When Decorations Have a Function. Technology and Aesthetics in Contemporary Facades

by Michele Valentino, Enrico Cicalò

In architecture, exterior walls have been the ideal surface for centuries to cover with ornamental elements which, with their visual impact, played a decisive role in the recognizability and fame of the buildings that housed them. Only during the 20th century, due to a series of contributing factors linked to the prevalence of a rationalist and industrialist perspective, did this tradition enter into crisis. However, in recent decades, it has shown significant signs of revival. Starting from a historical review supported by some illustrious medieval and Renaissance examples, this essay examines the reasons behind the renewed interest in exterior cladding in today's architectural research, modulated according to open, enveloping, technologically advanced designs. It originally appeared in "TEMA. Technologies Engineering Materials Architecture", 10 (1), 2024, pp. 78-87. We would like to express our sincere thanks to the authors, Michele Valentino and Enrico Cicalò, of the Department of Architecture, Design, and Urban Planning, Università degli Studi di Sassari, Alghero, and to the editorial staff of "TEMA" for agreeing to this reissue.

1. Introduction

Buildings are complex systems of representation [1]. They can be considered systems of signs in which it is possible to recognise meanings that can denote precise functions if interpreted in the light of specific codes [2]. Therefore, through this approach, architecture entirely would fall within the field of mass media and could be considered a form of mass communication [3]. Thinking of architecture as mass media implies focusing on the interface between the built object and the public and on the architectural envelope that becomes the perceived image of architecture. The facades, as the elements closest to the public space and therefore most visible, constitute the readable pages of this media whose readability is based on the reading of codes and languages that transform in time and space.

Until the twentieth century, the reading of architecture was based on the interpretation of decorative features and ornamental elements that, composed in the surfaces of facades, constituted a form of visual narratives capable of communicating social, cultural, and functional information. However, unlike in art history, historiography and the most significant essays on architecture have often neglected and perhaps despised the use of ornaments, relegating them to an ancillary and non-essential role in the conception and execution of the architectural work. This approach, intrinsic to the debate on decoration, has deep roots in ancient rhetoric. From Plato's famous condemnation of mimesis, which fits into the truth-imitation dialectic in the problem of figuration, through Vitruvius' *De Architectura* [4], where the decorum and, therefore, the decorative principle must pass through the purpose for which the building is intended, to Leon Battista Alberti's *De re Aedificatoria* [5], where the emphasis is placed in relationship between pulchritude –linked to the architectural structure and therefore to the truth – and ornament – an accessory and therefore non-essential element. However, the essay with the most influential opinions on the subject is Adolf Loos's *Ornament und Verbrechen* (*Ornament and Crime*) [6], a cultural precursor of European modernism where ornament is associated with crime because it is superfluous in the conception of architectural form.

Doge’s Palace in Venice, perspective view and facade pattern (Matthias Suessen/Wikimedia, Bruno Rijsman/Wikimedia).

2. The tradition of decorated facades

However, before the stigma of modernism, the history of architecture has provided famous examples in which the use of wall textures and motifs conferred iconicity on buildings, conveying profound meanings that lie beyond the superficial gaze of the wall surfaces of their facades. A notable example of this is Venetian Gothic-Byzantine architecture, which has specific characteristics compared to the rest of European Gothic. One of its main characteristics is, in fact, the use of two-colour decorations involving the use of different marbles, usually biancone and rosa Verona, which draw a characteristic contrasting colour effect. Two-colour decorations were mainly used on friezes, column capitals, cornices and window arches, but in some cases, they were used to design decorative motifs on facades. Particularly noteworthy is the two-colour wall motif on the main facade on Piazzetta San Marco of the Doge’s Palace (Fig. 1), which contributes to a chromatic contrast that makes the palace’s facade unique. The geometric motif covers the last band of the façade, the one that is higher and less “pierced”, and through the use of two different materials, reproduces a two-dimensional wall decoration typical of certain orientalism in Venetian architecture, also taken up in Islamic culture, from Spain to Indonesia, and rooted in iconoclastic religious ideology.

Palazzo dei Diamanti in Ferrara, perspective view and facade pattern (Wikimedia).

