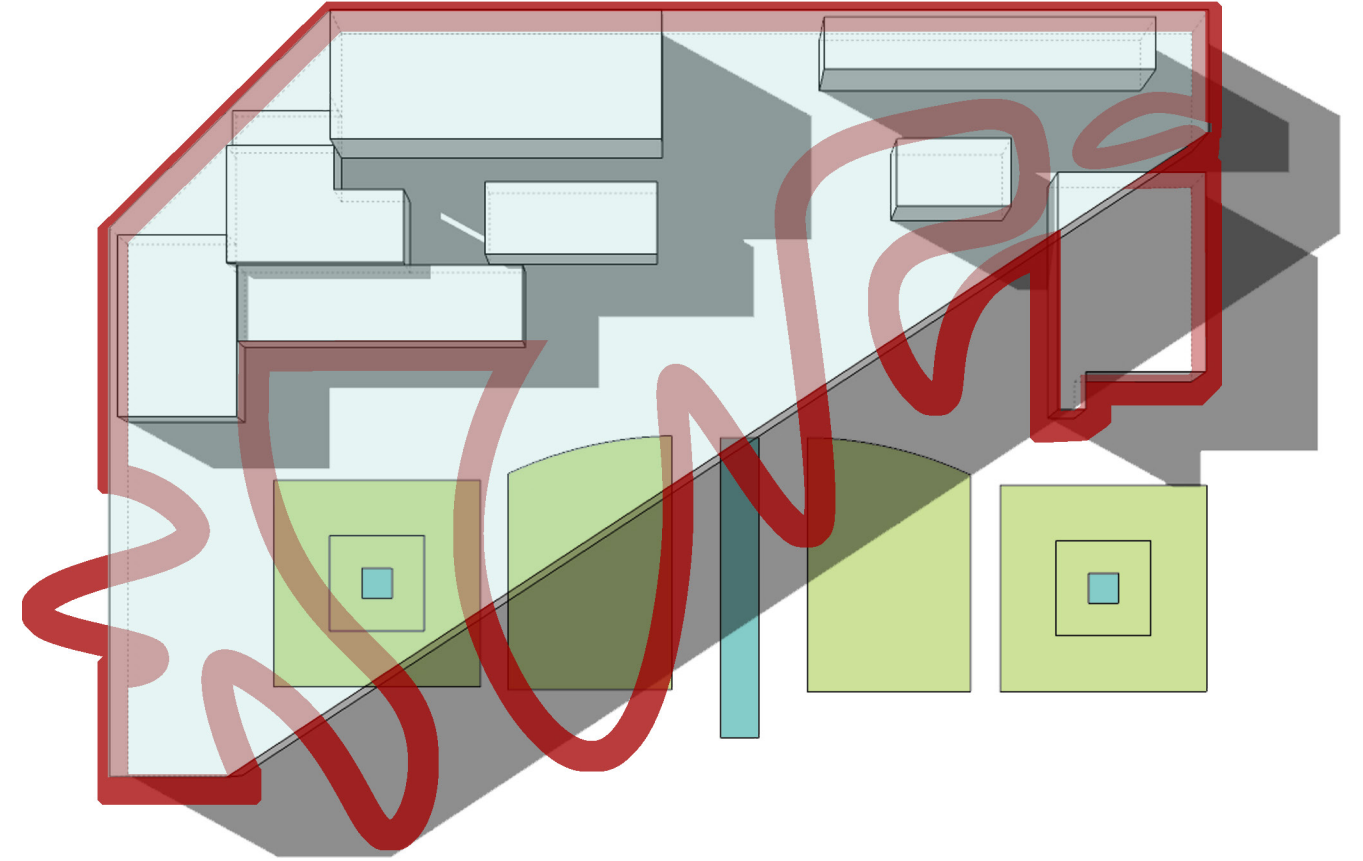
# Museum Design

After more specific case study research and categorize, according the four methods which based on study of architecture, interior design and Chinese traditional gardens do the museum design.





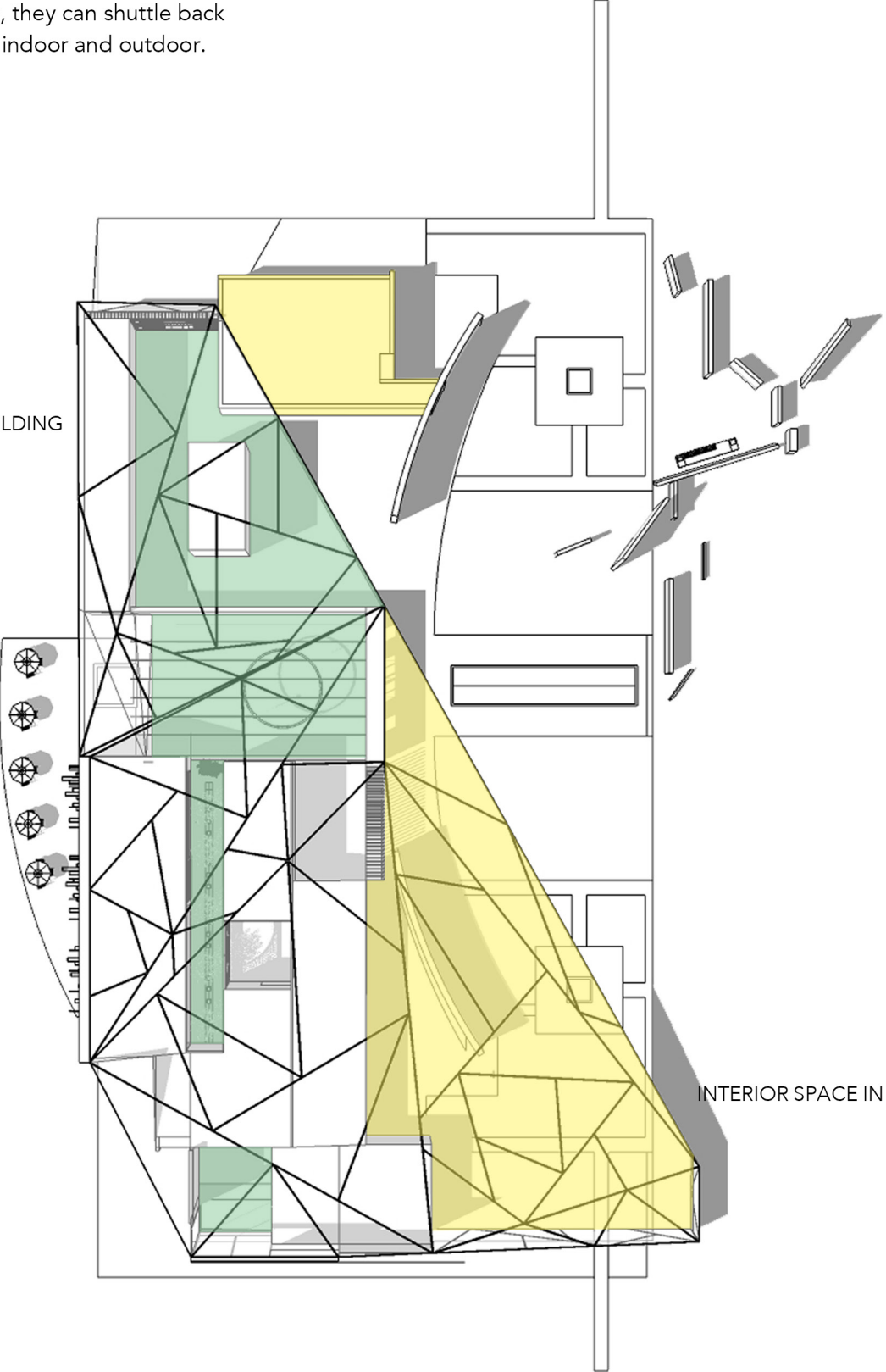
Existing, the edge between indoors and outdoor is very clear. Indoors is indoor, outdoor is outdoor, the boundary is the outer wall of the building. The edge won't change, there are no interaction between indoors and outdoors.



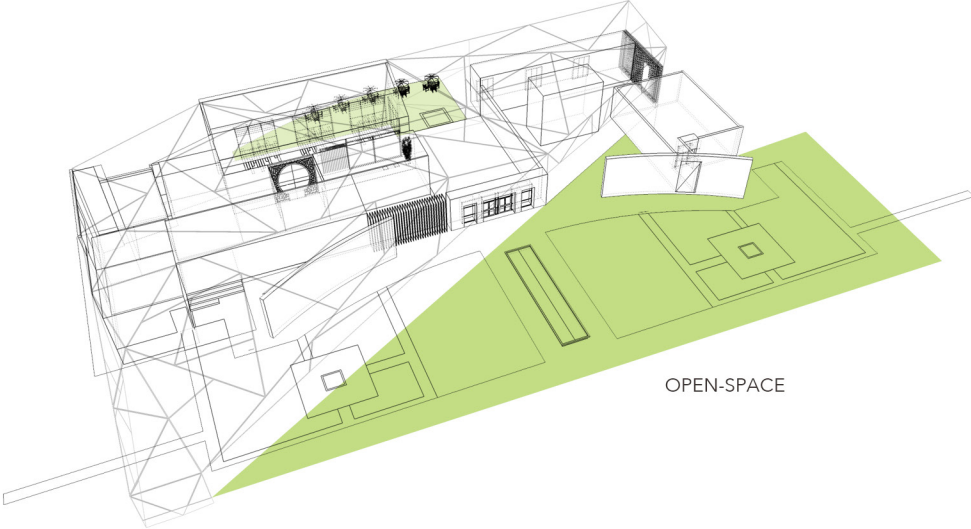
My design will break the outer wall of the building, and give the edge a various change. I add more semi-open space between indoor and outdoor, connect and mix them together. People can have a good interaction between indoors and outdoors.

