Environmental Design Projects

Flooding Resilience

House Refurbishment

Office Extension

Residential Projects

Cal Caria House

Orange Grove House

Refurbishment Projects

Big Scale Project

Sports Centre

*Note: This portfolio is a very small collection of work samples from a very wide professional and academic career. Please, contact the author for more information.
In recent years, the frequency and impact of flash floods in Mediterranean coastal towns has substantially increased and will continue to rise due to a combination of climate change and anthropogenic factors.

In 2007, the Valencian town of El Verger in Spain was tragically affected by the Girona River floods, which in few hours severely damaged large portions of the urban tissue as well as destroyed entire buildings. However, despite the severe psychological, physical and economic loss that the population suffered, there are insufficient information and awareness on the risks of recurrence of this phenomenon and the threat that it represents for the inhabitants.

Previous research studies based on this basin have proposed to free the riverbed by demolishing buildings and creating more green areas. However, an architectural and environmental design approach to retrofit and adapt the damaged housing in order to improve their resilience to extreme climatic events had never been proposed.

The aim of this project was to identify sustainable adaptation strategies for the design and construction of housing buildings affected by the floods. Two different case studies were taken into consideration as a basis for applicability of the retrofit strategies to all the existing buildings within the flood risk zone. The study demonstrated that a series of mitigation and adaptive strategies can be successfully applied not only to prevent water coming into the houses and increased permeability within and around the urban areas, but also to improve interior environmental conditions in order to maximise comfort and minimise heating and cooling energy demand.
Sustainable Retrofit for Flooding Resilience: Houses Close to the Girona River, Spain

10:00 AM - Normal Situation - No water

1:00 PM - Flash-Flood Happened - Water inside the GF
This project’s aim was to undertake a good analytical assessment of a semi-detached house located in East London and introduce numerous methods of passive improvements into it. The dwelling has 3 bedrooms on the first floor and the living and dining areas converted into two additional bedrooms on the ground floor, completing a total of 5 bedrooms at the present time. Some of the data collection methods were on-site spot measurements of air and surface temperatures, sound levels, relative humidity percentages, illuminance and air velocity of the dwelling and its surroundings. Several software tools were also used to run different simulations and see how the house will perform depending on the solution taken.

The upgrade strategies were based not only on the current energy performance state of the house, but also on real design proposals and building construction solutions to address and improve the everyday thermal and visual occupants’ comfort. Some of the solutions included: create a skylight on the centre of the house, just above the staircase; add an additional cladding system together with cellulose insulation; replace the existing flooring and add the necessary insulation too; change the size and material of the windows to get better Uvalues, etc...
The purpose of this project was to develop a sustainable environmental building design founded in the site-specific relationships between urban context, user function and architectural expression. The site is located on Euston Road in the borough of Camden, London. Through literature review, fieldwork, and software simulation, a methodology was developed to evaluate the outdoor environment of the existing site to identify the relationships between climatic and microclimatic factors, existing buildings, and the current users of the site.

Based on identified current and projected trends pertaining to lifestyle, technology, population, economics, and climate, it was decided that the proposed design would be a shared co-work space that provides facilities for small start-up businesses, artisans, freelance designers, and technical professionals. These users were identified based on (a) the lack of affordable workspace in central London, (b) the high demand of office space for small businesses, (c) the lack of facilities made available to young professionals, and (d) the evolution of technologies including wireless networks and virtual storage which eliminate the need for a permanent or fixed office space. The provision of spaces with multiple functions was also important for accommodating the various activities and requirements for each user typology.
In this project the clients were looking for a Mediterranean and modern house placed in an outskirts residential area of a little town near to the sea. One of the most important features to take into consideration was the building orientation to get as much light as possible during the daytime, but also to avoid the overheating risk inside the rooms due to excessive solar radiation, especially during summer months. The variation from direct natural light to overshadowing was considered as an important design feature too, therefore roof skylights and concrete pergolas are found around the building.

On the other hand, in order to be as much sustainable as possible, several local materials like calcareous stone and white sand were used to compose some of the main design elements. Also, regarding the colours choice, light ones like white or cream were mainly selected to provide solar reflection, as it is typical from the Mediterranean vernacular architecture.
This project had an important challenge from the early design stage because it had to preserve the main volume, character and essence of an existing old listed building, but adding cutting-edge technology and sustainable design strategies. The structural system and interior layout could be rearranged without restrictions, which allowed to create great spaces, complex interconnected floors and several skylights around the building.

The existing villa is placed on the middle of the Spanish countryside, surrounded by orange groves and vegetables fields and its owners are passionate about sustainability and bio-climatic architecture. For this reason, different strategies like natural stack ventilation, use of local materials, thermal comfort methods, green walls and even geothermal energy system for the house’s heating and refrigeration systems were installed.
Two different projects are explained on this slide. Both of them are terraced houses placed in Mediterranean towns, but with very different features and clients’ requirements. One of the first things they had in common was that both of them needed an important introduction of natural light and ventilation, because very often most of old vernacular houses tend to be dark and have numerous spaces inside their layout without any kind of direct openings. In order to achieve these important requirements, several holes into the existing slabs were opened to create interior courtyards and skylights at different levels.

The first one (left) is already finished and the owners called it now “the light house”, because of the big amount of light they receive in every room almost at all times of the day. On the other hand, the second one (right) is still under construction, but in this case a much bigger intervention is needed because an important extension is taking place too. In both cases sustainable strategies to allow thermal comfort of the occupants were studied as well as materials, tones and finishings full renewal.
This sports centre regenerates and extends an existing old town to create a complex project composed by three principal areas: main sports building, services and educational units (library, classrooms, cafe, dining room, health centre, polyvalent room, etc...) and students' accommodation. These three parts might seem not related, but all of them have the same common goal: provide the best experience to the users and be in contact with the nature and the surrounding views.

The sports building is placed on the highest point of the town and has two different levels adapted to the natural land slope. Its roof covers both storeys and unifies all interior spaces. Differently, the students' residence is fragmented on different modules, all of them in a ground floor level and open to the forest, although avoiding crossed views between them and providing the necessary privacy.
Thank You