A journey into the activities of Kengo Kuma Laboratory

“This book aims to establish the interrelation between patterns and layering within architecture. These two previously detached notions can now be integrated into one methodology mediated by structural concepts.

*Patterns and Layering* is the first book to introduce this new interrelationship, which has the potential to begin a new architectural and design revolution.”

Kengo Kuma

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PATTERNS and LAYERING

Japanese Spatial Culture, Nature and Architecture

Foreword by Kengo KUMA

Edited by Salvator-John A. LIOTTA and Matteo BELFIORE
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When I learned that Salvator-John A. Liotta and Matteo Belfiore in my laboratory had launched a study on patterns and layering, I had a premonition of something new and unseen in preexisting research on Japan. Conventional research on Japan has been initiated out of deep affection for Japanese architecture and thus prone to wetness and sentimentality, distanced from the universal and lacking in potential breadth of architectural theories. Meanwhile, patterns and layering are based on dry reasons derived from mathematical concepts. Their methodology of departing from the reason to reach the sentimental being that is Japan seemed intriguing and full of possibilities.

Approximately one hundred years ago, in the nineteenth to early twentieth century, a temporary surge of interest in Japanese architecture occurred. The Arts and Crafts Movement in England took notice of Japanese traditional patterns. Neither fitting the categories of mathematical geometry nor a lifelike depiction of nature, the “third way” of Japanese pattern making was discovered. An alternative attitude toward nature in Japan dissimilar from that of the West was also discerned, which profoundly influenced subsequent Arts and Crafts movements and Art Nouveau.

In the United States, Frank Lloyd Wright had been inspired by layering techniques of Japanese space, disclosing in his autobiography that his works would not have been if not for the woodblock artist Hiroshige Ando and The Book of Tea written by Tenshin Okakura. Wright, upon learning that Japanese comprehend space within the overlapping of thin layers, understood that Hiroshige’s woodblock prints were products of this spatial comprehension. We may postulate that the unfolding of such layering technique defines Wright’s architecture. His layered architecture significantly affected European architects such as Mies van der Rohe, whose transparent architecture exemplifies extended versions of Wright’s Layering techniques.

It is unquestionable that encounters with Japanese culture in this period brought on revolutionary significance for Western design and architecture. Regrettably, ideas linking patterns and layering did not exist then; Arts and Crafts and Art Nouveau were only interested in traditional Japanese patterns while Wright and Mies were solely interested in technique.

One hundred years later, Salvator-John and Matteo have attempted to create a link between patterns and layering. These two previously detached notions can now be integrated into one methodology mediated by structural concepts that, in my opinion, are the key to this link. Structural analysis of the twentieth century struggled to advance beyond the column and beam structural frame. Analysis today allows us to conceive stable structures through the accumulation of delicate members, which have the capacity to produce a variety of patterns while fulfilling their structural responsibilities.

This book aims to inaugurate this new integration which, I believe, has the potential to begin a new architectural and design revolution. Inside this beautiful book are many clues to that new revolution.
Background
Salvator-John A. Liotta and Matteo Belfiore

Conceived at the Kengo Kuma Laboratory, University of Tokyo, this work brings together the results of research surrounding concepts of patterns and layering.

The current global crisis urges all of us to seek alternative solutions. While architecture during the twentieth century focused on function and form, the current architectural debate deals more with relationships, boundaries, and energies. Thanks to the current paradigm shift—in the attempt to synthesize nature, culture, and technology—it is possible to rethink both the meaning and the role that patterns might play as diagrams of spatial organization and generative elements of a project.

Today, there is a renewed interest in elaborating an architecture that can again balance economic and social forces and connect space through different spatial devices such as layering techniques. In this regard, layering—as a technique for articulating the space—conjugated through patterns reveals strong potentialities for producing a more appropriate architecture for our times. In our opinion, the West is looking to Eastern nations to re-orient itself by discovering different ideas, values, and concepts. To orient means to adjust to specified circumstances or needs, or to find one’s position in relation to new and strange surroundings. While Western culture is characterized by binary and dichotomous thinking, Japan can offer to the rest of the world is its culture of integration: the ability to learn from different cultures without giving up on its own.

Sometimes Japan underestimates its own culture, yet every now and then, at the beginning of a new cycle, Japan always returns to its own culture, made of symbiosis and integration. Japanese boundaries, compared to those in the West, are more vague and blurred and can create relationships. Layering is made of devices able to create a juxtaposition of heterogeneous elements instead of creating uniformity. This leads to a non-dominant hierarchy, a de-centered stratification of shapes and colors that exudes sensuous beauty.

For articulating the space—conjugated through patterns reveals strong potentialities for producing a more appropriate architecture for our times. In our opinion, the West is looking to Eastern nations to re-orient itself by discovering different ideas, values, and concepts. To orient means to adjust to specified circumstances or needs, or to find one’s position in relation to new and strange surroundings. While Western culture is characterized by binary and dichotomous thinking, Japan can offer to the rest of the world is its culture of integration: the ability to learn from different cultures without giving up on its own.

True to Japanese culture, editorial effort was placed in creating a work with a high degree of diversity and inclusivity. Organized through the same logic of openness and aggregated by loose logical nexuses, this book addresses patterns and layering from diverse viewpoints. It is not meant to be a definitive study on this topic, but rather a first exploration of an uncharted territory of study.