Introduce open space in the building and add some private space outside. When people visit gallery, they can shuttle back and forth between indoor and outdoor.

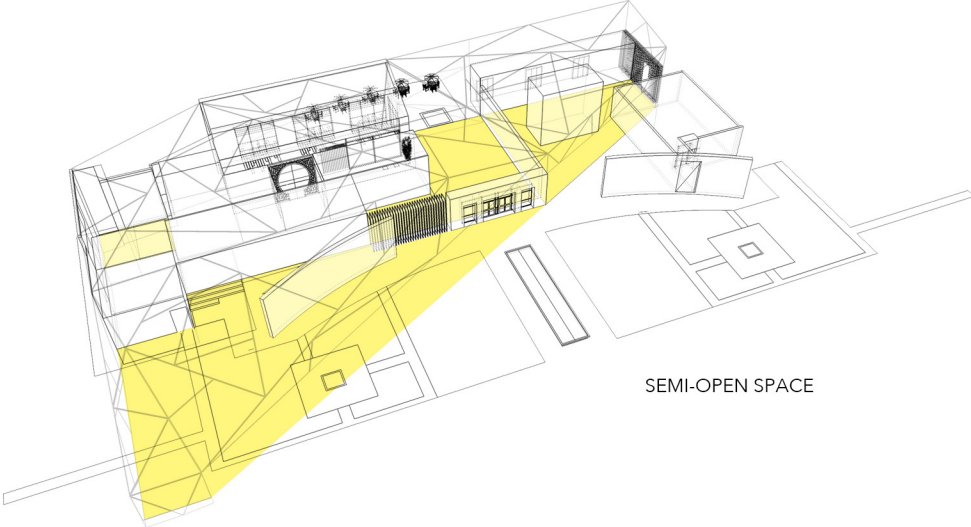
OPEN-SPACE IN BUILDING



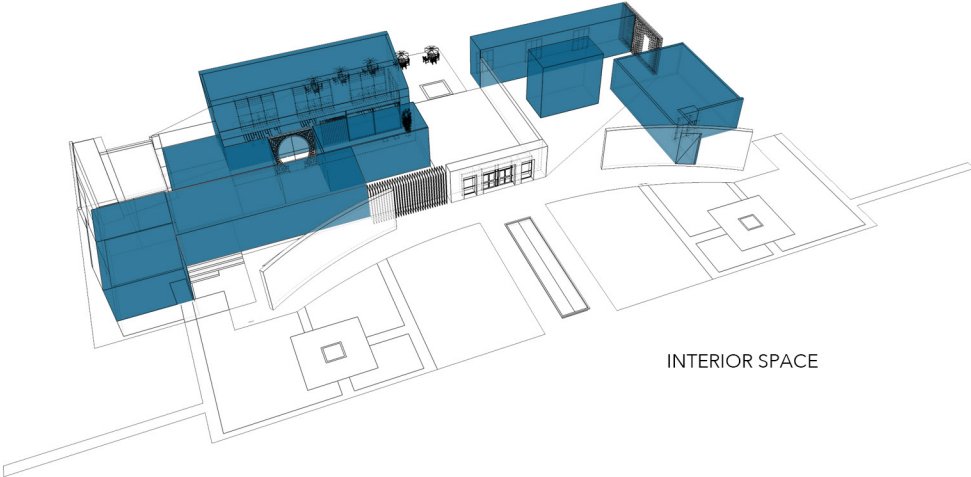
INTERIOR SPACE IN OUTDOOR



OPEN-SPACE

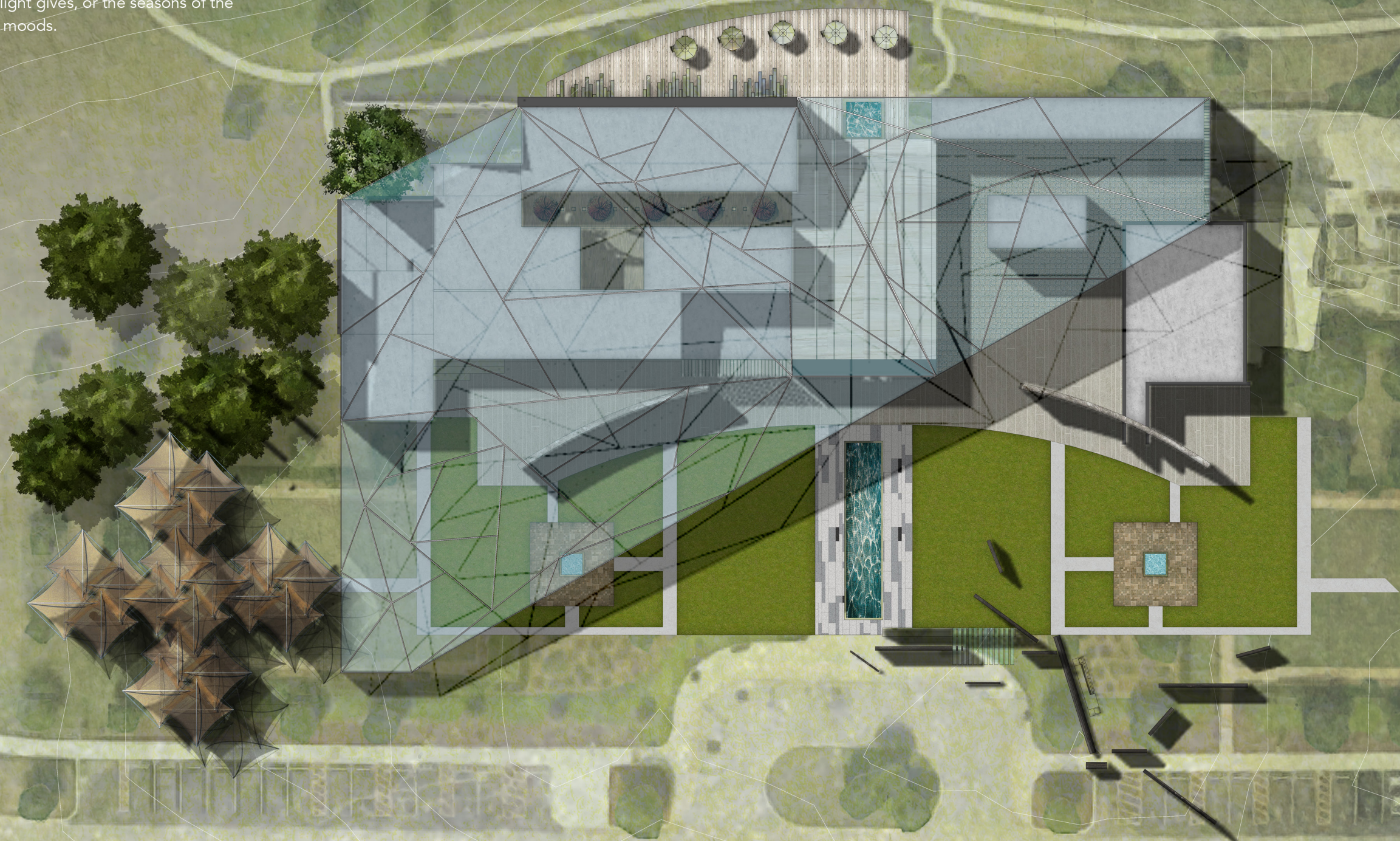


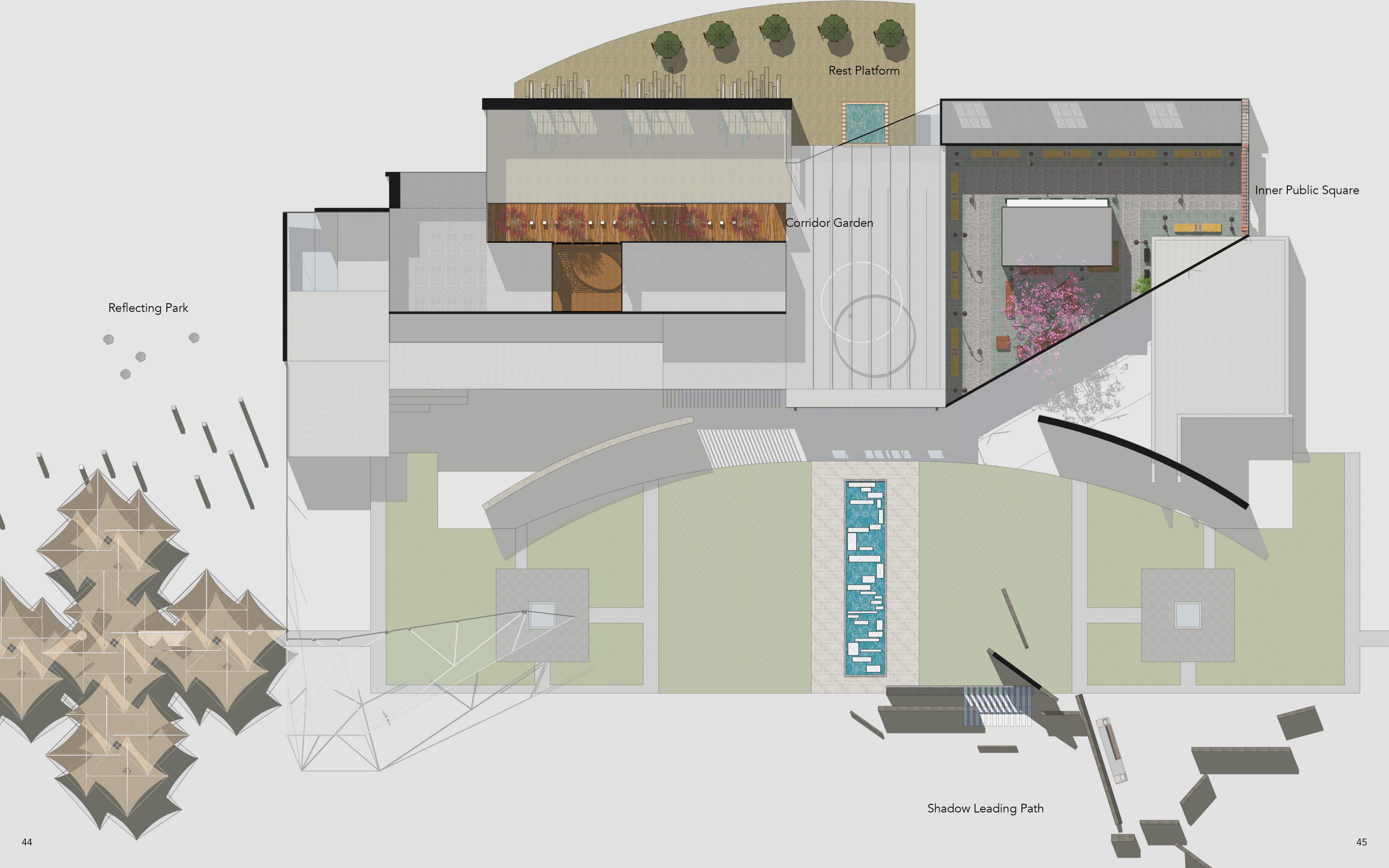
SEMI-OPEN SPACE



INTERIOR SPACE

So this is a kind of invention that comes out of the desire to have natural light. Because it is the light the painter used to paint his painting. And artificial light is a static light... where natural light is a light of mood. And sometimes the room get dark - why not? - and sometimes you must get close to look at it. And come another day, you see, to see it in another mood - a different time... to see the mood natural light gives, or the seasons of the year, which have other moods.





Rest Platform

Corridor Garden

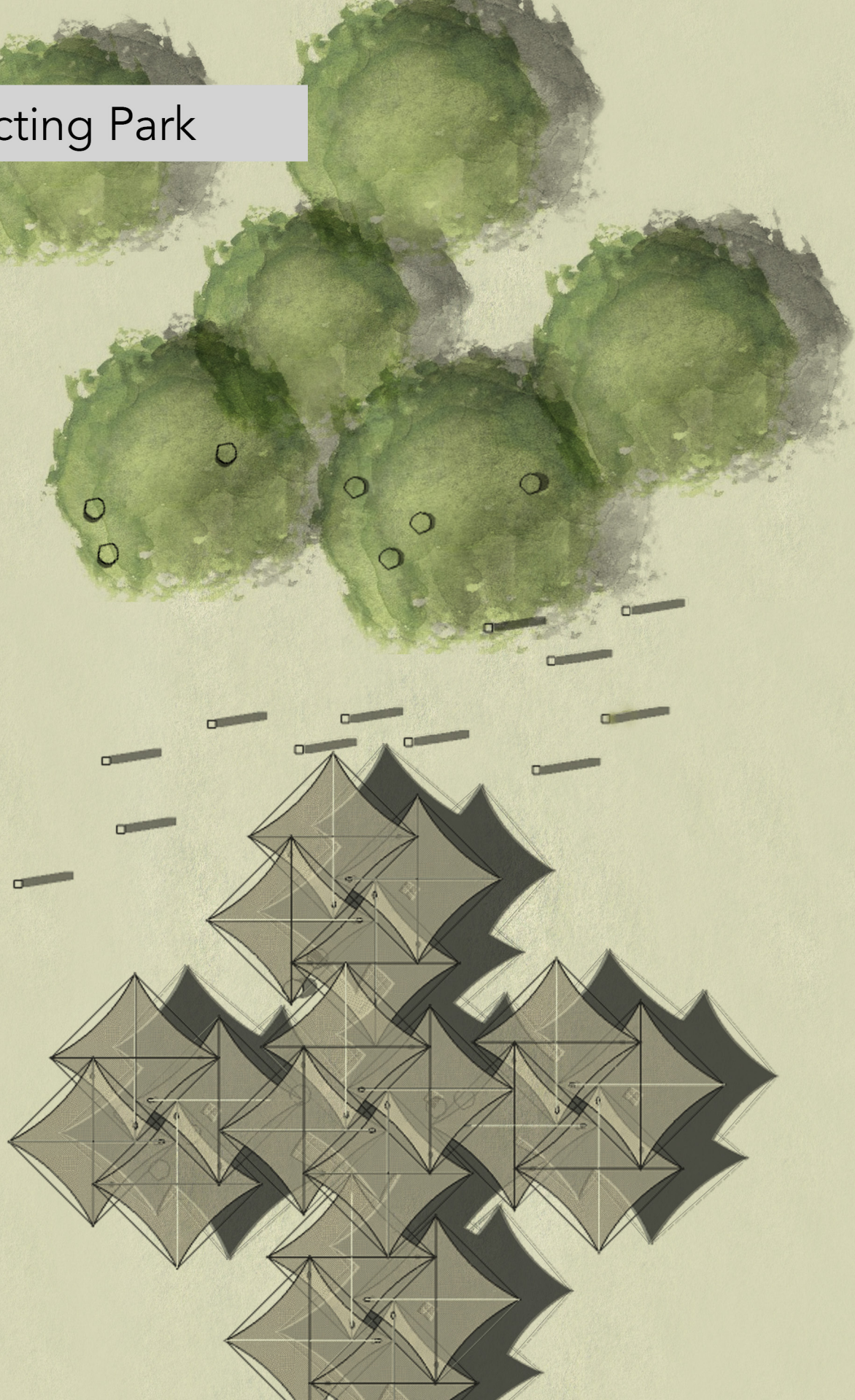