Similarly, although with very different formal results, mention may be made of the Palazzo dei Diamanti in Ferrara (Fig. 2) or the Chiesa del Gesù Nuovo in Naples (Fig. 3). Although there are slight variations in both cases, the facades feature ashlar as a wall motif that makes it iconic and recognisable. The diamond-shaped rustication – a small pyramid with a square base – is precisely and rigorously arranged, creating a three-dimensional pattern capable of creating light and shadow effects that give the facades particular colour effects throughout the day.

Beyond construction authenticity, the cases above show how wall motifs, obtained through ashlars, colours and texture joints, contribute to the aesthetic conformation and iconicity of buildings, expressed through the design of facade surfaces [7].

Chiesa del Gesù Nuovo in Naples, perspective view and facade pattern (Vitold Muratov/Wikimedia).

3. Historical functions of decoration in architectural facades

Hence, throughout history, the design of architectural facades has always been inextricably linked to the theme of decoration. It is no coincidence that Gottfried Semper, one of the most significant theorists of decoration, studied architectural surfaces in relation to textures. Gottfried Semper's nineteenth-century treatises on decoration, as well as those of Owen Jones [8], profoundly influenced the works of architects and those of Louis Sullivan (Fig. 4) and Frank Lloyd Wright (Fig. 5), who used the metaphor of textiles in the design of their buildings and in particular their facades. Wright referred to himself as "the weaver" for his method of construction based on the composition of textured blocks forming enveloping membranes [9].

According to the traditional conception, decoration is not a functionless element but has the function of attracting the eye and giving visual and aesthetic pleasure. From this point of view, the decoration is designed to attract and capture the eye, transforming objects into images [10]. In order to do this, decoration relies mainly on pure form, favouring abstraction and stylisation, almost forcing the eye to enjoy the pure harmony of signs rather than the meanings conveyed by images of a figurative nature.

Guaranty Building in Buffalo, designed by Louis Sullivan, perspective view and facade pattern

(Lemay/Wikimedia).

However, decoration is not only aimed at the gratification of visual pleasure. Historically, the representative function of architecture has been based on it. Traditionally, decoration also plays a political role, distinguishing the social status of the owners of the objects on which it was applied, them being tools, objects, furniture, clothing, accessories, spaces or buildings. In pre-modern buildings, facade decoration provided social, cultural, functional, and economic information, making the built form a legible and interpretable object. The ornamentation of the building provided information about its function, its role in society and the people who had built and inhabited it [11]. This social and representative function was emphasised as early as the 16th century by Sebastiano Serlio, who, in volume VI of *I sette libri dell'architettura* (*The Seven Books of Architecture*) [12], explicitly attributes a social function to decoration in that it allows the building to adapt to the class to which the individual inhabiting it belongs, a conception that was to remain unchanged until the early decades of the 20th century when the spread of Art Nouveau and Art Deco stylistic elements in the facades of bourgeois houses became a symbol of the affirmation of social status.

Ennis House in Los Angeles, designed by Frank Lloyd Wright, perspective view and facade pattern (Edward Stojakovic/Wikimedia).

4. The crisis of the decorated façade

This conception of "ornament as style", advocated by Owen Jones, Alois Riegl and Wilhelm Worringer [13] and sedimented over time until the early 20th century, contrasts with the concept of "ornament as crime" advocated by Adolf Loos, who put ornament on trial in his 1908 *Ornament and Crime*, calling it a

crime against human civilisation. Adolf Loos' position is at the origin of a kind of ornamentoclastia understood as a new form of iconoclasm [14] that relegates decoration to a testimony of an obsolete past and a symbol of cultural backwardness. The crisis of decoration originated from a rekindling of the debate on what is valuable and necessary and what is useless and superfluous, on what is functional and structural and what is additional and extrinsic that originated in the treatises on rhetoric. From this context, ornamentation takes on negative connotations. The rhetorical *ornatus*, referred to in the visual arts, is seen as additional and extrinsic, distracting and distancing from the argument's substance and the discourse's simplicity. The principle of *decorum*, of "appropriateness", as conceived by Vitruvius, is also found in Leon Battista Alberti's *De Re Aedificatoria*, according to which ornament complements the work closer to beauty. However, to do this, it must respect a severe demeanour not to harm the harmony of the whole and, above all, not to transcend into luxury and pomp. Therefore, ornaments would not have a negative connotation but only concerning their use. Leon Battista Alberti condemns ornamental elements only when they are reduced to external trappings that impede their vision and understanding instead of emphasising the beauty of the form.

