

Towards Sustainability and Transdisciplinarity. Harquitectes's Collaborative Practice

Maria Francesca Lui

Abstract: *Harquitectes* is a Catalan architecture studio founded in 2000, renowned for its blend of technological innovation and traditional techniques, as well as its focus on environmental, ethical, and social issues. The studio's approach is rooted in research and continuous dialogue among its four partners: David Lorente Ibáñez; Josep Ricart Ulldemolins; Xavier Ros Majó and Roger Tudó Galí, as well as collaboration with external professionals. This collaboration allows them to rediscover and reinterpret experiences from the traditional Catalan architectural heritage, identifying principles of design and energy management and adapting them to meet the needs of contemporary society, specific contexts, and client requirements. Working with external mechanical engineers enables them to develop innovative solutions to ensure passive indoor comfort in buildings. Termed »climatic parameterization« by the studio, this approach relies on the use of algorithms and simulations to assess and optimize design choices from the early stages. This complicity between different disciplines not only blurs professional boundaries but also transforms architecture into a space for sharing and learning where the integration of expertise offers a new model for bioclimatic design.

Keywords: Climate; Critic Regionalism; Passive Systems; Innovation; Complicity; Comfort.

Architecture, as an ancient discipline, has gone through various evolutionary phases, influenced by the conception of the human being and its relationship with the world. One of the crucial moments in the history of »international« architecture, as identified by Terunobu Fujimori, was the transition from constructing simple buildings with available materials to standardization, which occurred after the Industrial Revolution (Pierconti 2019).¹ This paradigm shift led architects to overlook climatic aspects within their designs, now replaced by technological air conditioning systems, and deprived them of the fundamental task of defining spaces capable of controlling variables such as temperature, humidity, and natural ventilation. Since the 1970s, following the energy crisis, more and more architects have reconsidered the relationship between design, climate, and resources, seeking to reconcile technological progress with traditional knowledge. Among them, Kenneth Frampton, in his essay »Towards a Critical Regionalism: Six Points for an Architecture of Resistance« argues that architecture should assume a position of *avant-garde*, distancing itself from the myth of Enlightenment progress and reactionary impulses to return to the past (Frampton 1983).² Likewise, Bernard Rudofsky highlighted the conditions of modernity by criticizing the uniformity of mechanized and internationalist modernism (fig. 1).

Today, more than fifty years after these initial considerations, contemporary society is faced with urgent challenges due to the construction sector being responsible for a significant number of emissions and the intensive use of natural resources. In this transformative context, the Spanish studio *Harquitectes* emerges, representing both an interesting contemporary development in »Critical Regionalism«³ theorized by Frampton and a manifesta-

1 Fujimori is interested in this internationalism which he identifies as occurring in two periods in history: »The first time during the Stone Age [...] using natural materials like soil, stone, wood, grass; the second time [...] exploiting industrial materials like iron, glass and cement [...] I believe that my interest in architecture lies in how to recall the former in the present time« (Pierconti 2019: 75).

2 According to Frampton, only through this *arrière-garde* perspective can architecture develop a resilient and identity-driven culture, making appropriate use of universal technique.

3 Kenneth Frampton adopted the term »Critical Regionalism«, coined by Alessandro Tzonis and Liane Lefaivre, in reference to Greek architects Dimitris and Suzana Antonakakis. In Frampton's interpretation, it is an approach to architecture that seeks to enhance the cultural and historical identity of a place through the design of buildings that respect the local characteristics of the context in which they emerge. The term »critical« in the movement's name stems from Frampton's belief that architecture should be able to critique and resist the homogenizing forces of modernity, instead embracing regional and local differences in the design process.

tion of architecture in which different stakeholders collaborate to achieve internal comfort and reduce energy consumption. All of this begins with the definition of space and matter (fig. 2).