Inner Public Square

Reflecting Park

Shadow Leading Path



# Reflecting Park



The trees canopy provide a shady space for people.

The canopy material provide a shady space for people.

But

These two shady spaces are different, different material will cause different shadow.

Trees are flexible because the tree are alive, they be different day by day, year by year. And winds will make the leaves movement. So the shadow are different, are dynamic.

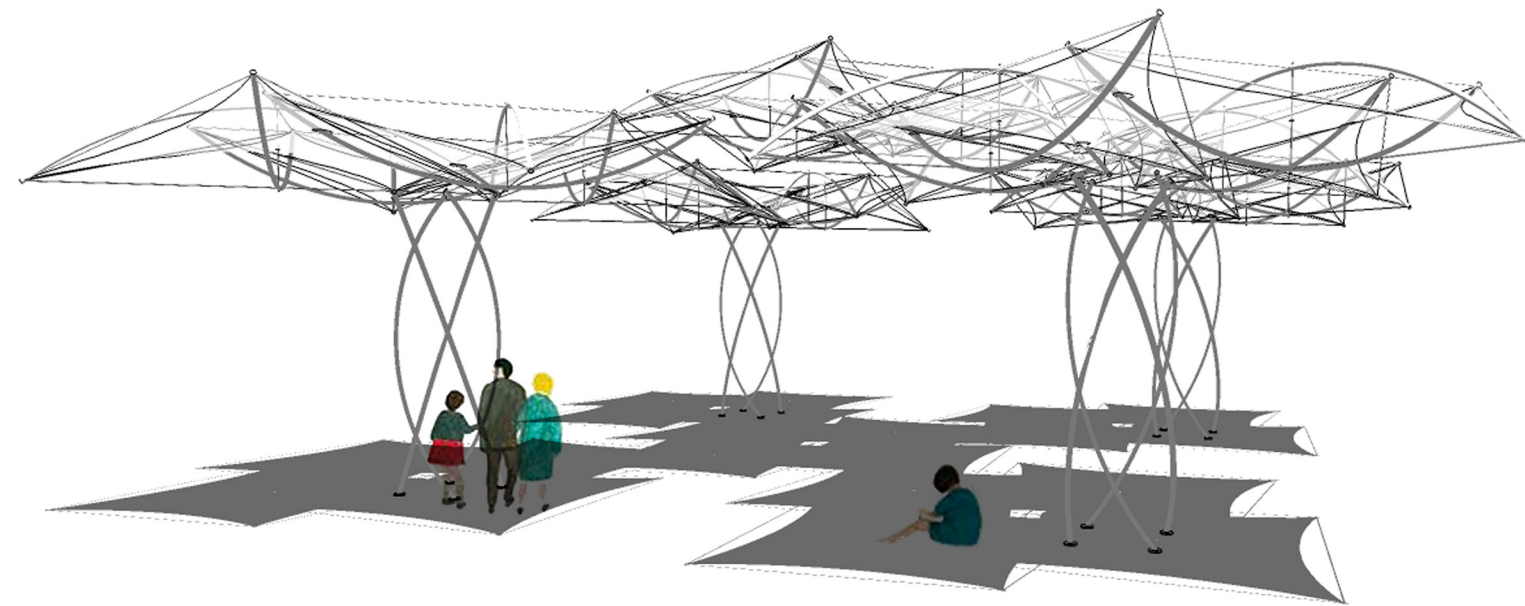
The canopy is structures, they won't change anymore, so the shadow just change with day time change. So in the stable material, I do some change on the surface of the material, using the fiber net to do the canopy, some light can pass through the gap.

## PART 1 - MIRROR STRUCTURE



The structures are taller than people, and material are glass. They will reflect the surrounding environment, and enlarge the space for people. And the structures distribute a way and let people go along with it.