The third part of this book includes investigations on patterns and layering conducted by PhD candidates at the Kengo Kuma Laboratory. Rafaela Balboa and Ilze Paklona draw attention to the relevance of the concept of “eccentricity” in certain traditional Japanese patterns. For them, eccentricity is an aesthetic preference that became a significant feature able to consolidate Japanese identity. Ling Zhang analyzes the emergence of patterns during various periods in Japanese history, explaining the social and historical reasons that have encouraged the use of certain patterns over others. Yau Chen describes the introduction of Chinese patterns to Japan, and the selection criteria used by the Japanese in adopting them. Their preference for vegetal motifs over patterns with political connotations—such as the dragon pattern—unveils some traits of Japanese cultural identity. Patterns in vernacular architecture is the topic investigated by Catarina Vitorino Santos. Covering different regions of Japan, she underlines the presence of soft elements that wrap space with a thick softness. This shows the link between milieu, nature, and the ecosystem. Bojan Končarčević speculates on psychological and physical distances in Kuma’s Bato Hiroshige ukiyo-e museum. For him, pattern sizes are essential to establishing a visual and physical relationship between the museum, its adjacent environment, and the human body. Comparing the differences between Eastern and Western spatiality, Federico Scarioni focuses on the definition of intermediate space and on the role of Japanese painting—ukiyo-e in particular—in creating space through layers. Robert Baum addresses the issue of light and shadow, emphasizing how boundaries in the East are porous and pervious, ambiguous, and atmospheric: different from the West, in Japan, shadows have a positive connotation in defining spatiality. Focusing on the concept of spatial depth (oku) in Tokyo, Cristiano Lippa analyzes how interstitial spaces connect the layers of Tokyo’s urban structure. Finally, Kaon Ko writes about the encounter between Charlotte Perriand and Bruno Taut, and Japanese craftsmen. This meeting shows how the raw materiality of bamboo was adapted to traditional aspects of local production and modern Western forms, yielding somewhat familiar yet unseen patterns and aesthetics.

The last section of the book presents experiments on patterns and layering developed at Kengo Kuma Lab and Yusuke Obuchi Lab at the University of Tokyo. Ko Nakamura and Mikako Koike of the Kuma Lab describe how patterns and layering are used as a tool to design innovative architectures that can establish healthy connections between nature and people. Yusuke Obuchi presents a selection of recent projects realized at his lab, which use parametric design and digital fabrication. Here, pattern is used as a generator of three-dimensional forms and as a device to create performances.

The graphic concept of the book—designed by Ilze Paklona and Rafaela Balboa—conveys an atmospheric abstraction of Japanese sensibilities. The book takes on a flow of two main axes—patterns and layering—and embraces other concepts rooted in Japanese aesthetic such as irregularity (不均斉 – fukinsei), simplicity (簡素 – kanso), and nature (自然 – shizen), rendered through the chosen color palette and the dialogue between images and text.

At the opening of each chapter, the book is enriched by the handmade silkscreen prints of Japanese artist Norika Niki. Her work—an exploration of contemporary Japanese patterns—is able to connect human and natural spirit through a mixture of seasonal colors and natural motifs. By layering organic and geometric forms, Niki produces a delicate stratification of shapes and colors that exudes sensuous beauty.

Calligraphy was contributed by Kaon Ko, whose strokes and sensibilities coexist with the text and capture the essence of the fluid spirit intended throughout the book design.

The rediscovery of traditional patterns and layering tools is a way to meet the needs of a radically changing society and can unveil new horizons in terms of sustainability. The March 11, 2011 earthquake that devastated Japan showed the weakness of contemporary architecture compared to the power of natural elements. Spatial layering and patterns are extraordinary tools to create buildings which are able to coexist in harmony with nature, people, and culture.

In an age where feelings of uncertainty prevail, Japanese culture can have a decisive role in offering alternative solutions to crisis. We feel that now is time for the architecture world to move forward; Japan can provide the necessary tools to create architecture that is more appropriate for the pending future.

Thanks to the invaluable teachings and enthusiasm of Kengo Kuma, Patterns and Layering breathes the essence of Japanese spatial culture, nature, and architecture.
“Man is the only one among the animals to make patterns, and among men, the Japanese are probably the foremost pattern makers. They are a patterned people who live in a patterned country, a land where habit is exalted to rite; where the exemplar still exists; where the shape of an idea or an action may be as important as its content; where the configuration of parts depends upon recognized form, and the profile of the country depends upon the shape of living. The profile is visible—to think of Japan is to think of form... because these patterns are repeated often and faithfully. Wherever the eye rests they occur. They give the look of a land a consistency, as though a set of rules had been rigorously followed. It is these patterns, these shapes, these forms, these designs endlessly occurring, which mark the country. Chaos is vanquished; pattern prevails. They make the view more consistent than would otherwise have been possible. They create what often identifies art: style.” Donald Richie

The most mysterious forces in the universe manifest themselves via patterns, as they are a collector able to receive cosmic energy, metabolize and filter it, and finally release it in ordered shape back to life. Patterns can be seen as latent forms potentially ready to incarnate into tangible and intangible elements where there is no apparent structure, and also as connecting agents, able to articulate space and to produce diversity and beauty. The style of Japan cannot be separated from patterns as they are the essence of this country. However, at some point in history, patterns were associated with ornamentation and excessive decoration. But patterns are much more than something to be confused with just ornament. "Pattern as style, detail, ornament, adornment, embellishment and structure was deeply influenced by religion, geometry and maths as well as the arts, design and crafts. The concepts and theories through which spatial pattern was theorized include order, hierarchy, organization, system, scale, proportion, symmetry, balance, complexity, beauty, unity, function, decorum, representation, symbol, joint, nature, expression, imagination and creativity. Other pattern-related concepts (such as harmony, rhythm, narrative and color) were influenced by other disciplines in the mechanical and liberal arts... and the dominant historical meta-patterns of space were alternately chains, trees, vortices, concentric circles and orbits.” 1

Patterns, Japanese Spatial Culture, Nature, and Generative Design
Salvator-John A. Liotta

Patterns, Japanese Spatial Culture, Nature, and Generative Design
Salvator-John A. Liotta
At home, in art and architecture, philosophy and linguistics, and in biology and mathematics, patterns are above all a border crossing structure. Today, thanks to the advent of new technologies and design tools such as generative and parametric design, patterns have become once again central in the architectural debate. As a result of one of the most significant innovations initiated by parametric modeling software, architects are ultimately able to extract, edit, and abstract aspects pertinent to their own culture and transform them into what contemporary design might be. Even though patterns had a hard time in the West, they did not experience the same fate in Japan. Even if there are many studies about the exile of patterns in the West, not so much has been written about what happened to them in Japan. Used differently by each culture, Japanese patterns do not differ from those of other countries because they are different in form, but because patterns are culturally codified, represented, and utilized differently.

