A FESTIVE AMC
Project: Renovation of AMC

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Research tutor: Marcel
What would the AMC be in 50 years?
Nursing Center

Future Identity
Two urgent factors

that are challenging the current hospitals
1. AI / Big data

- remote diagnose

- information network

- new business model

small & acute hospital

(Source: https://gotaki.com/es/lugar/the-academic-medical-center)
result 1:

**Spatial surplus**

- outpatient clinics

- bed wards

Number of hospital beds in the Netherlands from 2000 to 2016*

2. *Prolonged life expectancy*

- growing aged population

3 million (2015) - 4.2 million (2030)
result 2:

**Shortage of nursing institution**

- long-term care population rising

will reach over **350,000** in 2050, NL
Shortage  
Nursing  
Fill in  
Surplus  
hospital space

Bed Tower

Outpatient clinic

AMC
A transformation plan

3 phases
Phase 1

F6-F8 Bed wards - Nursing apartments

50% Shopping street - Treatment institution
Phase 2

Original public squares - Leisure activity space

Restaurants/Shops

Leisure activity space

basic public infrastructure / bridge
Phase 3

50% Outpatient clinic - Full-time nursing center
Problem: Relocation & Adaptation

Positive perception & human emotions

Skylight
Cognitive Map
Problem: Relocation & Adaptation

Leisure activities
Public spaces in AMC
Four lighting modes

direct

bright

central

warm

diffused

dim

peripheral

cold
<table>
<thead>
<tr>
<th>Light</th>
<th>Positive influence</th>
<th>Negative influence</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bright</td>
<td>attention; exited; efficiency; intensify positive emotions</td>
<td>stress and anxiety when over-lighting</td>
<td>atrium; exhibition hall; reading room</td>
</tr>
<tr>
<td>Dim</td>
<td>calmness; steady; security</td>
<td>depression risk when prolonged</td>
<td>meditating room; lounge</td>
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</table>

2. Direct light and diffused light and their corresponding human emotional responses

3. Central light and perimeter light and their corresponding human emotional responses

Bright: Nadir Afonso Contemporary Art Museum

Dim: Church of Light
## Lighting Modes & Human Emotional Responses

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<tr>
<td>Direct</td>
<td>visual clarity; pleasant; sense of nature</td>
<td>intense directional light causes stress</td>
<td>most public spaces providing relaxing and natural environment</td>
</tr>
<tr>
<td>Diffused</td>
<td>attention; efficiency</td>
<td>stress; disoriented; spacialness</td>
<td>library; working space</td>
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</table>

**Direct:** Seattle Public Library  

**Diffused:** Bagsvaerd Church  
(source right: source: [http://pikde.com/media/96686723221678623](http://pikde.com/media/96686723221678623))
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<td>Central</td>
<td>attention; sense of intensity; efficiency</td>
<td>stress and anxiety when intensified</td>
<td>working space; stage</td>
</tr>
<tr>
<td>Perimeter</td>
<td>relaxing; hospitality</td>
<td>lack of sense of space; disoriented</td>
<td>lounge; chatting space; private booth</td>
</tr>
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</table>

**Central: Warehouse Office**
(source left: https://archello.com/story/41581/attachments/photos-videos/1)

**Perimeter: Rothko Chapel**
(source right: https://www.atlasobscura.com/places/rothko-chapel)
Case Studies

How to shape different ambient skylight through architectural methods?
Direct Light 1:

Method:
Single Bright Spot

Case Study 1:
Pantheon, Rome

Ambient Light: Natural / Change through time / Directional / Bright

Emotional Response: Sense of universe or nature / Circadian Rhythm
Direct Light 2:

**Case Study 2:**
Seattle Public Library, U.S.

**Method:**
Textured Shades

**Ambient Light:** Natural / Change through time / Directional / Bright

**Emotional Response:** Sense of universe or nature / Circadian Rhythm
Diffused Light - Filtration

**Method:**
Filtered with Panels

**Case Study 3:**
Nadir Afonso Contemporary Art Museum

**Ambient Light:** Natural / Change through time / Directional / Bright

**Emotional Response:** Sense of universe or nature / Circadian Rhythm
Diffused Light - Reflection
Top-down Lighting 1

**Method:**
Additional Panel

**Case Study 4:**
Kimbell Art Museum, U.S.

**Ambient Light:** Natural / Change through time / Directional / Bright

**Emotional Response:** Sense of universe or nature / Circadian Rhythm
Method: Vertical Void Reflection

Case Study 5: Herz Jesu Church, Munich

Ambient Light: Natural / Change through time / Directional / Bright

Emotional Response: Sense of universe or nature / Circadian Rhythm
**Diffused Light - Reflection**

**Side Lighting**

**Method:**  
Side Void Reflection

**Case Study 6:**  
Bagsvaerd Church, Denmark

**Ambient Light:** Natural / Change through time / Directional / Bright

**Emotional Response:** Sense of universe or nature / Circadian Rhythm
Peripheral Light:

Method: Peripheral Reflection

Case Study 7: Rothko Chapel, U.S.

Ambient Light: Natural / Change through time / Directional / Bright

Emotional Response: Sense of universe or nature / Circadian Rhythm
**Bright Light:**

**Method:**
Big Opening

**Case Study 8:**
Teshima Art Museum, Japan

**Ambient Light:** Natural / Change through time / Directional / Bright

**Emotional Response:** Sense of universe or nature / Circadian Rhythm
Dim Light 1:

Method: Rebound

Case Study 9: Menil Collection Museum

Ambient Light: Natural / Change through time / Directional / Bright

Emotional Response: Sense of universe or nature / Circadian Rhythm
Dim Light 2:

Method: Small Opening

Case Study 10: Church of Light, Japan

Ambient Light: Natural / Change through time / Directional / Bright

Emotional Response: Sense of universe or nature / Circadian Rhythm
**Dim Light 3:**

**Method:**

Deep Void / Single Small Opening

**Case Study 11:**

Bruder Klaus Chapel, DE

**Ambient Light:** Natural / Change through time / Directional / Bright

**Emotional Response:** Sense of universe or nature / Circadian Rhythm
The Coorperation of Different Factors

Prototype + Factor 1 + Factor 2 → Result → Example

- diffused
- dim
- textured

- diffused
- bright
- textured

- diffused
- dark

- diffused
dark central

- diffused
bright peripheral
<table>
<thead>
<tr>
<th>Form</th>
<th>Front view</th>
<th>Perspective view</th>
<th>Perspective view</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
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<tr>
<td>Slant</td>
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<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
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<tr>
<td>Extented</td>
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<td><img src="image8" alt="Diagram" /></td>
<td><img src="image9" alt="Diagram" /></td>
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<tr>
<td>Covered</td>
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<td><img src="image12" alt="Diagram" /></td>
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<tr>
<td>Textured</td>
<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
<td><img src="image15" alt="Diagram" /></td>
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Synthetic Skylight Roof System Testing

Skylight Test 01
Ambient Light: Bright / Direct

Skylight Test 02
Ambient Light: Dim / Direct

Skylight Test 03
Ambient Light: Bright / Direct / Textured

Skylight Test 04
Ambient Light: Bright / Diffused

Skylight Test 05
Ambient Light: Dim / Diffused (deep void)

Skylight Test 06
Ambient Light: Dim / Diffused (small opening)

Skylight Test 07
Ambient Light: Dim / Diffused (deep void + small opening)

Skylight Test 08
Ambient Light: Bright / Diffused / Textured
Design Strategy

Multi-lighting roof

Creating different lights at one time
Providing exclusive lights for each space

Super surface

Reorganizing space
Proper height & exclusive lighting

Multi-lighting therapy

Immersive experience
THE IDENTITY OF THE FOUR PUBLIC SQUARES
FOR WHOM?

Doctors/Researchers  Patients  Visitors  Kids

A Melting Pot of Feelings
Happiness  Relaxation  Sadness  Stress  Fear  Anxiety
WHAT DO THEY NEED?

The Festive Square

A Space absorbing all the sadness and stress and produce joy and color.