## PART 2 - CANOPY



The canopy provides shelter for people. The material of the canopy is fiber and like net, the shadow will change with the light, and some light the through the canopy.

### PART 3 - MIRROR STUMPS

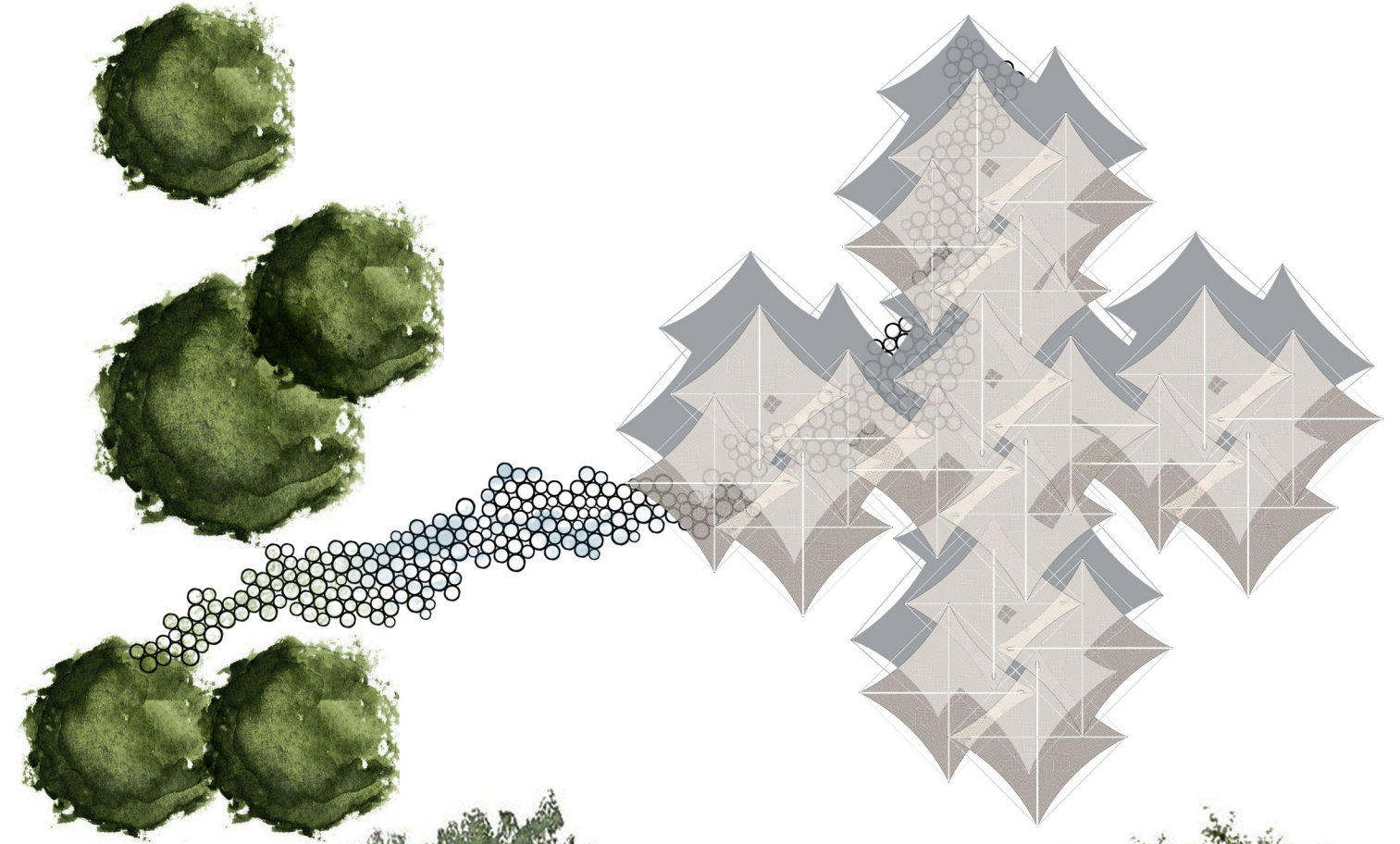


The stumps with the mirror material on the surface will reflect the surrounding environment. Different direction of the surface can reflect different orientations. The leaves and sky will be reflected to people.  
The scale of stumps are suited for sitting.

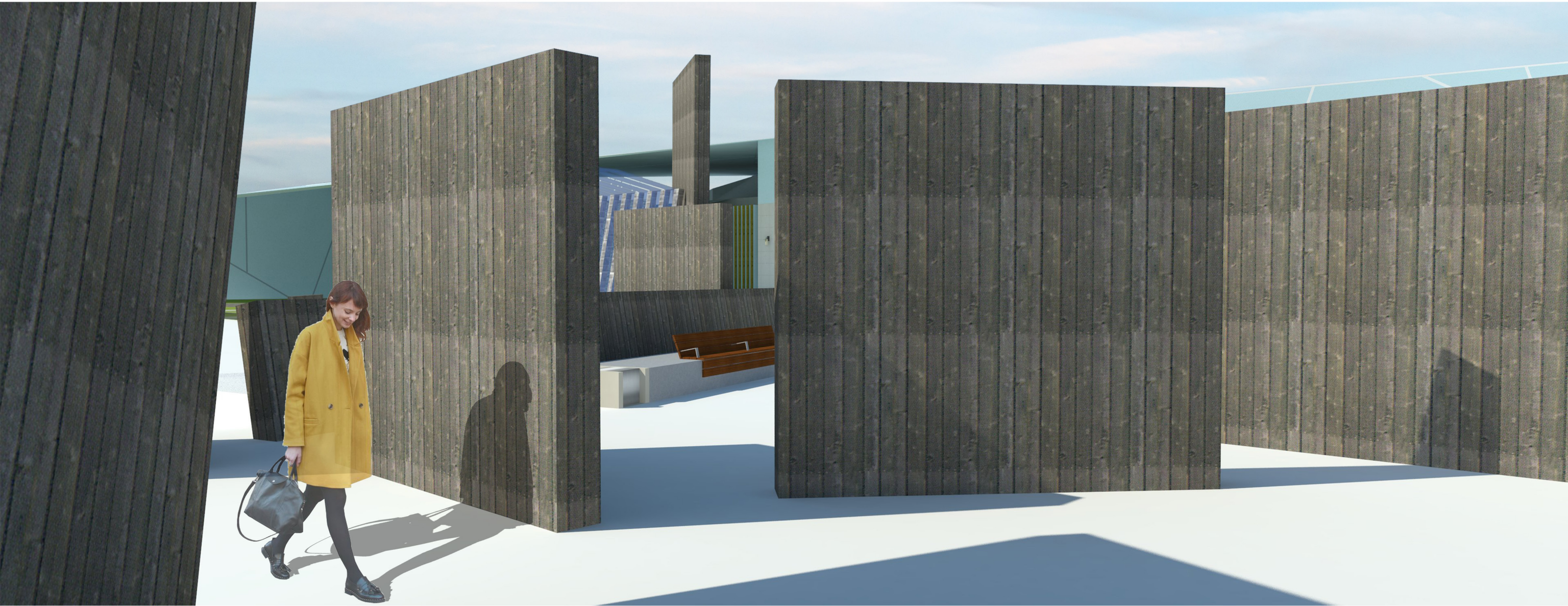


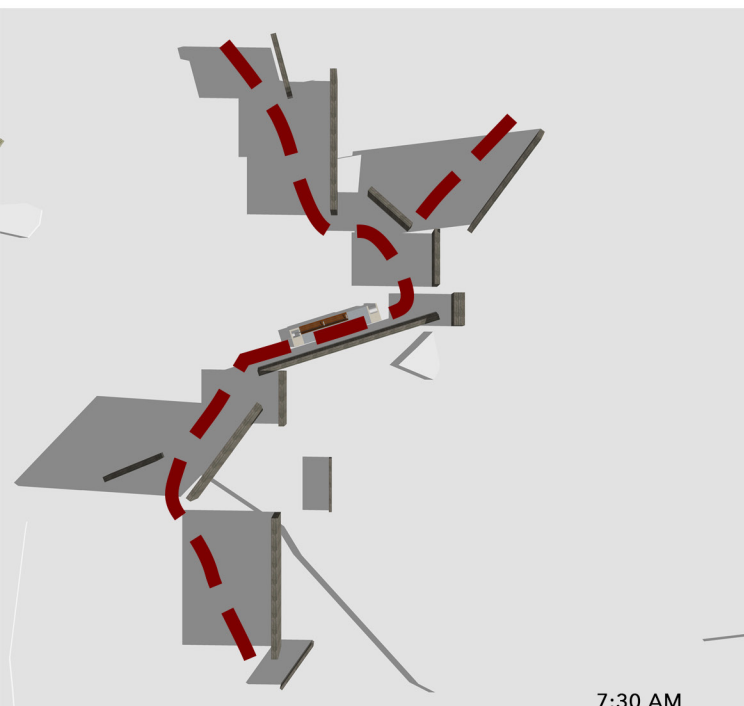
This is one idea of reflecting design, using the mirror structure and stumps to reflect surrounding environment, trees leaves, sky and canopy texture. People also can sit on the stumps.

This is another idea of reflecting design.  
Using the stumps with mirror surface to build a path  
in the grass bed.  
The same way to use stumps with mirror, but in a  
different scale.  
People can walk on it and see the sky under their  
steps, and the path sink into the grass, give people a  
feeling of walking on the sky. The mirror path create a  
virtual space for people.