During the industrial revolution seriality, identity, the replacement of craftsmanship by the rise of mass production, and the consequent diffusion of an aesthetic based on sameness were critiqued by architects such as Adolf Loos who attacked ornament (patterns) as excessive, redundant, and immoral. The ideas promoted by Loos ignited a revolution in architecture and influenced the modernist emphasis on unadorned form and the elimination of ornament in favor of skeletal structure. While in the West changes are due to revolutions and generational wars, in Japan changes happen through inclusivity and continuity between the past and the future. Japan has a rich cultural history made of “a confluence of streams of thought that together have formed a sophisticated and remarkably harmonious worldview. The indigenous Shinto tradition serves as the foundation of Japan, but the entire cultural edifice consists of strong influence from Confucian, Buddhist, and, of course, Western sources. What is most remarkable about the Japanese is the way in which they welcomed new ideas insofar as they were seen to be compatible with and enriching of the existing Japanese spirit.”

In 1868—after 300 years of self-imposed isolation—the shogun dictatorship ended. Returned to his post, the emperor ended feudum and samurai martial law. Japan is the only Asian nation to participate in modernity initiated by Western powers. Thanks to the introduction of Western culture and technologies, Japan became a field of experiments resulting in the hybridization of the urban landscape, architecture, and society. From then on, Japan was no longer just a nation of the Far East; but also an extremely Westernized nation. Simultaneously, Japan exported its millenarian culture and influenced both International Style and Arts and Crafts movements. The former appropriated spatial and structural patterns, while the latter utilized as source of inspiration motifs from graphic and textile design.

Japanese patterns influenced architects such as Wright, Le Corbusier, Mies, Taut, and Gropius, and they played a determinant role in defining the new principles of modern architecture. The production of buildings with a minimal massing and no ornamentation was spread in the West thanks to architects who traveled to and lived in Japan, through world’s fairs such as in Philadelphia in 1876 and by the circulation of ukiyo-e paintings and manuals on construction called kiwanjutsu, a collection of spatial patterns with diagrams and constructive process secretly handed down within carpenters’ families. Jencks writes that “the entire conceptual knowledge developed by the International Style had already been present in Japan for 400 years. Standardization, flexibility, modularity, use of natural materials, the unfinished, the formalization of the structure, pilasters, asymmetrical geometry. In order for the West to become modern, architects had to review all its constructive traditions, while Japan was already modern.”

At the end of the nineteenth century a huge number of Japanese katagami, a traditional type of stencil used for dyeing cloth, was exported to the West along with ukiyo-e prints, leading to the rise of Japonisme. Fascinated by katagami, Thomas W. Cutler provided the first survey on the grammar of Japanese ornamentation and design, listing the following: “An avoidance of the appearance of symmetry while producing symmetrical effects, a suggestion rather than expression of proportion, an unobtrusive order, and in repetition of form an irregularity and changefulness, giving to it an unusual charm and freshness. . . .” A Japanese artist proceeding to decorate a given space would not mark out the centre and place his ornament there, nor would he divide it into equal parts, but he would most probably throw his design a little out of the centre, and cleverly balance the composition by a butterfly, a leaf, or even a spot of color. Western architects and artists were greatly influenced by the innovative compositions of the woodblock prints, but katagami were also eye-catching, and were adopted as a source of inspiration. Also, like ukiyo-e, the paper stencils helped spawn the trend of Japonisme as evidenced in the Jugendstil and Art Nouveau movements. Japanese patterns exerted their influence both at the structural and ornamental levels. But it is precisely beyond these two categories—ornament and structure—and a binary opposition that one should go to approach the meaning of Japanese patterns. They are symbolic abstractions, human interpretation of the cosmos, and connecting agents. Sometimes they are congruent, sometimes they are not. “Patterns do not have any well-defined, unitary function. As patterns evolve they acquire new functions and lose their prior functions, or new functions are superimposed upon older ones.”

**Origin of Patterns**

In the West, a first account on patterns is present in *On Form* where Empedocles presents an elaborately wrought account of the formation of the universe, and in *Timaeus* where Plato describes the world as filled with patterns of atom-like solids and geometric forms. He thought patterns—gnoisologically speaking—represented the medium between disorderly natural phenomena and the perfection of the hyperuranium, the world of ideas: “The universe . . . is the handiwork of a divine Craftsman (Demiurge) who, initiating an unchanging and eternal model, imposes mathematical order on a preexistent chaos to generate the ordered universe (kosmos).” For Aristotle, patterns are similar to seeds, he would call them dynamics: they are to be seen not just as forms, but as potential generators of form and actuality.

In the East, the first patterns owe their origin to the observation of visible phenomena and forces that rule the universe. Produced nearly 3,500 years ago, these first characters helped to define the entire Chinese mental architecture. The principle they started has never changed: to catch the universe as if it were an image. The ideogram is seen as the representation of the laws of the universe, since ideograms are an attempt to signify what exists through a visual representation of patterns.

In Japan, patterns and signs were first found on pottery of the Jomon period (10,000 BC to 300 BC)—named after the characteristic surface patterns made with cords on the vase—and later on Shinto and Buddhist art, lacquerware, metalwork, and furniure. *Miyao, 文様* is the term used to identify Japanese design patterns. The ideogram means *sentence, literature, style, art, decoration, figures, plan, pattern, means appearing, looking, resembling. It is taught in Shintoism that oneness is represented by lines such as the ones depicted on pottery of the Jomon period. The lines simultaneously allude to the edge of empty space and to the edge of a form, and here one of the basic teachings and most important principles of Japanese aesthetic emerges: “Form is emptiness and emptiness is form.” After the Jomon period the use of patterns evolved into sometimes intricate design making use of outlined images of natural and geometric forms. From that moment on, the same concept—the importance of emptiness—was explored in different fields such as architecture, philosophy, and society as well as through different spatial dimensions.