According to this point of view, ornament and structure can and must coexist, as in the column case, which, although born to satisfy structural needs, is appreciated for its aesthetic qualities, so much so that it becomes the most ornamental architectural element. The column is thus configured as a significant example of functional ornamentation [15]. The exact synergy between form and function emerges in the writings of Sullivan, who associates the beauty of ornament with its being part of the material from which the building is constructed, with its being part of the tectonics of architecture. Construction and ornament, in his view, benefit from this harmony, in which each enhances the value of the other [16].

The loss of this unity between tectonics and the image of the built object will sanction the 20th-century crisis of decoration. The twentieth-century idea of decoration and ornament results from this disconnection between form and function, between tectonics and decoration, in which decoration is no longer constitutive of the conception and structure of the work but is entirely separable from the functional form of the object [17].

Ornament, once synonymous with the pursuit of beauty, harmony, and aesthetic pleasure, is thus, for a long time, removed from the surface design of objects and buildings. Among the greatest interpreters of this new purist aesthetic is Le Corbusier [18], according to whom the true intent of decorative art must be to produce objects of perfect utility, whose authentic luxury emanates not from decoration but from the elegance of its conception, the simplicity of its execution and the effectiveness of its performance. A

new aesthetic paradigm is thus affirmed based on the concepts of smooth, white, clean, and transparent [19]. Smooth as unadorned, white as neutral, clean as pure, transparent as immaterial. A paradigm, this one that will profoundly influence the design of 20th-century architectural facades.

5. The revival of decorated façades

The paradigm of modernism was questioned seventy years later by the writings of Robert Venturi and Denise Scott Brown [20], who denounced its limitations and instead proposed to replace the smooth, white, and transparent with the drawn surface. For them, the architectural design of facades favours the integration of buildings in the urban context and allows the construction of meanings. The predominance of functional aspects was replaced by semantic and representational aspects, favouring the search for architectural expressiveness capable of communicating with the post-modern public and dialoguing with contemporary socio-cultural dynamics.

In the early 1980s, a critical-cultural debate developed on the revival of decoration. The positions of Gillo Dorfles [21], who, coming somewhat close to the thought of Ernst H. Gombrich [22], criticises a certain anti-ornamental puritanism of the historical avant-gardes of the 20th century [23], are of considerable importance. His position becomes even more apparent in his book *Elogio della disarmonia* (*In Praise of Disharmony*). Dorfles now declares the positions of Adolf Loos and the Modern Movement historicised and affirms the intrinsic necessity of ornament. These were the years in which art, as in architecture, was the first opening of criticism towards “anti-modern” and post-modern positions. These were the same years in which the Venice Architecture Biennial was entrusted first to Paolo Portoghesi – *Architettura dei Paesi Islamici* (*Architecture of Islamic Countries*) 1982-1983 – and then to Aldo Rossi – *Progetto Venezia* (*Venice Project*) 1985 –; two of the greatest exponents of that Postmodernism in architecture characterised by the return of ornament and stylistic citations as a response to the formalism of the Modern Movement and the International Style.