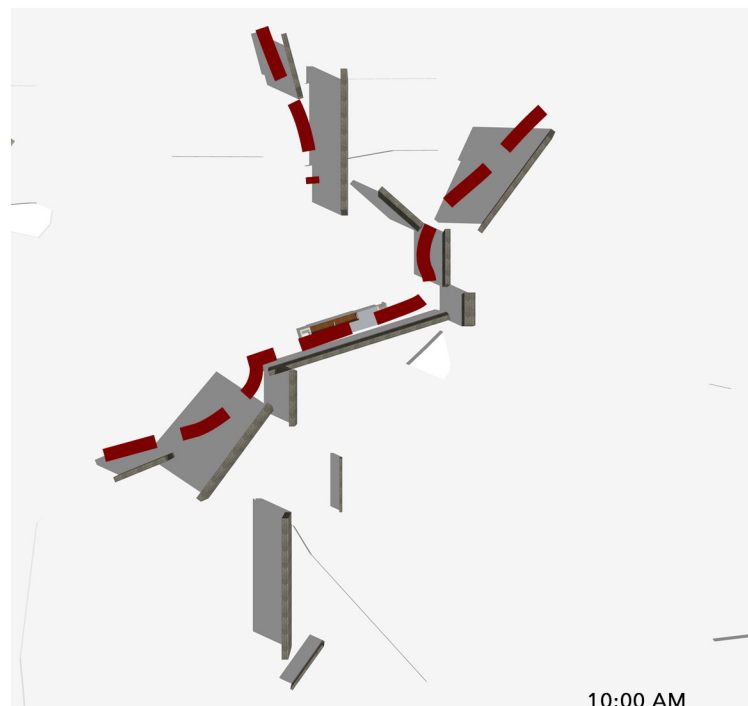


# Shadow Leading Path





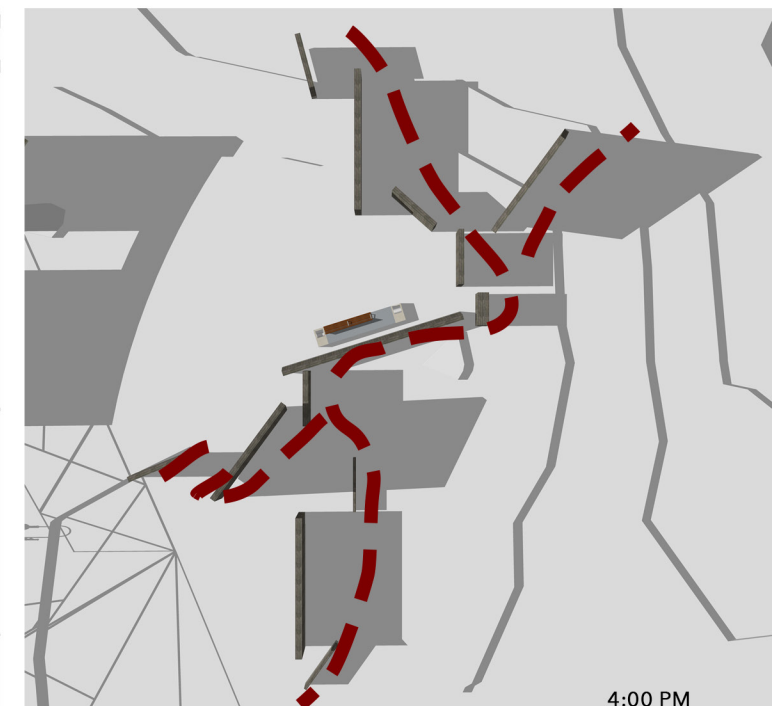
7:30 AM



10:00 AM



02:00 PM

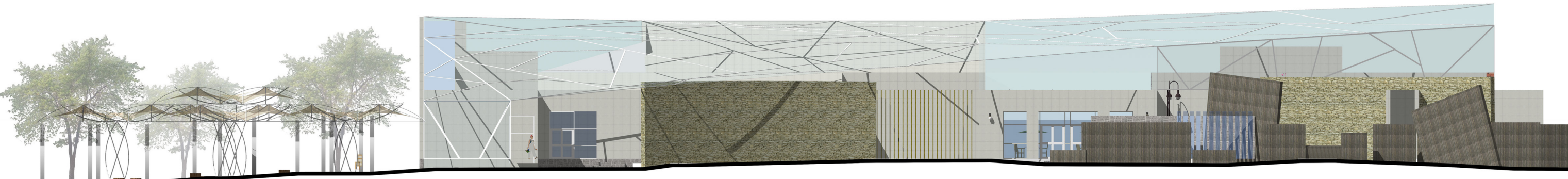
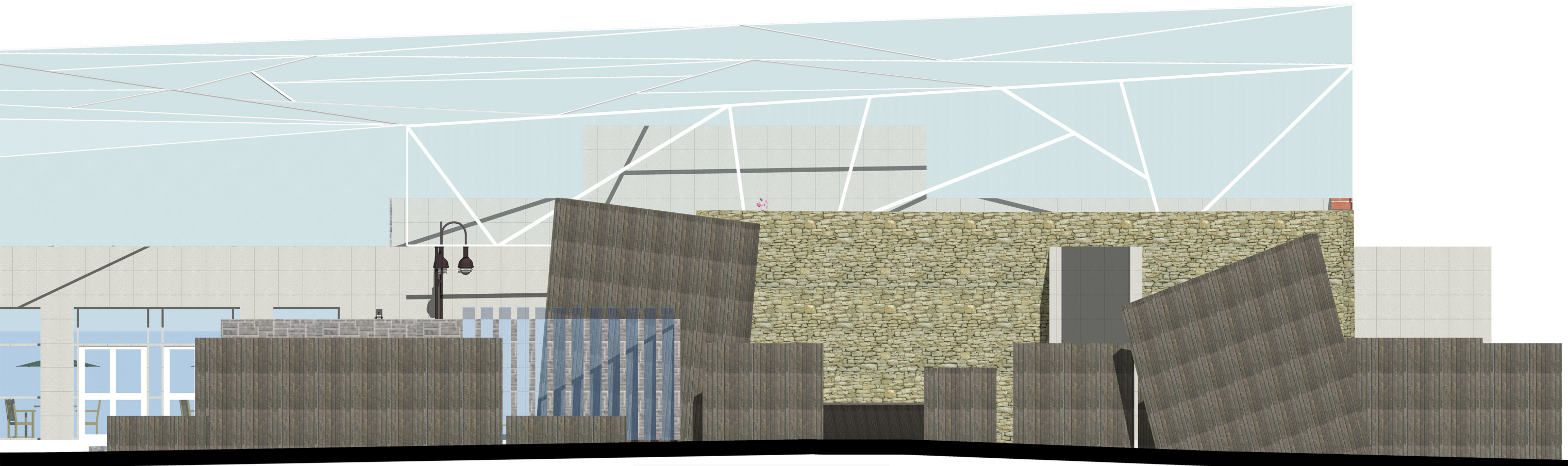


4:00 PM

There are some existing walls around the garden, I think these walls can make more shadow effect, so I decide to change it.

At first, I always regards them as "walls", just change the shape, material and direction, but with the light test, it not achieve the effect I want. It is still a wall shadow. Then when I break the wall definition, I don't want it be a wall to show the edge, so I make the design to separate the walls to some structures on the ground.

These walls looks like some structures on the ground, but with the sunlight changing, the walls will form various shadow path, the path are different in different minutes. People may go along under the shadow. This shadow will leading people to go in or out of the gallery.





# Inner Public Square



This is a public square in the building, because of the glass roof, people can see the outside environment and have an experience like outside.

Sometimes, designing light and shadow is about feeling. Just like some drama, the lovers stand under a tree and the shadow of leaves texture on the ground movement with wind. It is really a romantic atmosphere for lovers.

The cloud that passes over gives the room a feeling of association with the person that is in it, knowing that there is life outside of the room, and it reflects the life - giving that a painting does because I think a work of art is a giver of life.

