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Dynamic lighting design
A transdisciplinary investigation and operationalization of dynamic lighting design criteria that supports health and wellbeing

Introduction to the concept of dynamic lighting design

The importance of dynamic light to support health and well-being has been more and more recognized [Hansen et al., 2017]. Humans have through many years of evolution adapted to the changing light of the sun, varying through the day, seasons and under various weather conditions, creating a multitude of light settings. Humans live in interaction with this dynamic light and consider it as a natural part of our world [Mathiasen, 2015]. Furthermore, it has by the recent discovery of intrinsically photosensitive retinal ganglion cells in 2002 [Hansen et al., 2002] become apparent, that light, beside serving a purpose of enabling visual orientation, also is influencing the internal body clock, affecting sleep-wake cycle, immune responses, appetite, behaviour, mood, alertness and attention - depending on the duration, timing and quality of light [Schlangen, 2014]. But, as humans spend more than 90% of the time inside a build environment [Klepeis et al., 2001] and the daylight intake in our buildings is not always optimal to meet the needs for dynamic light [Hansen et al., 2017], this research project points to the importance of considering the indoor lighting environment that support health and wellbeing as a total sum of electrical light and daylight in a dynamic interplay.

Hypothesis

Combining daylight and dynamic lighting technology in architectural lighting solutions can contribute to better health and well-being.

Objectives

1. To investigate the biological aspects of human needs for dynamic lighting, from the field of natural science.
2. To investigate the phenomenological aspects of human needs for dynamic lighting from the field of architectural research.
3. To establish a set of criteria, that meets the biological and phenomenological aspects of human needs for dynamic lighting.
4. To test the criteria in a series of architectural experiments to validate the criteria’s potential for facilitate dynamic lighting design that supports health and well-being.

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