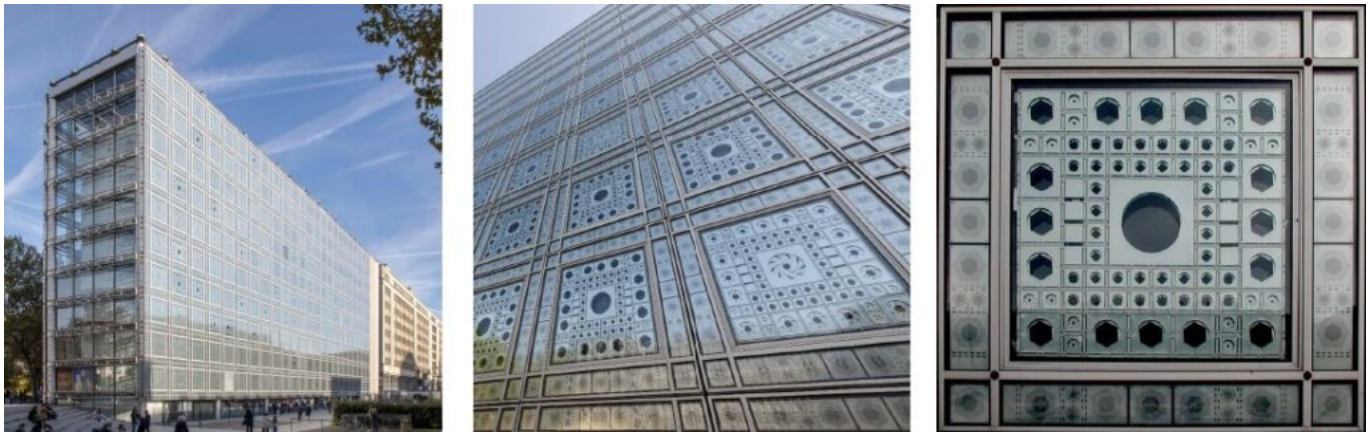
Almost a century after the moment of maximum splendour and the beginning of the decline of the so-called “decorative arts”, decoration thus returned to be the protagonist of industrial production in different fields, such as design, fashion and architecture, reappearing even in specialist and scientific magazines, as if to certify the definitive overcoming of the reluctance of that modernism that had caused its estrangement from both the world of production and that of culture. After having been repudiated in the early years of the 20th century as an expression of the elite and thus having been elected as a symbol of the degeneration of culture, after having been relegated to the role of “minor” art compared to the nobler figurative arts, after having risen to the symbol of kitsch and sour taste, decoration is

today being revalued and is regaining its central role in the cultural debate.

6. Contemporary functions of decoration in architectural facades

This revival is partly linked to the new dynamics of the mediatisation of architecture [24] but also, above all, to the effects of the use of digital technologies that favour innovation in the design and application of decorative patterns on surfaces through practical technological solutions and novel designs based on previously unimaginable complex geometries, now made possible by the widespread diffusion of new technologies in the field of digital design and fabrication that greatly facilitate the experimentation and production of elaborate forms and surface finishes [25]. The production of new types of ornaments has also been influenced by the availability of materials and devices that can respond to changing information from the environment through digital sensors [26].

Today, the focus is increasingly on the surface of buildings, expressing a new taste for ornamentation and decoration. The design and finish of surfaces, their colour and their aesthetic-decorative effects are all elements that contribute to the architectural quality and legibility of the building [27]. The image created by the decoration covers the entire external skin of the buildings and becomes a qualifying element of the architecture. The images created by sensors make facades responsive to environmental comfort or communication needs. Sensors that have been incorporated into buildings to play a pragmatic role could also play an aesthetic role by becoming a “dynamic ornament” that responds responsively to the qualities of the environment [28]. The facade, more than any other building element, nowadays becomes an iconic and symbolic element of the building and its designer, conveying a specific image and acting as a vehicle for self-representation.



Institut du Monde Arabe in Paris, designed by Jean Nouvel, building elevation, texture and texture tile (photo credits Thierry Rambaud/IMA).

7. The actuality of decorated facades

In the following years, the revival of the decorative architectural tradition led to experiences of synthesis between modern and post-modern culture and the tradition of masonry patterns in masonry buildings mentioned above. Among these, the Institut du Monde Arabe in Paris, designed by Jean Nouvel, should undoubtedly be mentioned (Fig. 6). The building's façade is a contemporary take on the wall decorations of Islamic architecture, a perfect synthesis of western culture of volumes and eastern culture of masonry patterns. Experiences are consolidated in the works of architects Jacques Herzog and Pierre de Meuron. From the Ricola factory and warehouse in Mulhouse (Fig. 7) to the headquarters of the Brandenburg University of Technology in Cottbus (Fig. 8), the skin and facade of the Swiss architects' buildings often coincide with surfaces that conceal the structural elements and achieve an aesthetic and decorative definition through processes borrowed from the artistic sphere.

Ricola factory and warehouse in Mulhouse, designed by Jacques Herzog and Pierre de Meuron, building elevation, texture and texture tile (herzogdemeuron.com).