Founded in 2000 in Sabadell, Catalonia, by David Lorente Ibáñez, Josep Ricart Ulldemolins, Xavier Ros Majó, and Roger Tudó Galí, *Harquitectes* Studio stands out for its synergistic integration of technological innovation and traditional techniques, as well as its thoughtful consideration of environmental, ethical, and social themes. A particularly interesting aspect of *Harquitectes'* operational philosophy is its openness to collaboration with various professional figures, both within and outside the field of architecture. Since its early stages of development, the studio has demonstrated this collaborative inclination. Initially, collaboration with experts within the academic environment allowed the four architects to acquire a deep understanding of the reasons and principles underlying the traditional techniques of vernacular architecture, as well as the perceptual and tactile qualities of the built environment (fig. 3). Subsequently, this knowledge, gained from the lessons of vernacular architecture, merges with the adoption of innovative devices, resulting from collaboration with external mechanical engineers. This process of synergy allows *Harquitectes* to broaden the perspectives and competencies of their design approach while still holding firm to the principles and convictions that characterized the earlier and more intuitive phase of their work.

Undoubtedly, the curiosity of the four partners of *Harquitectes* about vernacular architecture constitutes a fundamental and consistent element of the studio's evolutionary process. Through an in-depth study of the structural, geometric, and material characteristics of vernacular constructions, the architects have gained profound insights into the pre-industrial mechanisms of climatic control present in such buildings. This cognitive progress has been further facilitated by valuable interactions with experts within the academic sphere like Coque Claret and Joan Sabaté.⁴ Thanks to

4 Coque Claret Martí and Joan Sabaté are two professors at ETSAV in Sant Cugat del Vallès, where Roger Tudó (*Harquitectes*) teaches. Specifically, Coque Claret focuses on architecture and sustainability, while Joan Sabaté specializes in construction. The engagement with these influential figures in the Catalan landscape has enriched *Harquitectes*, bringing them closer to a certain understanding of vernacular architecture, its behavior, and its potential. In the book *Harquitectes. Textos y conversaciones*, Roger Tudó states »We developed an awareness of what it meant to build when I started teaching construction at the School of Architecture La Salle with a group of very interesting young professors, led by other more senior and powerful ones: Coque Claret and Joan Sabaté« (*Harquitectes* 2022: 76–77).

these exchanges and their propensity for research, the studio has developed a greater awareness of traditional passive energy control systems and fundamental concepts of thermodynamics. *Harquitectes'* interest in Catalan vernacular architecture has allowed them to gain a deeper understanding of the potential of traditional materials. The use of Catalan brick has proven to be a crucial element in achieving multiple design objectives. According to the studio, brick offers the ideal conditions for defining spaces, thanks to its thermal inertia that regulates temperature through its mass. Additionally, its porosity facilitates humidity control, while its raw nature contributes to narrating the memory of the constructed space (fig. 4).

From this perspective, one of *Harquitectes'* most notable projects is Casa 1014, located at the heart of the historic center of Granollers. This building, nestled between two boundary walls, features two internal courtyards which consist of vertical spaces approximately nine meters high and are entirely constructed with exposed brickwork. These voids play an essential role in regulating internal temperature and controlling natural illumination, while also serving as a threshold of transition between the bustling street chaos and the intimacy of the domestic environment. Of particular interest is the innovative use of Catalan brick in the construction of the lintels. Instead of adopting conventional solutions, such as employing different materials or using arches, the studio has developed a clever approach by overlapping shorter bricks anchored with steel rods. This »contemporary vernacular« approach, skillfully reinterpreting traditional techniques to suit modern needs, is a distinctive feature of *Harquitectes'* methodology. Their attention to climatic solutions and adherence to ethical imperatives has led them to recognize the significance of designing spaces capable of ensuring comfort through the precise control of geometry and materials, thereby reducing energy demand and resource consumption (fig. 5). While, on the one hand, this understanding provides an intriguing response to the challenges posed by the climate crisis and resource scarcity, on the other, it allows *Harquitectes* to address themes related to bodily perception and the relationship between humans and nature (fig. 6).