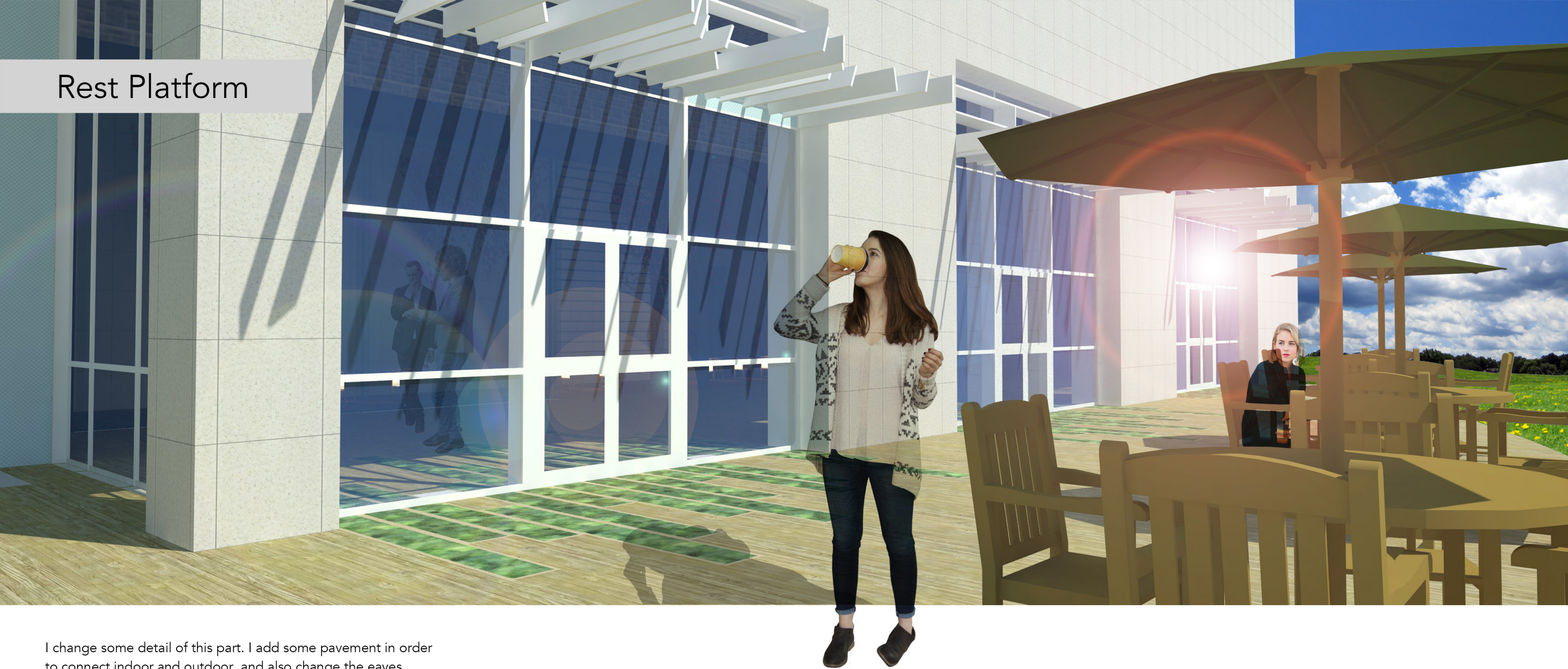
“So light, this great maker of presences, can be never... brought forth by the single moment in light which the electric bulb has. And natural light light has all the moods of the time of the day, the season of the year. [which] year for year and day for day are different from the day preceding.”

--Louis I. Kahn

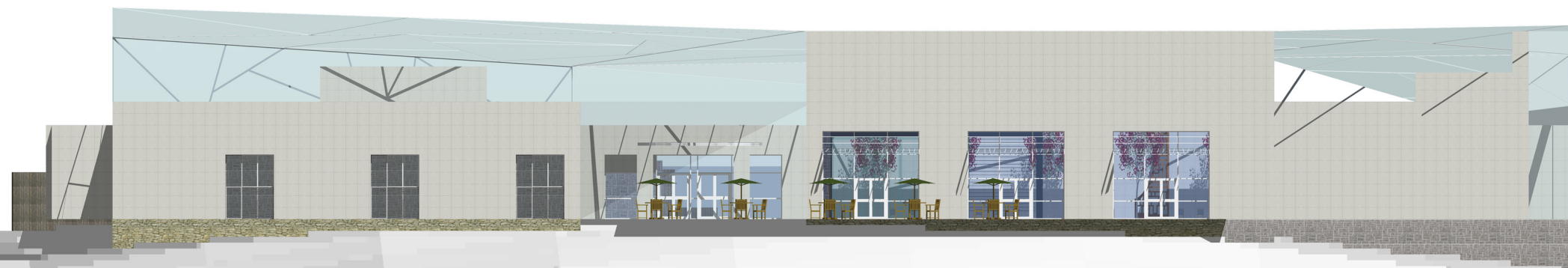


This is a perspective of the public square in the night. The lamps can point out the way for people and guide people to sit under the light to have some activities like reading, there are some seats under the light. Some seats with vegetation and some seats with the books in the bottom.

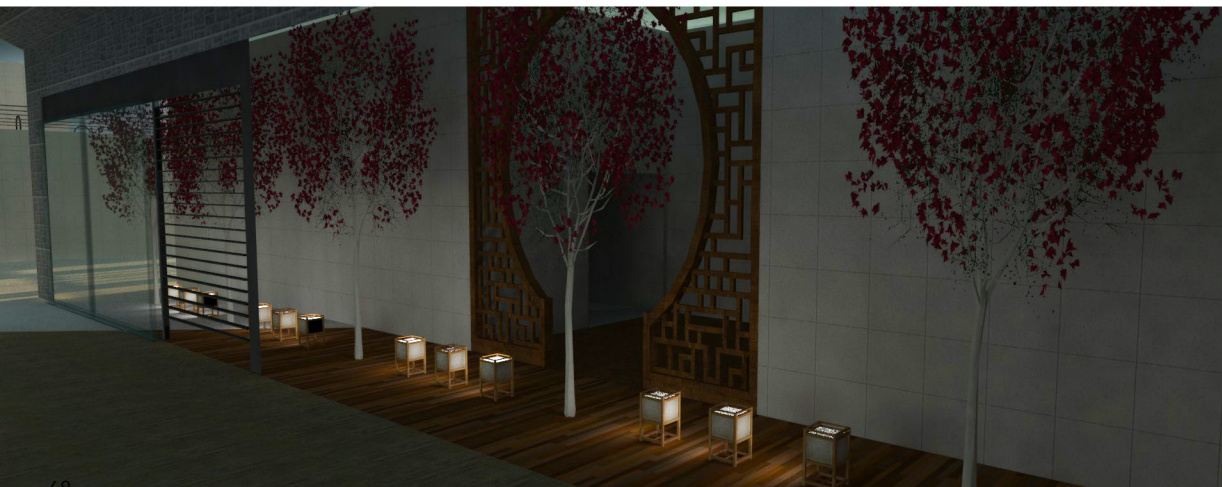
# Rest Platform



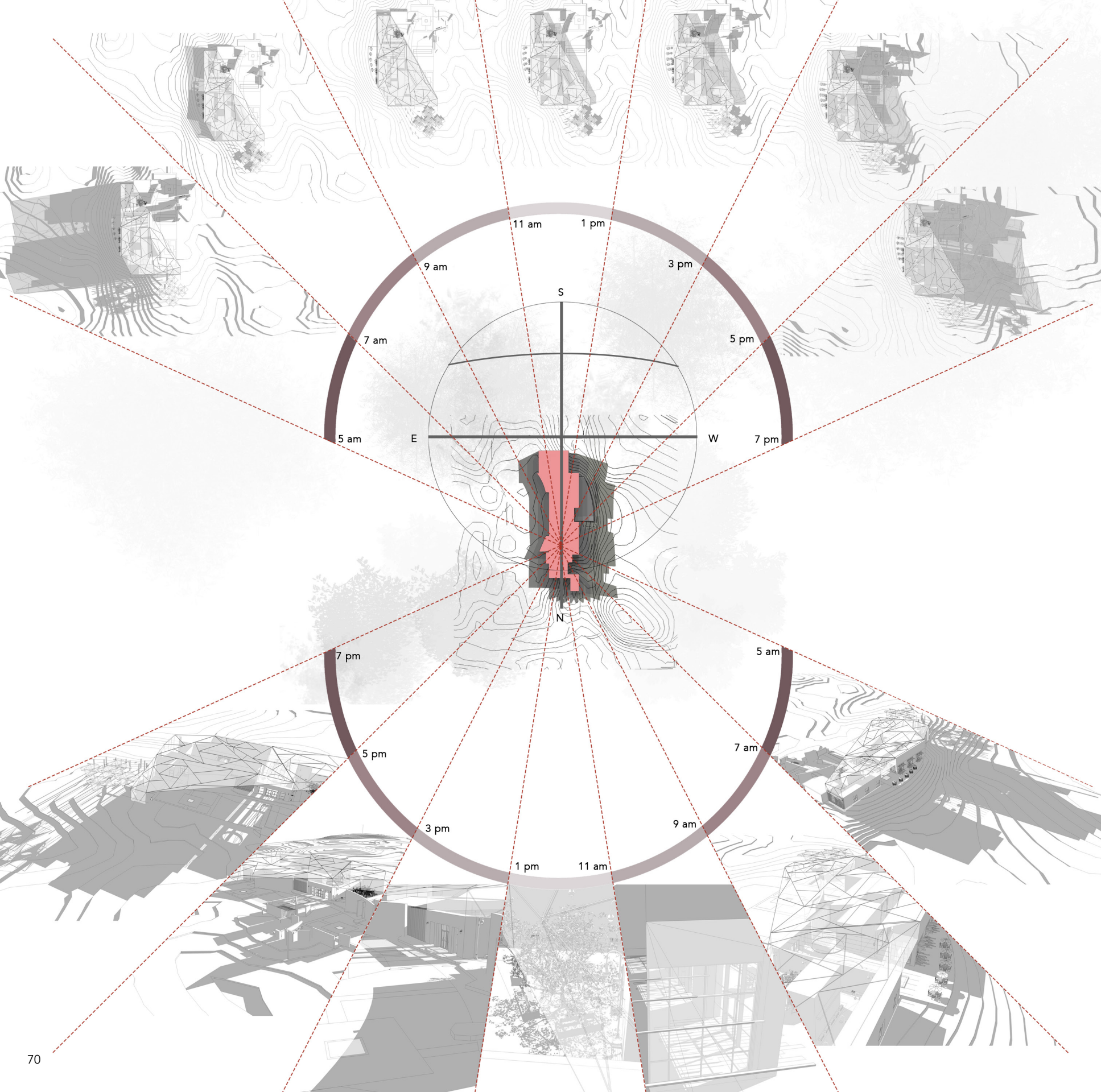
I change some detail of this part. I add some pavement in order to connect indoor and outdoor, and also change the eaves shape as same as the pavement, making some direction change to achieve different shadow effect.



