Graduation Plan for aE Studio Students

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Studio
Name of studio: Architectural Engineering
Teachers: Anne Snijders, Marcel Bilow

Argumentations of choice of the studio:
The AMC monolith combined with the architectural engineering perspective fascinates me a lot. The architectural renovation project is more and more important in terms of energetic issue and environmental problems. The technology can do a better job to improve the performance of an existing building to increase its service life and provide it a better identity towards the coming future.

Title
Synthetic skylight roof system design of the new AMC

Graduation Project
Problem Statement
The Amsterdam Medical Center, also called the AMC, is a medical complex located in Amsterdam, is faced with urgent factors that are challenging its current identity as a hospital. One factor is under the trend of “smart hospital”, the future hospital will be very small and extremely acute, which will lead to spatial surplus in the current hospitals; another factor is the rising of the aged population in the Netherlands will cause the shortage of nursing institutions. How to deal with those problems is an urgent issue that the AMC need to consider. The building of the AMC has many public spaces that is covered by giant roofs, which provide natural skylight for the public space. Under the circumstance of the necessary transformation program of the current AMC, the public space will be playing an important role. Whereas the lighting environment in the public space is monotonous. Since the theoretical studies shows that multiple and changeable skylights is good for human emotions, the current ambient lights in the public space of AMC, provided by the roof system, is obviously not able to achieve such a goal.
**Objective**
The main intention of the graduation project is to develop a transformation program for the original hospital, in my case, is the transformation from hospital to nursing center. On such basis, further develop the design focus and the design question, in this case, the design focus is the skylight in public space of nursing center; the design question is how to shape different ambient skylight by the roof system of public space. Therefore, to provide positive emotional responses for the users, in this case are the old people, to successfully relocate their life in new environment.

**Overall design question**
How to give the AMC a new identity towards future and how to promote the technological design in order to strength the future identity of the AMC?

Sub Questions:
1. Based on the current trend of hospital transformation, it is clear that one of the possible identities of future hospitals is becoming a medical complex in which the nursing home plays a dominant role. So how to promote this transformation program smoothly? How to establish the new business model?

2. Under the circumstance of becoming a nursing center, what could the new environment provide for the users, in this case, the old people, to help them successfully relocate their daily life from home to the nursing home?

3. In the public space of the new nursing center, how to take the advantage of the natural skylight to become a tool in influencing the human emotional responses so as to help the old people have positive emotion during their relocation process in the nursing home?

4. How to design the roof system of the public space so as to control the multiple daylight environments in order to stimulate positive human emotional responses to help the old people have a better life in the nursing home?

**Thematic Research Question**
How to evoke human emotions in the public space of future nursing environment by manipulating skylight performances by a synthetic skylight roof system?

**Methodologies**
The study is conducted in both theoretical and practical aspects within which the two are mutually weaved and reflected. Theoretically, based on the published papers on psychological and medical aspects, part 1 gives a clear mutual relation between specific lighting environment and human emotion that it can stimulate. Based on this, a set of
design guidelines with regards to the mutual cooperation between skylight and human behavior in public spaces of nursing institution can be concluded. With such, a more detailed design strategy targeting to building parts, such as roof system, could be easily promoted towards the AMC project in a both technological and architectural way; Part 2 involves a series of case studies regarding to different methods of daylight shaping. By matching the daylight strategies featured in actual architecture projects to the various lighting environments that the nursing space need to have according to part 1, this part clearly answers the question of how to actually implement those different skylight environments in a building; Part 3 investigates the possibility of a synthetic skylight strategy implemented on a unified roof system. In order to give it an answer, an initial design concept is proposed and a series of tests regarding daylight performance follows. It will give a strong vision for the following design project. See the illustration bellow:

![Figure 1. Research for design](image-url)
Planning

Relevance

The architectural renovation project is more and more important in terms of energetic issue and environmental problems and the technology can do a better job to improve the performance of an existing building to increase its service life and provide it a better identity towards the coming future. From this perspective, the graduation project of redesign the AMC can be an example that tackles this generic social problem. Meanwhile, from a more specific technological point of view, the technological approach in this project is more specific and problem-oriented.

Literature