In a subsequent phase, coinciding with projects such as the student residence at the *Escola de Arquitectura del Vallès (ETSAV)* (2010–11) or the *Institut de Ciència i Tecnologia Ambientals (ICTA-UAB)* (2013–14), the Catalan studio *Harquitectes* decided to combine the knowledge acquired from vernacular architecture with the utilization of innovative devices through collaboration with external mechanical engineers. The four partners realized that

tradition and common sense were insufficient to objectively justify their design choices. Consequently, when facing more complex projects, they opted to rely on consultants capable of simulating thermodynamic variables. As they state:

»We have never been interested in an efficiency based on machines; instead, we have always believed in sustainable comfort whose success and longevity rely on the ›natural‹ behavior of construction. However, we understood that relying solely on tradition or common sense would not be enough to objectively justify it. Hence the appearance of new external collaborators who helped us outline a thermodynamic approach and employ parametric simulations to precisely verify our strategies« (De Ferrari 2022: 45).

The adopted design methodology enabled them to rigorously optimize the internal comfort of the building. Through collaboration with external experts, the studio introduced an additional level of complexity and control over the involved variables, utilizing algorithms and simulations to test the newly introduced strategies and assess the most promising choices during the design phase, as they define it, »climatic parameterization«. This openness to external expertise allowed *Harquitectes* to transcend the disciplinary boundaries of architecture and integrate competences from other fields, such as engineering, to address environmental, social, and economic issues in a more effective and sustainable manner.

In contrast to other architectural studies that use parameterization to manage complex structures, *Harquitectes* adopts simulations to increasingly simplify the envisioned solutions and make them feasible while adhering to regulatory constraints. A paradigmatic example of this collaborative approach is represented by the Cívico Cristalerías Planell, a historic former glass factory located in the Les Corts district, which was transformed into an adult education center. In this case, continuous interaction with a mechanical engineer experienced in CFD software allowed the replacement of mechanical systems with innovative passive systems. The building features four solar chimneys on the roof and two internal courtyards, generating a »metabolic« behavior that varies according to different periods of the year. During winter, when heat dispersion needs to be controlled, clean air enters the building through the lateral courtyards and is heated thanks to the greenhouse effect. In contrast, during the summer, when heat dissipation is

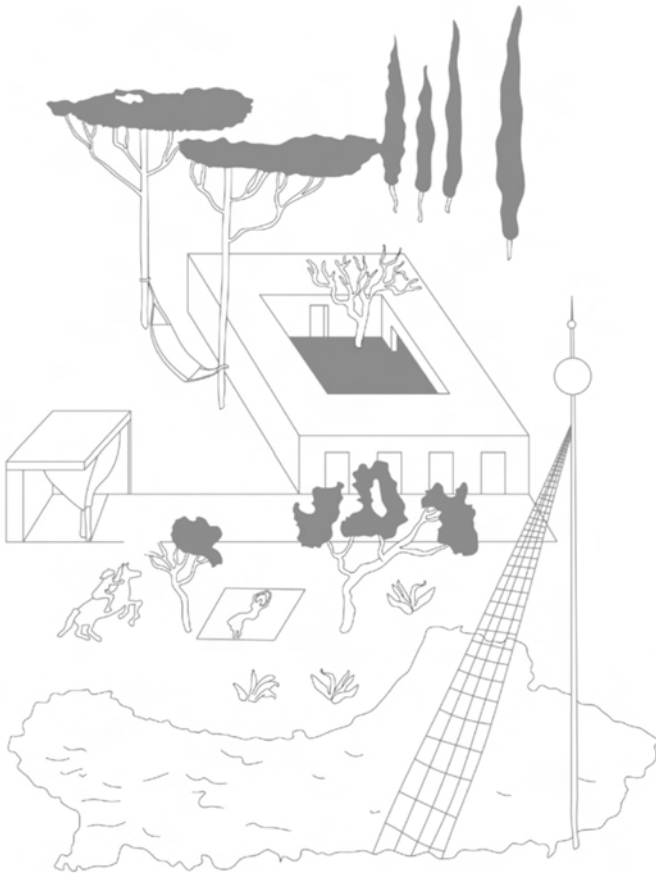
necessary, shaded courtyards allow fresh air to enter naturally through the four solar chimneys (fig. 7).