Japanese philosopher Matsuoka compared patterns to particles, referring to them as *kami* or *Kaiha*. “This *tehar* of kami has set the basic tone of Japanese culture and has pervaded the structure of homes, tea houses, literature, arts, and entertainment, and it has developed into the characteristic Japanese aesthetic of stillness and motion. No doubt this was what is today perceived as *ch'i* by those involved in martial arts and meditation. This is what we call *ma* the magnetic field from which the *ch'i* or kami subtly emanates. Space, or *ma*, is the very foundation of Japanese aesthetics. Minute particles of *kami*, as it were, fill that *ma*.”

Philosopher Nishida Kitaro emphasizes that Japanese culture is based on absolute nothingness (*zettai mu*) rather than being (*yu*), and on an intuitive grasp of the “formless and voiceless” rather than concrete things. “On the other hand, Goethe distinguishes in the Western category of space between formation and structured form, between *Bildung*—which changes structured form in an ongoing process—and *Gestalt*—something that is already formed. In Architecture as
Metaphor, Karatani affirms that the foundation of Western thinking is grounded in the will to architecture—that is the will to construct—a practice that traverses many disciplines: architecture, philosophy, literature, linguistics, city planning, anthropology, political economics, psychoanalysis, and mathematics. The will to construct reveals architecture as the mechanism through which the metaphysics that ground Western thought inevitably came into existence. For Karatani, the will to architecture does not exist in Japan; the Shinto and Buddhist cultures are very influential in teaching that transience is part of life, that loss is part of things, that there is no refuge from transformation and dissolution. Both cultures think of patterns as connecting agents of formation, in the West oscillating between formation and becoming, in Japan between becoming and nothingness. Architect Kazuo Shinohara once stated that “In the West meaning is put into things, in Japan it is taken out.”

Both cultures know the significance of becoming. Yet while Western aesthetics seeks concluded and perfect forms and patterns, Japanese aesthetics also values transiency and imperfection. On the one hand, a culture that distinguishes between nature and artifice, on the other, one that understands the complete whole. The Greeks knew this, but over the centuries there has been a caesura between the cultures because of the irreconcilable conflict between holistic thought and the critical, scientific rationality of modernity. Humankind’s total immersion in nature, so typical of Shintoism, does not bring with it a lowering of the spiritual to materialism, quite the reverse. Patterns were associated with the natural elements. Western scientific doctrines then travelled along a 2,000-year path and patterns went from being considered as links between different cognitive dimensions and a means of connecting worlds to being seen—as formalism—as closed systems, only valid in the absence of any contradiction in their generating equation. Today, we have once again begun to study their application and meaning in architecture that goes beyond the obsession of perfect or sculptural forms made of powerful reinforced-concrete lines, and looks at the organic as the relationship between natural systems and the human body.

Patterns and Nature

Patterns are more than just observation of nature: patterns are a depiction of essence, where the dense and compact prevails over the extended, and all non-essentials must be removed. The philosopher Soetsu Yanagi—one of the few Japanese scholars who have ever tried to theorize Japanese pattern—writes that “pattern is not a scientific rendering of the original. The pattern is a symbol of the plant, not the plant itself. It is an emblem of the bamboo, and yet the living bamboo is there in it. A pattern is a picture of the essence of an object, an object’s very life; its beauty is of that life.” Pattern is not a literal representation or mere imitation of nature. For Yanagi, what gives meaning to nature is the human viewpoint. Without the eyes, observed nature would remain raw, with no particular content, and especially without beauty. Even though universal principles create nature, in Japan, nature reveals those principles only after things have been arranged, moved, transformed. As in ikebana: flowers look natural only after they are cut and put in order. Even in the most placid of the Japanese patterns there is movement and vitality. Pattern expresses a dynamic tension between nature and artifice, which are not to be seen as opposites. It does not resolve in a synthesis, but rather defines its proper subject by maintaining the tension between affirmation and negation as opposite poles or perspectives. Patterns can be defined as something not rational or redundant. Pattern is non-realistic. In a sense, it is an amplification of reality, an exaggeration of nature. An offspring of the imagination, pattern is a vision of what is mirrored by intuition, perception and instinct, through feelings and not via analytic or logical speculations. The intellect can understand only a part of the whole, but intuition can grasp the whole. From nature to the pattern there is a metamorphosis, a reincarnation of the spirit in a new shape. The significance lies in the metamorphosis itself. A pattern is the reflection of the essence of an object, a culture, a nation; its beauty is of that essence. The best patterns derive from Zen emptiness as a product of mu (void), and are produced through Zen principles of design such as kanso, shizen, and yugen—bare essentials, absence of pretense, and suggestion rather than revelation. Similar to an exercise of containment, reduction, contraction, and abbreviation, patterning produces dense/intense forms that refer to a type of beauty in delicate harmony. At best, patterns are “visions” of what is reflected by the intuition. Creation of patterns eliminates the non-essential and brings nature and forms to their minimal and primal truth. Through intuition an observer can easily shift from seeing objects to seeing patterns. This exquisite skill of the Japanese to reduce representational forms to ideographic motifs makes patterns intriguing and visually appealing. Pattern does not explain; it leaves things to the viewer, its beauty is determined by the freedom it gives to the viewer’s imagination. “The pattern is what remains. There is no wordy explanation. There must be the ‘speech without words’ of Zen. Good patterns are simple; if they are cluttered, they are not yet patterns. Pattern is the transmitter of beauty. Through pattern we learn how to look at nature. Without pattern, man’s view of nature would be far more vague and equivocal than it is. Pattern contains the nature of nature. Rather than say that pattern depends on nature, thus, it would be better to say that nature depends on pattern. Pattern is nature seen in the best light.”

