

## Shady Attia

Prof. Shady Attia is an architectural engineer and Professor of Sustainable Architecture and Building Technology at the University of Liège, Belgium. He is a faculty member of the United States Green Building Council. He heads the Sustainable Building Design Lab founded in 2014. The lab activities are focused around design decision support of high-performance buildings and user-centred advanced façades. The lab is focused on integrative sustainable design and performance monitoring, addressing users' interaction in relation to energy efficiency, thermal comfort, and indoor environmental quality.

## USER CONTROL OF ADAPTIVE FAÇADES: BALANCING THERMAL AND VISUAL COMFORT

Shady Attia U.Liege

## ABSTRACT

User control of adaptive façades is based on prioritising one of the following objectives: thermal comfort, visual comfort or energy saving. One of these objectives can be prioritised depending on the nature of the adaptive façade technology, user activity, comfort requirements, and energy use. In practice, this causes conflicts and results in low user satisfaction. Despite the importance of interactive user feedback, most control strategies rely on regulated feedback based on temperature or illuminance sensors and model-based control strategies. There are almost no practical approaches to balance thermal and visual comfort and, at the same time, empower



users, allowing them to personalise the control of adaptive facades. To understand this gap, this presentation shows observations from different case studies with dynamic solar shading, chromogenic glazing and solar-active façades. Results from different post-occupancy evaluations are collected and analysed in office buildings to define and compare the common control strategies and evaluate the users' perception of comfort.

The presentation proposes a framework to balance thermal and comfort requirements while allowing for overriding occupant feedback. The presentation provides recommendations collected from occupants who participated in field studies in which measurements of physical environmental conditions were cross-linked to the participants' assessment of visual and thermal comfort sensations.