Harquitectes demonstrates how the use of climatic parameterization can lead to more effective design solutions and during a lecture at the University of Navarra, Josep Ricar Ulldemolins (2022) emphasized:

»All these projects would be impossible without collaboration with engineers. However, we must seek engineers who are accomplices in solving the comfort problem starting from the discipline of architecture. We need simulations, calculations, justifications, and sometimes even machines. But above all, we need engineers who are willing to set aside machine efficiency and focus on demand management«.

In an era marked by urgent challenges such as the climate emergency and the search for sustainable solutions, the work of *Harquitectes* serves as a reference model on multiple fronts. On one hand, their ability to reinterpret traditional techniques and adapt them to contemporary needs represents a convincing and replicable approach in similar contexts, where vernacular architecture can be studied and reinvented to provide concrete and creative solutions. On the other hand, *Harquitectes'* openness to collaboration with external experts represents a virtuous model to enrich the design process and allows for the convergence of diverse competences to adequately address the complex challenges of our time. This synergy between the past and the present, combined with an open and multi-disciplinary vision, offers the opportunity to construct a meaningful future for contemporary architecture.

In 1938, Bernard Rudofsky published an article in *Domus* in which he described the project for a house on the island of Procida (Rudofsky 1938). This house would serve as an interface between humans and nature, a component capable of managing external factors to create a comfortable experience indoors and redefine the way we live in domestic spaces.

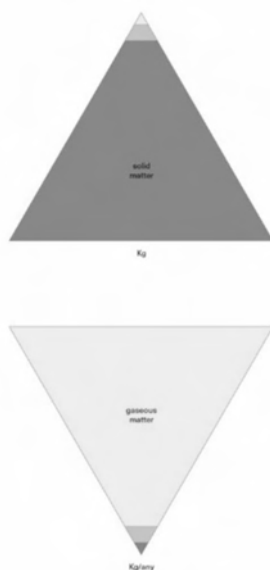


1.

Maria Francesca Lui: Schematization of Bernard Rudofsky's drawing for a house in Procida, 2023.

This graph (fig. 2) is the result of a reflection conducted by *Harquitectes* on the relationship between solid, liquid, and gaseous matter (in kilograms), using a standard house as a model. The introduction of time as a factor revealed that over the course of 50 years, the quantity of circulating fluid matter predominates over solid matter, constituting over 90 percent of the building's weight. Based on these considerations, they began to take a greater interest in controlling the qualities of gaseous matter, starting from the definition of solid matter.

»We discovered the contribution of materials to the atmosphere somewhat randomly, but we soon realized their value. [...] Between you and the physical support, there is transparent material, but the solid matter allows the transparent to acquire presence, to be more corporeal for reasons of light and its relationship with the final enclosing support. It's not just about working with solid matter but exploring the combination between the environmental conditions of transparent matter and the surrounding matter« (Díaz Moreno/García Grinda 2020: 25).