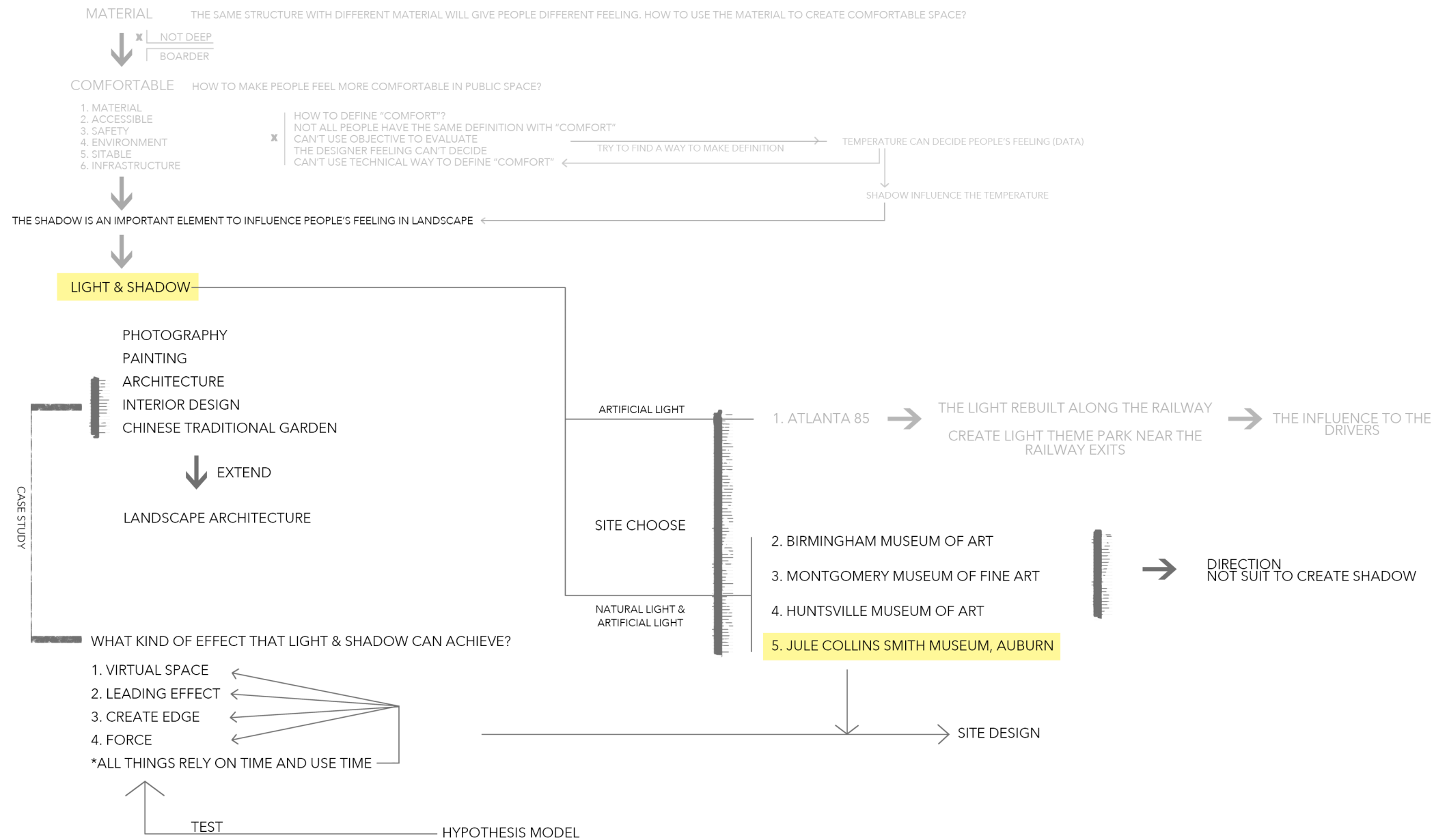
# Corridor Garden



This is corridor garden indoor, with the glass roof, it likes a gap between two rooms. This design comes from Chinese tradition garden, people always use this ways to build their yard. The light will form the doors and the roof, it make the shadow more fexilbe with the tree and artifical light.



This is a time series to show the shadow changes of the whole site, from the morning to night. The center is the existing building's shadow changes in one day, and the surrounding diagrams is after design. Top diagrams is the shadow changes showing on plan, bottom diagrams is perspective from the view point from the lines and each one is corresponded with the plan at same time. Connecting before design and after design together to show the shadow changes clearly, the light and shadow become more flexible and interesting in the site. It's not only the auxiliary product of the structures and plants, it turns into dominant element. Becoming a kind of art in the art museum. Visitors will pay attention on the light and shadow in the environment and enjoy in the space, not just to see the exhibit in the gallery. Because all site is a large gallery, the light and shadow break the old edge between the building and open space outside. That's my goal, making the landscape better, and the light and shadow is a good way to achieve it.



# Conclusion

From this thesis research, I met many difficulties and many unsuccessful state happened. But during these processing, I gradually seek the way to research a method and test it by site design.

At first time, my topic is about Material, and then it can be deeper, so I make it wider, I study the comfort in open space. But another problem came out, how to define comfort? Different people have different feeling, I can't define it by myself. Then I find some technical way to define it, but it is not design research. Then I consider about some detail of the comfort, the shade is an important element in open space to provide comfort for people.

Finally, my thesis is focus on light and shadow, I do some case study about light and shadow, I found that light and shadow method is always used in architecture interior design and Chinese traditional garden, and also light and shadow even be the soul of photography and painting. But take a panoramic view of the landscape situation, the light and shadow are not paid attention. Actually, the light and shadow is the cheapest thing we can use in landscape but it is a good way to create interesting space. So, I want to extend the light and shadow method from architecture, interior design, Chinese traditional garden, pick the great method they used, and try to use the method in landscape, creating a better space with landscape.

About the light and shadow, I do the case study, make category, do test model, physical model and digital model, test my method on real site. Light and shadow methods have potential in the landscape. Through there are many problem occurred and sometimes test model deny my idea, but the all success is after many times unsuccessful.

This thesis research are not the end actually, many thing are not enough to support my method. Some idea need to use actual scale model in real environment to test. I will still work on it. And during this whole processing, I learned how to do the research, I think it will help me a lot in the future.

# Bibliography

1. Louis Kahn. *Light is the theme: Louis I. Kahn and the Kimbell art museum*. Fort Worth, Tex, Kimbell Art Foundation, 1975. Print.

This book makes comments on Architecture by Louis Kahn.

We knew that the museum would always be full of surprise. The blues would be one thing one day; the blues would be another thing another day, depending on the character of the light. Nothing static, nothing static as an electric bulb, which can only give you one iota of the character of light. So the museum has as many moods as there are moments in time, and never as long as the museum remains as a building will there be a single day like the other.

Louis Kahn said, I don't like to see nailed down. If you could move it and change it every day, fine. So the light is a good thing to use that can give the museum a dramatic effect. Structure is the giver of light. No space, architecturally, is a space unless it has natural light.

2. John Lobell. *Between silence and light, Spirit in the Architecture of Louis I. Kahn*. Boulder: Shambhala, 1979. Print.

Architecture stands between ourselves and world.

Louis Kahn saw architecture as the meeting of the measurable and the unmeasurable. He used the word "Silence" for the unmeasurable, for that which is not yet; and the word "Light" for the measurable, for that which is. Kahn saw architecture as existing at a threshold between Silence and Light, which he called the Treasury of the Shadow. He felt that a great building begins with a realization in the unmeasurable. Measurable means are then used to build it, and when it is finished, it gives us access back to the original realization in the unmeasurable.

All material in nature, the mountains and the streams and the air and we, are made of Light which has been spent, and this crumpled mass called material casts a shadow, and the shadow belongs to Light.  
—Louis Kahn

3. Herausgegeben von, Herausgebergruppe, Mit Hilfe und Beiträgen von, Mit weiteren Beiträgen von. *The secret of the shadow, Light and shadow in architecture*. Tübingen: E. Wasmuth; New York, NY: Available through D.A.P., 2002. Print.

There is no light without shadow. The interaction of these two unequal brother has been described in ways as different as the notion that shadows are "holes in the light" through to the opposite idea that they are "the remaining representatives on earth of the cosmic darkness, otherwise torn apart by light". Today, there are so many sources of light on earth and such a multifarious use of light that we

are slowly losing an awareness of darkness. It is quite justifiable to talk of "light pollution".

4. Kent Larson. *Louis I. Kahn: unbuilt masterworks*. New York, NY: Monacelli Press, 2000. Print.

"Author Kent Larson has delved into Kahn's extensive archives to construct faithful computer models of a series of proposals the architect was not able to build: the U.S. Consulate in Luanda, Angola; the Meeting House of the Salk Institute in La Jolla; the Mikveh Israel Synagogue in Philadelphia; the Memorial to Six Million Jewish Martyrs in New York City; three proposals for the Hurva Synagogue in Jerusalem; and the Palazzo dei Congressi in Venice. The resulting computer-generated images present striking views of "real" buildings in "real" sites." "Complementing the new computer images is extensive archival material - rough preliminary drawings, finely delineated plans, and beautiful travel sketches. Larson also presents documentation of each project, often including correspondence with the clients that shows not only the deep respect accorded the architect but the complicated circumstances that sometimes made it impossible to bring a design to fruition. Not only a historical study of Kahn's unbuilt works, this volume is in itself an intriguing alternative history of architecture."

5. Victoria Meyers. *Designing with light*. New York: Abbeville Press, 2006. Print.

An in-depth look at how light is used in contemporary architecture to delineate form, color, and space, with particular attention to major projects by international architects including Stephen Holl, Zaha Hadid and Rem Koolhaas.