While for Western philosophy, nature is the phenomenon of the physical world collectively including flora, fauna, the landscape, and other features and products of the earth, as opposed to humans or human creations, philosopher Tetsuo Watsuji defined nature through the concept of fudo or climate. By climate, Watsuji includes not just weather patterns of a nation but the natural geographic setting of a people plus the social environment of family, community, society, lifestyle, and even the technological apparatus that supports community survival and interaction. Fudo is the interconnected network of influences that together create an entire people’s attitudes (or their ways of going about in the world) and which represents geographic and climatic influences on human society and human interaction with climatic necessities, together with the human transformation of geographic aspects of the environment. In Japan, culture and nature are not considered as opposed entities. Japanese are particularly inclined to naturalize different stimuli coming both from nature and foreign cultures. The encounter with China had an huge impact in defining its self-perception. In the seventh century the Japanese started to call their country “the land of the rising sun” to distinguish itself from the Chinese who regarded their country as the “central country.” Near the end of 500 AD, Japan was still a semi-tribal society, mainly composed of clans. At that point, Japan felt the need to import the Chinese political system and culture, in order to avoid jeopardizing the development of basic civil institutions. The presence of the Chinese colonists urged the Japanese to redefine their own identity. The Japanese production of space, art, architecture, and written language can be considered as the transposition of a de-centered geographical condition. In fact, the Japanese recognized that China indeed deserved to be called “the center,” and that it was appropriate for them to think of Japan as something de-centered and to explore the potentialities inherent within this undeniable geographical condition. Japan was aware of not being the center of the world, and invested in its awareness of being a de-centered country by producing a style that privileged an avoidance of symmetry, irregularity, and changefulness. Love for the unexpected and for nature, already present in Shinto culture, was brought to a higher level through the production of an entirely new series of patterns due to the naturalization of imported culture. The innate spirit of metamorphosing inherent in Japanese culture proved to be determinant in the production of a new spatiality and culture. Zen Buddhism played a decisive role in the naturalization of patterns used in written language, and of architecture imported from China. The fact that Japan is geographically de-centered influenced its aesthetic and culture. According to Karatani, the sense of Japanese articulation of space cannot be historically considered as architecture, with a structured arc but more as a temporary organization of a space, fragile and non-hierarchical. Talking about Ise, Japan’s holiest Shinto shrine, Yukio Mishima once commented on the fact that the very essence of Japan is that of emptiness; “Japan is nothing,” he said. At Ise, it is not the built complex that matters most, but above all the dynamic relation with its surrounding forest. Dismantled and reassembled every 20 years, the Ise Shrine is home to the Kaya no Kagami, one of the three sacred treasures of Japan: a metal mirror reflecting the figure, not clearly but opaque. Yukio Mishima wrote that it is not the mirror in itself that matters, but what it sends back, that is to say its reflection. This is what Japan can provide to the world: its essence is made of forces of transformation and metamorphosis as a mirror that reflects emanating from the things themselves.
Patterns and Architecture

Chinese characters do not reflect the sound of the Japanese language. Japanese is, in fact, a polysyllabic language while Chinese is monosyllabic. It was necessary to give a new sound to every single ideogram, and to each one a small graphic appendix—kana—and syntactic particle called a jyoshi was added. This led to a significant change in the linguistic architecture imported from China by the Buddhist monks. While ideograms were kept as they were—each character represents a single idea, and for this reason, it is essential that the integrity of each character’s form be preserved and thus transcribed—adding kana signs changed the graphic-spatial composition and the syntactic-logical composition. While jyoshi particles were useful to define the predicate and the nouns in the sentence, neutral kana provided an appropriate way to express the Japanese language. Versatile kana was paired with unmistakable ideograms. It was as if the hard and bony structure of the Chinese ideograms—through the introduction of kana signs—found its own fluidity, an adaptable part. The imported Chinese language block system changed through the addition of the jyoshi, becoming a different writing-reading system that produced a new mental context and the creation of a new spatiality.16 The combined use of ideogram and kana, logic and intuition, can be metaphorically extended to other scales such as urban planning, architecture, and design.17

The assimilation of the ideogrammatic writing system in Eastern countries came by way of the importation of Buddhist sacred texts, which affected not only the legal and political debates and codes but also the formation of architectural space and urban text. During the Venice Biennale 2002, Arata Isozaki asked his fellow architects, linguists, and geographers to investigate the spatial similarities in countries where ideograms are used. Isozaki’s research proved that there is a direct correlation between linguistic syntax and spatial syntax, that the ways we build are closely related to the ways we write. Nara and Heian (old name for Kyoto) were founded using a typological model as a structure based on the checkerboard pattern preexisting in Beijing, Chang-an, Nanking, and other cities that had succeeded as headquarters of the Chinese Empire. Common features that contribute to the structuring of space are the design of the city forms, the identification of roads, and the blocks of buildings for worship and exercise of power. On spaces divided into regular squares, lots, patios, temples, monasteries, pagodas, houses, and gardens were built. According to Italian photographer and anthropologist Fosco Maraini, “when one says ‘palace’ he should not associate it with the massive development of Western cities, derived ultimately from the medieval fortified house. The house in Japan has always been very light. It has no walls, railings, and turrets, but pavilions and covered walkways, gardens and kiosks, lobbies and porches all connected through filters, and passages.”18 Because of their redundancy, the grid pattern used for shaping the Japanese city and language was ready to receive new inputs, integrating them as new information through an adaption and modification of the patterns that preceded it. The Japanese love for the unexpected, the asymptotic, the becoming, and nature-dominated architecture, and its artists favored the process leading to the production of a new space. This new spatially did not consider the presence of a central subject, which is substantial and stable as it was expressed in China and in the West. Many aspects of Japanese culture, above all the features of the language, were not connected in any form to the centrality of the subject. The traditional organization of spaces expressed this through its preference for de-centered and topological orientations, with an aesthetic that values positive asymmetry and non-hierarchical patterns of organization. The Japanese language always leaves a margin of choice for guessing the sense of the discourse. In the same way, Japanese space may be seen as a graphic with no precisely defined contour, vague as the language itself.