1. SOCIAL HUB
2. CAFE
3. LOUNGE
4. PLAYGROUND
5. CALMING SPACE
HUGE POTENTIAL
FUNCTION ------ ATMOSPHERE

LIGHT      SPACE      COLOR
ATMOSPHERE ELEMENT 1:

LIGHT
THE SQUARE
Bright --------------------------Dark
A SURFACE
Bright --------------------------Dark
Public --------------------------Private
ATMOSPHERE ELEMENT 2:

SPACE
High/Big ----------------------------Low/Small
Public ---------------------------------Private
ATMOSPHERE ELEMEN 3:

COLOR
FOR SURFACE:

Using colored floor to influence the atmosphere for each piece of area
THE COLOR SHAPING

FOR SPACE UNDER THE SURFACE

Colored Sheer Fabric

Surrounding and enclosing the space with color
Sheer fabric skylight lampshade influence the **brightness** under the surface
By changing the size of the lampshades to create different atmosphere
HOW TO ORGANIZE THE VOCABULARY TO PRODUCE SPECIFIC ATMOSPHERE FOR CERTAIN FUNCTIONS?

1. A LOUVRE SYSTEM
2. A SURFACE
3. SHEER FABRIC
CUT OUT A CAN

ATMOSPHERE STUDY
SPACE ON THE SURFACE

ATMOSPHERE ELEMENT

LIGHT
- Dark
- Bright

SPACE
- Small
- Big
- Short
- High

COLOR
- Cold
- Warm

VOCABULARY

1. The louver system
2. The Surface
3. Sheer fabric curtains and lampshades
FUNCTION 1: SOCIAL HUB

City Square

Underground Hub
FUNCTION 2: CAFE

Terrace

Intimate Bar Space

LIGHT
- Dark
- Bright

SPACE
- Small
- Big
- Short
- High

COLOR
- Cold
- Warm
FUNCTION 3 : LOUNGE

Light Bath

Bedroom Talk
FUNCTION 4 : PLAYGROUND

Nature

Colorful Cave
FUNCTION 5 : PRIVATE SPACE

Calming Space

Private Booth
Spaces on Top of the Surface

CALMING SPACE  LOUNGE  CAFE  SOCIAL HUB  PLAYGROUND
Spaces Under the Surface

SOCIAL HUB  CAFE  LOUNGE  PLAYGROUND  PRIVATE BOOTH
Voorwoord
STEP 1: LIFT
SOCIAL HUB
STEP 2: LIFT
STEP 3: LIFT
STEP 4: PULL DOWN
"The Sequential Roof" at ETH Zurich
The roof was constructed by load-bearing timber structure consisting of nearly 50,000 members, robotically assembled layer-by-layer into trusses, connecting to each other very tightly by fixing nails.
The overview of the roof build-up

Roofing layers, skylights, sprinklers, lighting and other systems are tightly integrated into the roof structure.

Assembling piece by piece
Automated fabrication and assembly using a 6-axis gantry robot
Fixing the slats by using the fix-nails
The 50mm slats are from 1m to 1.2m. Between every three chord elements there is a layer of web elements. All timber slats are cut at their unique angles in order to shape a smooth rooftop and ceiling.
The surface structure
Steel Box Beam

Steel Cylinder Column
Timber Truss
carpet 8mm

dual overlay base board 7mm

foil heater system 5mm

warmup insulated underlayer 10mm

wooden board 20mm

timber truss
30mm toughened laminated glass
PVC
silicone sealant
foam

8mm carpet and carpet pad
7mm dual overlay base board
5mm warmup foil heater system
10mm warmup insulated underlayer
20mm wooden board
wooden slats

Detail 3
1:5
Hi, I'm Marc!
Mom, look at that flying carpet!
It's so much fun!!!
Amazing
Let's eat under the carpet!
Climate: cooling
Climate: heating
THE IDENTITY OF THE FOUR PUBLIC SQUARES
The Greenery Square
Peaceful and Quiet

Green Roof Surface

Inner Courtyard
Social Activities

Small Lounge Space
Under the eave