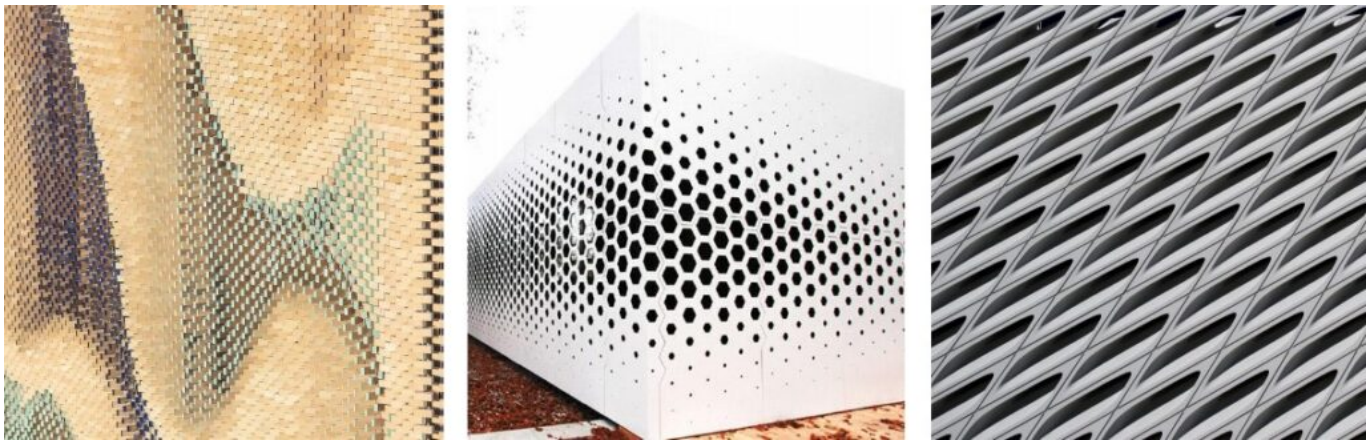
Architectural experiences in which geometric patterns are used in the design of facades gradually consolidated, culminating in compositional exercises with great formal results that use parametric modelling software and generative algorithms typical of patterns. Unlike traditional modelling, architectural projects using parametric modelling are based on a numerical construction approach consisting of a set of constraints and a sequence of elements characterised by a hierarchical structure.

As Patrik Schumacher reminds us in the essay *Parametric Patterns*, geometric patterns have covered architectural surfaces since time immemorial and, in their evolution, have taken on different meanings and purposes: "decorative enhancement, feature accentuation, camouflaging, totemic identification, semiotic differentiation, or any combination of those" [29]. Nowadays, their applications extend to many areas of design, from landscape to urban

planning, from design objects to architectural envelopes. This now-established practice is due not only to formal research but is fostered mainly by the development of various software and applications commonly used in the various areas of design.

Brandenburg University of Technology in Cottbus, designed by Jacques Herzog and Pierre de Meuron, building elevation, texture and texture tile (herzogdemeuron.com).

One of the most popular parametric tools is the Grasshopper plugin of the 3D modelling software Rhinoceros. Unlike other CAD software, this is based on a Visual Programming Language (VPL) capable of combining graphical manipulation of elements with a written syntax that structures an ordered sequence of instructions that are conditioned by specific parameters [30]. Although within set ranges, the parameters constraining the figures' geometries allow many variable solutions to be generated with extreme simplicity. With this language, a cause-and-effect system is established between the figure, its variation and its combination, which allows different formal and functional solutions to be determined. The final existences of these graphic-design processes, determined through the combinatorial possibilities introduced by software through the established constraints, manifest themselves as multiple formal facade outcomes, where the aesthetic component often combines with a technological one.