The ambition of Japanese traditional architecture is to create a space that is neither indoors nor outdoors, neither in nor out. It is not even in between, but it has its own atmosphere. It is an intermediate space that connects the interior space to nature. The exchange between indoor and outdoor spaces is modulated through a sequence of thin screens, such as paper sliding doors, wooden screens, and bamboo folding curtains that present a certain degree of transparency and permeability and are organized through spatial patterns. All of these devices create juxtapositions of heterogeneous elements instead of uniformity.19 This leads to the production of patterns that are non-hierarchical, transitional, de-centered, and similar to the Japanese language: a composition of particles connected by a weak syntax.

The Japanese proclivity in creating and utilizing de-centered patterns produced an architecture made of intermediate spaces with a particular order that positively values vagueness and incompleteness. There is a hidden order that can only be sensed as it happens in the Japanese language, which is never direct or closed but always open to possibilities.20 It is perfectly defined by its proxemic behavior, de-centered both from the vertebrate and mono-centered Western system and the strongly centered Chinese system. Western dualistic thought, beginning with the Greek philosophers, is traditionally reluctant to deal with this intermediate territory. Other traditions, on the other hand, attach considerable importance to this realm, as does Japan’s, with its affinity for ambiguity and incompleteness. According to Berque, it is very stimulating to see the organization of Japanese spatiality as a metaphor of those dissipative patterns that conceive order emerging from chaos, without an identifiable arc, as it is not identifiable in the Japanese city.21 This particular sensibility has its more outstanding product in the way in which the Japanese contemporary city shaped itself. Itself depicted it as a topologic and kinetic construction that is in opposition to the static geometry given by the Western universal and rational space born from the analytic use of Western logic and will to architecture.22

Patterns and Generative Design

Today architects are free to experiment with unseen digital patterning techniques. To better understand the different ways to create space via generative design, it is useful to look at the tools of the Western and Eastern traditions: instruments that are different in substance and intent. Where historically the West wrote with a scalpel and erected obelisks and temples with stones, the East used the brush, wood, and paper to create its own landscape. Where the West has expressed ideas related to eternal life, permanency, and immortality, the East declared its preference for the transience of existence, for the decentralized pluralism, and impermanence of time. It is immediately visible that these two systems are based on cognitive tools and different materials. The West is expressed graphically through engraving the chisels, and the fountain pen, all instruments affecting hard, scratching, and scraping, which leave their permanent marks. In the East, the brush—accompanied by the ink—is the only object that supports the whole theory of writing. These tools belong to the the calligrapher who smooths his ink-store and waits for the dilution of the ink before soaking the brush that strokes the paper, which then absorbs it. Where the West has historically practiced the art of inscription, the East has practiced the art of description. In one system there is a vigorous activity that is expressed through the tension of the muscle strain, in the second system there is a relaxed physicality that manifests itself in softness. In the West the practice of sharpening the tools for writing to get the precision of the sign refers to the art of aggression. In the East, the practice of softening, scrubbing, and waxing to make the gesture of the brush fluid refers to reflections and peace. Where European and American architects metaphorically build by inscribing, their East Asian colleagues build by describing. Rather than impose themselves and their patterns on a place, they perceive it and bring them to light. While in Western architecture and art, a sense of depth is created through perspective and the distance from a focal point, in the East this was traditionally created through the ink gradation. Even though fundamentally different in their tools, both approaches strive for the depiction and creation of spatial degrees of inhabitable depth. Then modernity arrived and the sensuous world of patterns in part vanished.

Lately, Kuma has reflected on the loss of reality in architecture. He describes the shift towards spectacular architecture and how it has allowed the rise and the success of the architect system. Kuma reflects on the instruments used by Le Corbusier and on his having opened a process of objectification of architecture through an use of the imagination as tool of design and communication. Conversely, the Japanese architect believes that architecture should aim for the ground to retrieve the detachment from reality. For Kuma, an “object” is an architecture that is expressly disconnected from its environment—even if objects can be found in all architectural styles. Objectification has long been one of the strategies
One of the process possible in the use of patterns in generative design pivots around the concept of amplified and made much more conspicuous. A strong emphasis on conspicuous differentiation is one of the hallmarks move from adaptive compensation to the amplification of differences. The underlying surface variability is utilized into a new and powerful register of articulation. The crucial move that inaugurates parametricist patterning is the

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In the West, recent studies by Patrick Schumacher, Mark Garcia, Cecil Salmond, Alejandro Zaera Polo, Paul Andersen, and David Salomón have cast a new light on the way architects are using patterns in contemporary architecture. In the East, many Japanese architects such as Toyo Ito, Jun Aoki, Riken Yamamoto, Fumihiko Maki, and especially Kengo Kuma have made ample use of spatial and design patterns, without these being theorized. While they are not organized in a group or a movement, the works of these architects reveal common traits, especially the belief that an inclusive architecture—more appropriate for our times—can be created through Japanese culture, Eastern intuition, Western logic, mathematics, and geometric studies based on algorithms and natural forms. Japanese architects were among the first to insist upon the necessity of looking to nature in its organic essence as a product of genetic algorithms that can unravel the secret of the growth of forms. In their early productions, architecture was inspired by the binary system and they systematically proposed forms developed through repetition and variation.

There is also a clear departure from modernist precepts in favor of architecture inspired by Japanese patterns and culture. They subsequently extended their interest to organic forms, reproducing them more or less sculpturally. In their recent production, they shift the meaning of their works once again, this time towards the production of architectural forms arising from active processes rather than from formal interests. This passage is decisive because it provides for growth and expansion of small elements; an open rather than closed formal system of transformation and expression. Introducing In-El, a lamp resembling his master Isamu Noguchi’s Akari collection, Issey Miyake says that, “on the one hand, archaic forms are inspired by those of nature seen with the naked eye; on the other, forms are derived from the use of algorithmic design, hence from a reasoning about nature’s innermost geometric but cellular code. These are two types of ‘organic’, but different design.” Today architects are free to experiment with unseen patterning techniques. This is one of the reasons for the proliferation of complex geometries, sophisticated tessellation techniques, and articulation of space through screens, façades, and filters.