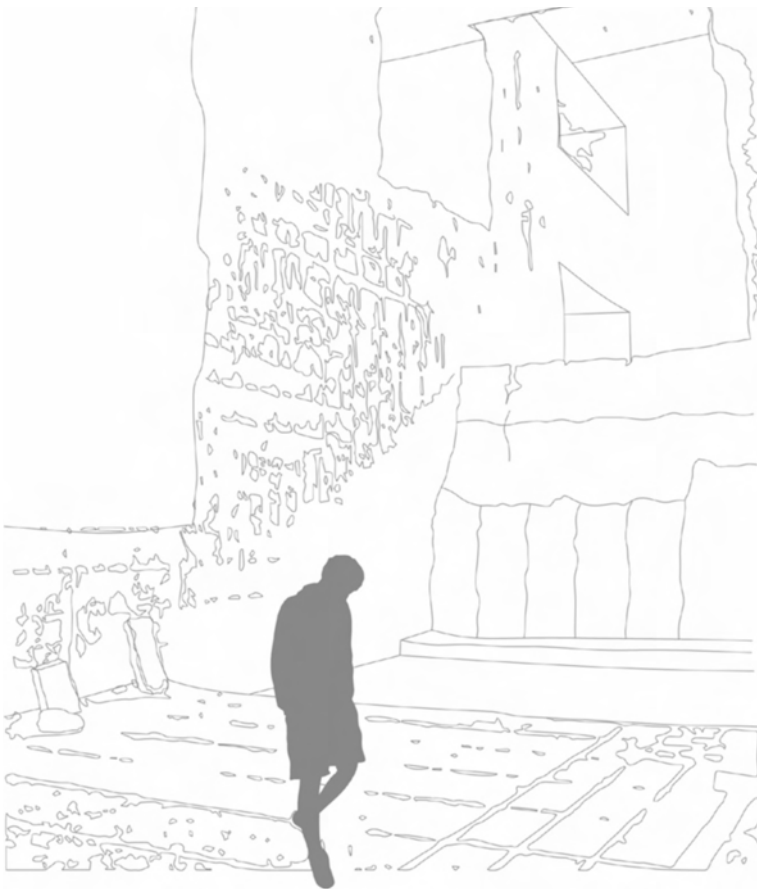


2.

Harquitectes: *Graph on solid, liquid, and gaseous matter*, 2020.

During my 2022 interview with Josep Ricart from *Harquitectes*, when discussing the value of architecture without architects, he stated:

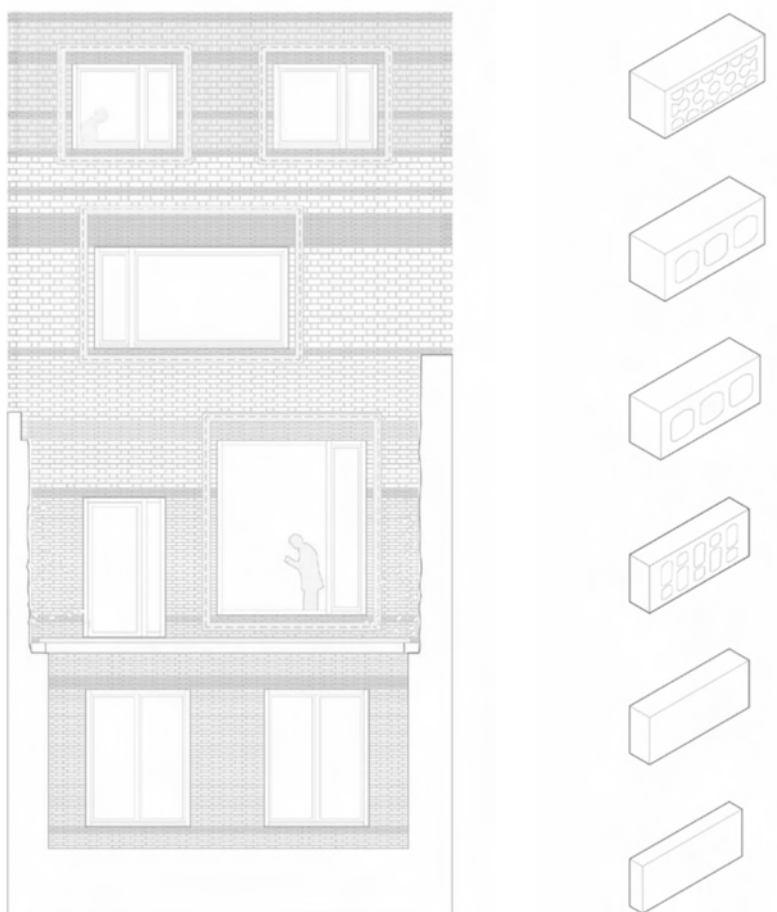
»Since we opened the studio, every year we organize one or two trips. Initially, we always visited buildings designed by famous architects. Then, there was a trip to Mallorca where we entered an active stone quarry in Mares. It felt like being inside Chillida's Tindaya project. It was during this trip that we began to understand the value of experience« (Cacciatore/Lui 2023: 8).