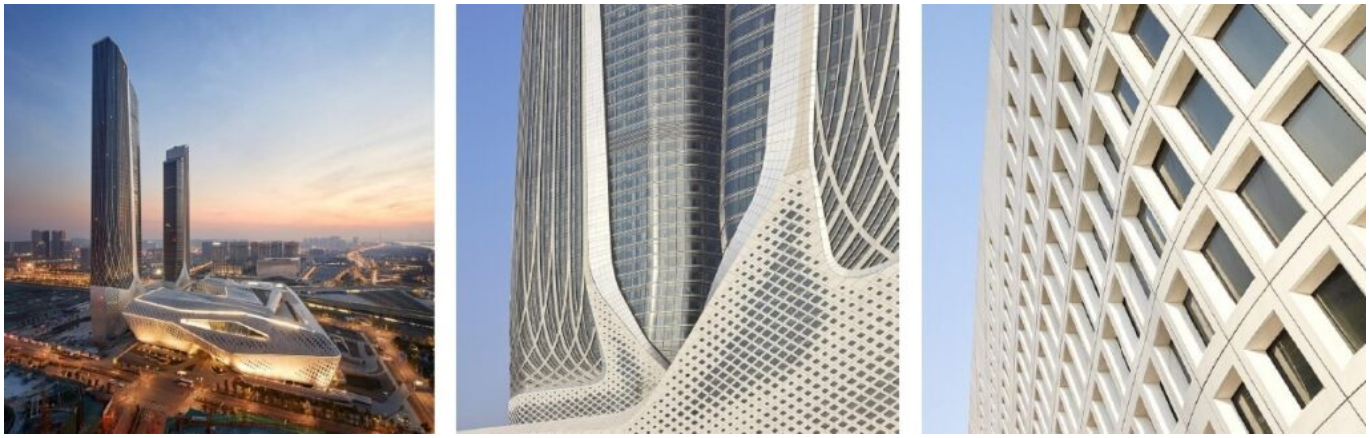


Comparisons of the masonry patterns of the facades of the Revolving Bricks Serai, the Netzwerk Campus pavilion and The Broad Museum.

Recent examples of this are the parametric brick facade of the Revolving Bricks Serai office complex in Arak (Iran) by Farhad Mirzaie, the metal honeycomb facade of the Netzwerk Campus pavilion in Töging (Germany) by Format Elf Architekten and that of The Broad Museum in Los Angeles (California) by Diller Scofidio (Fig. 9). A further evolutionary step is the geometric patterns that allow the design and construction of parametric responsive facades. These include the Al Bahar Tower in Abu Dhabi by Aedas Architects (Fig. 10). The single element, designed based on the equilateral triangle, is composed of the curved facades of the towers, simulating the typical perforated wooden frames of the Arab Emirates tradition. The entire facade changes as the environmental and climatic conditions change, and a series of sensors regulate the light and the resulting heat inside the building.

Bahar Tower in Abu Dhabi, designed by Aedas Architects, building elevation, texture and texture tile (parametric-architecture.com).

Many contemporary buildings force a rethinking of the elements that make up their tectonics. Indeed, especially for many of the architectures designed with parametric approaches, it is difficult to clearly identify the components of the facade separately from those of any roof. In these cases, it would be more appropriate to speak of the building envelope in a generic way where the issues discussed above are applied to the entire skin of the building. Examples of this are many of the buildings designed by Zaha Hadid, including the facade for the Civil Courts of Justice building in Madrid, composed of metal panels that modify the basic rhombic geometry to adapt to sun exposure or the composition of the skin of the Jumeirah Nanjing Hotel that adapts the basic geometry of the square to achieve different textures for different parts of the facade (Fig. 11).



Jumeirah Nanjing Hotel, designed by Zaha Hadid and Patrik Schumacher, building elevation, facade and texture (photo credits Hufton & Crow/Zaha Hadid Architects).

8. Conclusions

The contemporary debate is putting the theme of decoration in architecture back at the centre, as the characterisation of architectural surfaces today lends itself strongly to experimentation. If, on the one hand, facade surfaces continue to play the historically sedimented role of legible pages communicating messages and information through their visual elements, on the other hand, they lend themselves to hosting new technological solutions aimed at optimising the environmental comfort and energy efficiency of buildings.

Regarding the strictly semantic and media aspect, the characterisation of facades today responds to the need to stand out and differentiate within the immense quantity of images disseminated through the new digital channels. The building must acquire an iconic character and be representative and recognisable by differentiating itself from others.

Experimentation with the perceptual and visual characteristics of facades often goes hand in hand with experimentation not only with graphic solutions but also with those related to materials, construction technologies, and responsive dynamisms that bring decoration back to that concept of ideal unity between form and function sought throughout history, from classical antiquity to modernist polemics. Decoration, and more generally the design of surfaces, thus assumes the function of characterising architecture to allow it to be recognisable, iconic, and at the same time, becomes a constitutive part of the construction process and of the technologies that allow the building to function and interact with the environment and with users.