Patrick Schumacher writes that “the introduction of different surface effects, like different material textures, had already happened within the latter phases of modernism, but artificial, quasi-graphic techniques of surface treatment and surface patterning were now being deployed... Parametricism transforms this technique of parametric pattern design into a new and powerful register of articulation. The crucial move that inaugurates parametricist patterning is the move from adaptive compensation to the amplification of differences. The underlying surface variability is utilized as a data-set that can drive a much more radical pattern differentiation. The underlying surface differentiation is thus amplified and made much more conspicuous. A strong emphasis on conspicuous differentiation is one of the hallmarks of parametricism.” One of the process possible in the use of patterns in generative design pivots around the concept of the organic as a dynamic relationship. The organic architecture we are seeking investigates generative phenomena of organic forms. It differs from the American organicism of Wright or the European one of Alvaro Siza, and even from Kurokawa’s metabolist and symbiotic philosophy, whose architecture can be taken as the formal outcome of bodies at rest. The changing shapes are a result of recognizing the potential for latent shapes where there is no apparent shape. On one hand is a twentieth-century vision made of static objects, on the other, a contemporary, organic one, resulting from forces in a state of becoming, connected through patterns.

Thanks to a gradual and ongoing development process—and the creation of certain conventions through variations of design—Japanese craftspeople have managed to adapt and simplify their forms and aesthetic sense to adopt, via constant design evolution, a degree of extreme purity. A pattern might be altered by adding or subtracting elements, by distorting the perspective, by rotating and/or mirroring the motif. Each pattern has attained a level of graphic perfection similar to that of symbols and icons, making its application to the generation of connecting paths or forms ideal. For Anderson and Salomon, “patterns provide architects with a device to connect apparently incongruous categories and synthesize a multitude of performances, project requirements and informational types in a perception-based medium... Functioning both as process and image, graphic and code, they (patterns) are able to foreground the sensuous while shaping matter and behavior.” While architecture during the twentieth century focused on function and form, the current architectural debate is dealing more with relationships, boundaries, and energies. In this regard, spatial design patterns have the poetic and pertinent potential to precisely promote performances.

Thanks to the current changing paradigm, it is possible to rethink both the meaning and the role that patterns might play as diagrams of spatial organization and generative elements of a project. Today, there is a renewed interest in elaborating an architecture that can again balance economic and social forces and connect space through different spatial devices and in the study of their application and meaning in architecture.

Case Studies

“We can now see that completely new patterns can be generated. They will be entirely different from any pattern we have seen so far, and generate entirely different spaces and architectures... Pattern making holds the greatest promise for the next generation.” Kengo Kuma

In 2003, UNESCO adopted a Convention for the Safeguarding of the Intangible Cultural Heritage. This convention has been promoted by nations such as Japan, where the predominant culture and philosophy positively assess the transient and perishable nature of matter, and the beauty of the immaterial world. Even though Western aesthetics is familiar with simplicity and symmetry, and suggests qualities that distinguish the Japanese sense of beauty, the idea that beauty lies in its own disappearance and impermanence has never really occurred to Western culture. The idea of safeguarding the intangible heritage is rooted in Japanese culture as an alternative to the Eurocentric concept dominated by the safeguarding of monuments. “Safeguarding” here means measures aimed at ensuring the viability of the intangible cultural heritage, including the revitalization of the various aspects of such heritage.

What I have described in the previous paragraphs is the starting point for an investigative approach into applying the inventory of local cultural heritage as a source of inspiration for architecture. The following case study translates the spirit of traditional Japanese pattern into a contemporary design and pattern generating approach, bridging global technology with local culture. For this study, different types of patterns such as kamon and katagami—respectively Japanese family crests and paper stencil patterns—were chosen as sources of inspiration and interpretation. Both kamon and katagami/patterns depict plants, animals, and natural and man-made objects. Some are very figurative and others are more abstract, but most inhere certain geometric qualities and often exhibit a layered depth. The selected patterns are composed of geometric, natural, and vegetal motifs which can be easily translated into simple components that can be used for designing either single element or groups of elements for construction. After an extensive research of kamon...
and katagami patterns, a set of simple rules—such as creation of depth, opening of gaps, extrusion, or covering of a given surface—was implemented to enable the bi-dimensional system to become three-dimensional. The rules were based on Japanese spatiality.

The works resulting from this exploration convey that generative design can be a mechanism through which architects are able to produce new images of traditional patterns and retain their conceptual meanings, and that it can be a tool to retain architecture convergent with cultural values. The projects make clear that such traditional values combining with new digital technologies is not incompatible. On the contrary, the projects proved that it is possible to innovate and offer new interpretations of the long-established tradition and aesthetics of Japanese architecture and design based on patterning and layering. Aspects of Japanese spatial culture were interpreted in a contemporary digital manner and can be seen as reviving the tradition. This points to the benefit of implementing present technologies of parametric design, but also with certain specificity. When the specificity is drawn from a cultural reference, one seems to become more respectful of the complexities and principles that require interpretation.12 Safeguarding the intangible cultural heritage is the mainspring of our cultural diversity and its maintenance a guarantee for continuing creativity.

Moussavi writes: ‘Architecture needs mechanisms that allow it to become connected to culture. It achieves this by continually capturing the forces that shape society as material to work with. Architecture’s materiality is therefore a composite one, made up of visible as well invisible forces.’20

Finally, a chart of 17 Japanese wallpaper groups and 14 case studies is illustrated on the following pages. The chart is a geometric analysis of the 17 wallpaper groups, a classification of a bi-dimensional repetitive pattern derived from its underlying symmetries. Categorized by their symmetries in nature, there are only 17 possible distinct groups, while very subtle differences may place similar patterns in different groups. These symmetries correspond to simple geometrical transformations that leave the initial pattern unchanged.

