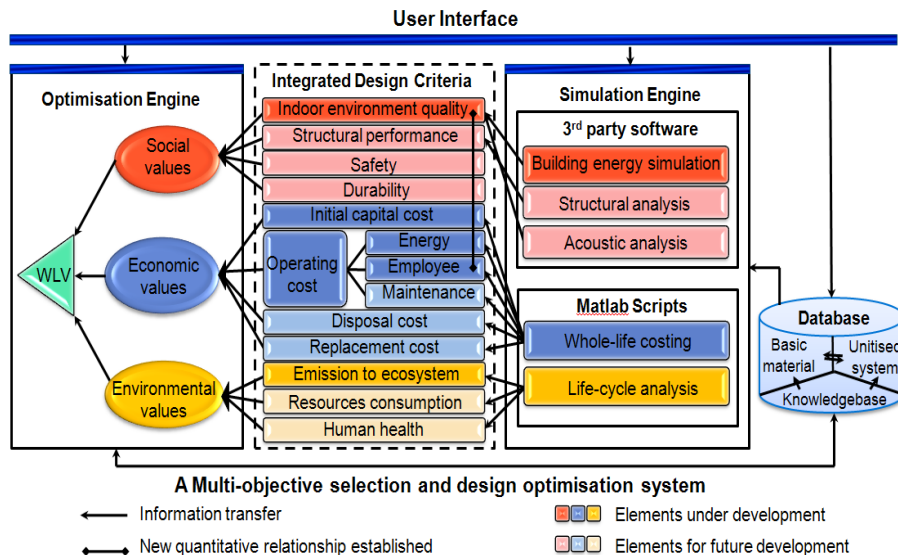
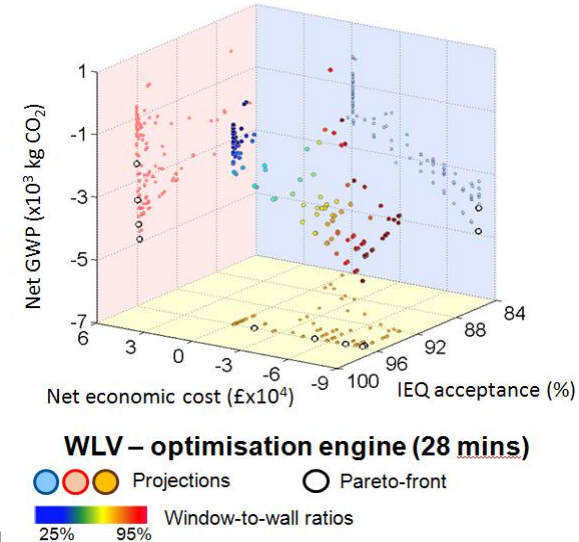


A multi-objective selection and design optimisation tool for high-performance glazed facades

Level | PGR

Research Student | Qian Jin
Supervisor | Dr. Mauro Overend

Overview | The demand for energy efficient buildings and occupant comfort often result in conflicting performance requirements, which are partly being addressed by bespoke high-performance facades with high complexity and cost. High-performance glazed facades, based on new materials and novel technologies provide an opportunity to satisfy, and in some instances exceed, these performance requirements. The high performance facades include several combinations of high performance static coatings, as well as facades with transient properties by incorporating passive systems or switchable devices. It is however challenging to assess the real impact of a particular façade solution during the design process, in particular how the social, economic, and environmental value of a building is affected over its whole life. Furthermore, the growing number of novel façade technologies and the possible permutations they generate make it increasingly difficult to identify the optimal façade solutions within the domain of possibilities.



Outcomes & Impact

- Develop a user-friendly representation for the relative whole-life cost for existing and future high-performance glazed facade technologies;
- Develop and validate simulation models for high-performance glazed facades that account for social, economic and environmental impacts;
- Develop a multi-objective optimisation model that integrates whole-life value design criteria.

Work involved | The research focuses on multi-objective design optimisation of high-performance glazed facades. The social, economic and environmental values will be investigated using third-party software. Development of the high-performance glazed facades will be achieved by performing the multi-objective optimisation for a high level of whole-life value.

Sponsors & Partners | Cambridge Overseas Trust, Buro Happold