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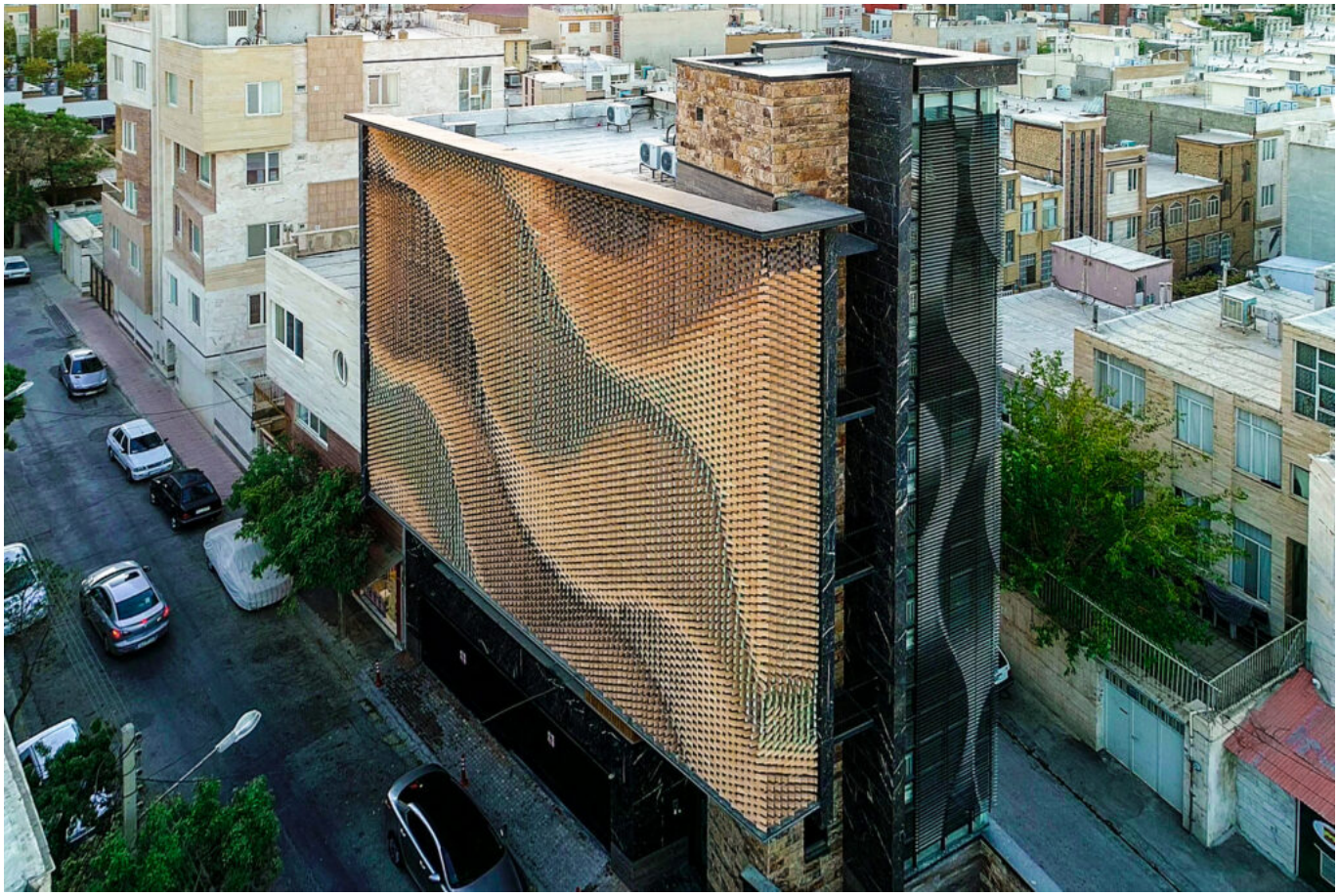
Homepage: Jacques Herzog and Pierre de Meuron, Ricola factory and warehouse, Mulhouse, front view (herzogdemeuron.com).
Below: Farhad Mirzaie, Revolving Bricks Serai, Arak (photo credits Masoud Badiee).