The history of great architecture is the history of buildings that adapt creatively to light. Light possesses the power to transform an ordinary building into a majestic edifice that inspires awe. Architects rely heavily on light, looking to it as a tool that reveals form and forges the important connection between vision and construction.

Designing With Light, by award-winning architect Victoria Meyers, explores the myriad ways in which light is used in contemporary architecture, both internally and externally, to enhance the design and sense of space in a building. Vivid color photographs depict how architects employ light in buildings such as the Guggenheim Las Vegas and the National Gallery of Canada. Meyer looks at recent developments in the science of light, giving an overview of the history of light in architecture and demonstrating how the use of light in film, theater, and art has influenced light's use in architecture. Meyers goes on to discuss how light creates architectural features such as color, line, and form, and how architects strive to control light through glass, windows, skylights, and the manipulation of shadow and reflection. She clearly illustrates these cases with intriguing examples from recent buildings designed by internationally renowned architects including Zaha Hadid, Steven Holl, Herzog & de Meuron, Rem Koolhaas, John

Pawson and many others.

6. Osborne, Michèle. *Creative garden lighting*. Portland, Or. : Timber Press, 2005. Print.

This book is divided into three sections, in which an array of stunning gardens show: how lighting transforms and prolongs the use of a garden at night; what features and plants to highlight in order to create a magical scene; and the fittings best suited to achieve the desired effects, from neon to tiny spotlights.

7. Mary Ann, Steane. *The architecture of light : recent approaches to designing with natural light*. Abingdon, Oxon; New York: Routledge, 2011. Print.

Reviewing the use of natural light by architects in the era of electricity, this book aims to show that natural light not only remains a potential source of order in architecture, but that natural lighting strategies impose a usefully creative discipline on design. Considering an approach to environmental context that sees light as a critical aspect of place, this book explores current attitudes to natural light by offering a series of in-depth studies of recent projects and the particular lighting issues they have addressed. It gives a more nuanced appraisal of these lighting strategies by setting them within their broader topographic, climatic and cultural contexts.

8. Moyer, Janet Lennox. *The landscape lighting book*. Hoboken, New Jersey: John Wiley & Sons, 2013. Print.

This richly illustrated, up-to-date guide offers practical coverage of all aspects of lighting design.

Landscape lighting offers an incredible expansion of the enjoyment of both residential and commercial properties. It makes outdoor spaces usable at night and adds a magical view into the landscape from interior spaces.

Light has the ability to transform a space, creating emotional responses or simple making an environment comfortable.

9. Gannon, Todd. *The light construction reader*. New York: Monacelli Press, 2002. Print.

"Light Construction" calls for a wholesale reexamination of not just transparency, but of architectural effects in general.

10. Urs Büttiker. *Louis I. Kahn : light and space*. New York: Whitney Library of Design, 1994. Print.

Kahn believed that architecture began with the "making of a room," and that "a room is no a room without natural light." Kahn used passionate light and functional light, glaring light and indirect light, warm light and cold light, each working differently in his architecture.

This book presents the best introduction to Kahn's ideas about light in architecture. The book contains a wealth of technical details covering

the entire spectrum of light modulation employed by Kahn throughout his career: the ceiling-framed window, the lookout slot, the key-hole window, many variations of brise-soleil, sliding window shutters, double space envelopes, the light cylinder, light ports, and an endless variety of skylights.

11. Helmut Köster. *Dynamic daylighting architecture : basics, systems, projects*. Basel; Boston: Birkhäuser-Publishers for Architecture, 2004. Print.

Since the principles of active and passive solar architecture are generally known, the author wishes to present a new approach to the reader on the topic of daylighting in architecture. The keyword is: optional daylight utilization. The theory is based on the observation that a more dynamic and intelligent use of daylight could conserve far more energy than is presently possible by accumulating solar energy with the help of solar collectors or photovoltaic solar cells on building facades.

The book consists of two parts: a principal section that visualizes the basics and technologies of daylight utilization, and integrated artificial lighting, and a supplementary section that broadens the scope and offers in-depth descriptions of the planning principles, the technologies, as well as the integrated contexts and planning processes. The two parts are organized in parallel fashion and follow the sun on its path into the building.

12.Peter Tregenza, Michael. *Daylighting : architecture and lighting design*. New York: Routledge, 2011. Print.

"This authoritative and multi-disciplinary book provides architects, lighting specialists, and anyone else working daylight into design, with all the tools needed to incorporate this most fundamental element of architecture".

The book is centered on practical daylighting design. It describes how new thinking about people' needs and about the requirements of sustainability is leading to a radical shift in daylighting design practice.

The focus of daylighting design is the comfort and happiness of users. People respond in many ways to light, and experience it in terms of what is recognized and felt, not as photometric values. So good design is subtle and many-faceted. It is a concern for the human body's dependence on daylight, for what gives joy and interest, for the creation of 'place', for a building's effect on its surroundings. A focus on people is essential to the creation of buildings which are sustainable within the natural world.

13. Pare, Richard, and Michael Webb. *Shadow and Light: Tadao Ando at the Clark*. Williamstown, MA: Clark Art Institute, 2014. Print.

This illustrated book celebrates the opening of the new Visitor Center

at the Clark Art Institute, designed by Pritzker Prize recipient Tadao Ando. Noted architectural photographer Richard Pare captures the building's indoor and outdoor spaces - including reflecting pools, galleries, and courtyards - in more than 60 gorgeous images. The accompanying essay offers an architectural critic's perspective on the building and discusses the most important facets of Ando's stunning design, including the structure's harmonious relationship to the Clark's existing buildings and the surrounding Berkshire scenery.

14. Ando, Tadao, and Massimo Vignelli. *Tadao Ando: Light and Water*. New York: Monacelli, 2003. Print.

"Japanese architect Tadao Ando is known throughout the world for his exquisite compositions: small, carefully wrought houses; striking museums and cultural facilities. Ando's distinctive palette of materials - concrete, stone, wood, and glass - sets his work apart, as does his thoughtful consideration of the palette of materials provided by nature. Covering works built over the course of more than twenty-five years, *Tadao Ando: Light and Water* presents the architect's masterful meditations on the physical and metaphysical qualities of existence." "Ando selected for inclusion the thirty-five projects that best embody his belief that the interplay with nature defines architecture and the passage of time molds architecture. All are shown in spectacular, specially commissioned color photography. Among the major recent works are the Modern Art Museum of Fort Worth in Texas; the Komyo-ji Temple in Saijo, Japan; the meditation space for UNESCO in Paris; the Pulitzer Foundation for the Arts in St. Louis; and the Armani/Teatro in Milan. Also included are some of Ando's most important and well-known earlier works, including the Church of the Water in Hokkaido, the Church of the Light in Ibaraki, and a series of houses throughout Japan."

15. Corrodi, Michelle, Klaus Spechtenhauser, and Gerhard Auer. *Illuminating: Natural Light in Residential Architecture*. Basel: Birkhauser, 2008. Print.

"The image of open working and living spaces flooded with light has, more than any other, become fixed in our minds as a symbol of modernity and the spirit of the times. While the workplace has always been the focus of ergonomic studies and optimization with respect to a good provision of daylight, large glass surfaces have now become the order of the day for living spaces as well. But does this automatically make for better illumination?"

"Taking this question as its starting point, this publication details central aspects of light planning, including the connection between the provision of daylight and architectural design, building orientation, the nature of the facade, the ground plan, comfort, and the proportions and atmosphere of rooms. In the process, general characteristics and fundamental principles as well as subtle facets of an intelligent treatment of daylight are discussed and critically examined within an

expanded architecture- and culture-historical context."

16. Herve, Lucien, and François Cali. *Architecture of Truth: The Cistercian Abbey of Le Thoronet*. London: Phaidon, 2001. Print.

"Le Thoronet Abbey, one of the wonders of twelfth-century Cistercian architecture and still revered by architects today, nestles in a wooded valley in Provence, south of France. This book is a pictorial appreciation of the abbey, photographed by Lucien Herve in the mid-1950s and introduced by Le Corbusier. 'The pictures in this book are witnesses to the truth', is how he describes Herve's photographs of the Romanesque abbey. Herve's exquisite study presents the building throughout the course of a day, depicting the changing play of light and shadow on its stone vaulted exterior and interior. Highly textured and almost abstract in quality, his photographs reveal how the abbey is defined as much by light as by the conventions of Romanesque architecture, as well as conveying the intense spirituality of the Cistercian monastic order. Arranged according to the canonical hours of prayer, Herve's photographs are complemented by quotations from the psalms and the saints. An essay by Father Samuel of the Abbey of Notre-Dame de Sept-Fons provides an insight into the Cistercian monastic order, while architect John Pawson contributes a personal appreciation of this fine example of Cistercian architecture."

17. Elwall, Robert. *Building with Light: The International History of Architectural Photography*. London: Merrell, 2004. Print.

"This book offers an exploration of the development of architectural photography and some of its key themes. From the earliest examples of the genre in the nineteenth century to today's digital revolution, Robert Elwall focuses on the changing aesthetic of the medium worldwide. Included are such topics as the early influence of architectural drawing; the growth of specialist photographic firms documenting the nineteenth-century building boom; the influence of photography on both architectural practice and history; the invention of half-tone reproduction; the role of photography in the spread of Modernism; the impact of colour photography during the 1970s and 1980s; and the increasing use of computers to shape a new direction." "Authoritatively written by a world-renowned expert and illustrated with images from collections throughout the world, this study is essential reading for anyone interested in architecture, photography and the history of their special relationship."

18. "I M PEI, *Learning from Light*." Vimeo. N.p., 15 Feb. 2017. Web. 15 Feb. 2017.