Façade impulse: capturing the façade effect on holistic comfort and satisfaction

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Overview | The research aims to capture the effect of adaptive façade on occupants’ holistic comfort and satisfaction, in order to identify the most effective interaction strategies and design features. Among all façade technologies, Adaptive façades are those that can interact with the user and vary the flow of energy through the building envelope in response to the external weather and indoor needs. Consequently, they have a large potential in delivering a tailored environmental condition, where users could also feel in control or automatically assisted in a natural and well-integrated interaction strategy. But the major barrier to their uptake in real-world buildings is the largely unknown relationship between occupants and technology.

Outcomes and Impact | This PhD research will address this main research and industry gaps (Fig.1) providing an early-stage methodology (Fig.2) to assess and predict façade effect on user satisfaction and holistic comfort. This tool will facilitate sustainable intelligent façades uptake in real-world applications and, hence, a shift from artificially environmentally-controlled office buildings to more natural, healthier and low carbon solutions tailored to provide human comfort and satisfaction. The new knowledge acquired through this PhD research will help to shape new guidelines and standards on intelligent built environments and, specifically, intelligent façades.

Work Involved | During the first year, the PhD research investigated the multi-faceted research problem, defining research gaps and, consequently, research methodologies on user interaction for environmental comfort and satisfaction. During the second and third year, experimental investigations will be undertaken in the MATElab (an experimental facility, Fig. 3) and in real office environments in order to meet the research objectives and to build the final comfort assessment tool.

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