3.

Maria Francesca Lui: Drawing of the stone quarry of Mares, taken from a photograph of Harquitectes' journey, 2023.

The use of Catalan brick allows *Harquitectes* to achieve multiple design objectives. For example, the intricate masonry composition of Casa 1014 reflects the typical stratifications found in historic buildings and consists of six different types of bricks, selected, and laid based upon their density. The heaviest bricks were used in the lower part of the building, while the perforated ones were used in the upper section. This gradation of density meets structural requirements and enables the walls to interact with light and transform into ornament.



4.

Harquitectes: Internal section of the entrance patio of Casa 1014, 2023.

The verticality, almost monumental, of the entrance courtyard of Casa 1014 engages in a dialogue with natural phenomena such as gravity, light, and the stratification of air, while the perception of the external environment allows for a connection to seasonal comfort. At the same time, the use of brick resolves multiple aspects through a single element: from composition and structure to thermal inertia and the management of air humidity.



5.

Maria Francesca Lui: Drawing of the entrance courtyard of Casa 1014, 2023.

In the same 2022 interview, Josep Ricart state:

»There is a painting by Ramon Casas, a Catalan painter, that interests us greatly. The title is Interior al Aire Libre (Interior in the Open Air). The title itself is an architectural manifesto that defines many of the values of our architecture. [...] This painting shows an architecture that connects people with the invisible: the climate, physical phenomena, cross-ventilation, and inertia. It is an extraordinary painting that effectively explains the concept of reciprocal architecture, which constitutes an emotional and comfortable experience through the collaboration between architectural space and the natural context.« (Cacciatore/Lui 2023: 5)

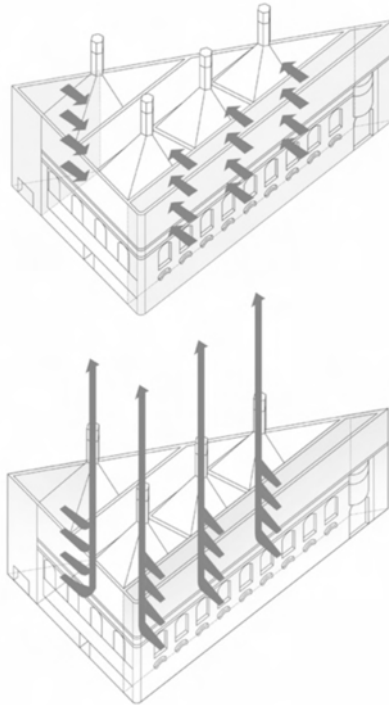


6.

Maria Francesca Lui: Schematization of Ramon Casas's Painting Interior al Aire Libre (Interior in the Open Air), 2023.

The Cristalleries Planell Civic Center represents a perfect example of collaboration and complicity in architecture. The management of air, through the introduction of solar chimneys on the roof, allows the building to self-regulate without the use of mechanical systems, while also reconnecting humans with the physical phenomena within the built environment. In an interview for the magazine *El Croquis*, the four partners state:

»There are people interested in thermodynamics who wanted to find a new language within it. We find it interesting – and the chimneys of Cristalleries Planell could accidentally fall into this category – but what truly interests us is bodily perception« (Díaz Moreno/García Grinda 2020: 27).



7.

Harquitectes: *Descriptive diagram of the airflow inside the Civic Center. The top diagram represents the summer behavior, while the bottom one represents the winter behavior, 2023.*

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