The case studies show the source of inspiration, the relationship with nature or crafts, translation into an architectural element, and rendered images of a possible application process, diagrams, and descriptive text. In each of the outcomes, characteristics of traditional patterns have been geometrically analyzed, linked to natural or cultural phenomena, and re-interpreted via generative processes, effectuating aesthetic choices otherwise unachievable. The design process of the projects presented here usually starts with the design of a “particle” including a set of characteristics with a range of transformations that leave the initial pattern unchanged.

The perplexing question is: How can traditional patterns and new digital technologies be integrated without losing their cultural meaning? The projects result convey that generative design can be a mechanism through which architects are able to produce new images of traditional patterns and renew their conceptual meanings, and that it can be a tool to retain architecture convergent with cultural values.

Endnotes

3. Shoumei—a book compiled by Heinouchi Yoshimasa in 1608—is the oldest manual on designing by proportions that survives. Books containing such sets of proportions were written in the Muromachi period and were handed down as secret texts within families of urban woodworkers.
5. Designing in the Baus Period (1784–1945), katagami, or Japanese paper stencil patterns, were first used for applying designs in dye to leather goods. They later came to be used for dyeing textiles and made great advances with the development of the kimono culture.
15. ibid., p. 114.

Essential bibliography about Kamon and Katagami

Kitao, Takashi, Traditional Japanese Patterns and Colors (Wa Gocoro), Seigensha, Tokyo, 2008, Japanese.


Essential bibliography about Kamon and Katagami


Calligraphy: Kaon Ko.

Scientific supervision: Kengo Kuma.

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Calligraphy: Kaon Ko.

Drawings of details for all projects: Giacomo Sponzilli.

Salvator-John A. Liotta

Salvatore-John A. Liotta is a licensed architect, senior researcher at Kengo Kuma Laboratory at the University of Tokyo, and a correspondent of Domus and Compassion and press/Observer in Japan. After graduating from the University of Palermo and earning a master’s degree from the National Institute of Architecture in Rome, Liotta worked in Paris at Reiulf. In 2003 he moved to Japan where he earned a PhD with a study on the architectural identity of Tokyo supervising for Marzio Masiwada his architectural works he has been exhibited at MAM, MAXXI, Venice Architecture Biennale, Berlin All-Biennale, and Warsaw Modern Art Museum. In 2012, he was a finalist in the WAF Young-Architect Program.
Pattern Typologies: 17 Types of Planar Geometry Through Traditional Japanese Patterns

In mathematics, a wallpaper group is a classification of a bi-dimensional repetitive pattern, based on the symmetries in the pattern. Categorized by their symmetries, in nature, there are only 17 possible distinct groups. Very subtle differences may place similar patterns in different groups. A pattern might be altered by adding or subtracting new elements, by rotating and/or mirroring the motif. A symmetry of a pattern is a way of changing so that the pattern looks identical after the transformation. True symmetry only exists in patterns that repeat exactly and continue indefinitely. Thanks to a gradual and ongoing development process—and the creation of certain conventions through variations of design—Japanese craftsmen have managed to adapt and simplify their forms and aesthetic sense to attain, via constant design evolution, a degree of extreme purity. When used along parametric software, patterns are similar to seeds: they are potential generator of space, form, and performances.

The two numbers in brackets at each pattern description signify ascending order from 1 to 17 and orbifold notation, respectively. The latter is a topological categorization that facilitates the understanding of the generating forces underlying each pattern. In the orbifold indices, the numbers indicate centers of rotation. The [*] indicates an axis of reflection and the [x] an axis of glide reflection. Their relative position compared to the numbers in the index indicates whether or not the rotations lie on these axes.
Pattern Typologies: 17 Types of Planar Geometry Through Traditional Japanese Patterns.

Concept and research: Salvator-John A. Liotta. Aris Kafantaris contributed to researching and drawing the chart.
The project takes inspiration from the traditional Japanese square-headed tool used by carpenters for removing nails. The façade and roof consist of squared wood panels to make an elaborate pattern with apertures of different size. The pattern on the roof and the walls generates complex plays of light and shadow that infuse the entire space. The apertures are either covered with glass or left open for natural ventilation. The pattern serves to connect the inside and outside through a parametric adaptation of the surrounding context. Also called manryoku (thousandfold power), the pattern conveyed the possibility to climb the social ladder through the principle of leverage: for the Japanese, great power can come from humble origins and small situations.

The project takes inspiration from the masu, a square wooden box used in the past to measure rice and now mainly used for drinking sake. The façade connects various parts of the museum and explores the aggregative potentialities of the square. First, gaps were inserted in the structure, and then the surface was populated by squared components of different sizes. The museum’s interiors and exteriors are interconnected by a set of footbridges and corridors. The interiors are wrapped with an aluminum mesh envelope that lets one guess the major functions of different spaces behind the filtering façade. While the façade shines during the day, at night, the interiors and the structure become visible.

The idea for the design started from the small hand drum, first used as an instrument during the Heian period in the mimetic dance form known as sagoraku, and later in Noh and Kabuki theater. Simple at first, the pattern becomes manifold when indulging in the building’s deeper composition. The façade is double layered (drum paneling) and has a wall cladding made of thin, drum-like shaped stone slabs. The apertures are covered with glass or left open for natural ventilation. The dynamic and lightweight character of the façade results from a delicate alternation of solids and voids. The supporting structure is created by the combination of supporting thin steel columns, allowing a greater passage of light.

Concept and design: Salvator John A. Liotta. Renderings: Maxime Angileri.
The project consists of a sensuous façade, made from a set of evenly distanced louvers attached to a metal plate for structural purposes. The louvers are ideally made of a compressed bamboo fiber and pulp and are connected through a hidden metal rod. This ensures that the bamboo louvers will not be just a cladding material but are integrated in the building’s structure. The traditional pattern is reinterpreted via a diversification and customization of the louvers. In fact, even though the louvers have the same dimension, each one presents a slightly different form achieved by a simple constructive expedient. The pictorial pattern shape is created by gluing small parts of bamboo pulp on the bamboo louver. Bamboo symbolizes the dignity and ability to adapt and go through hard times without breaking. In Japan, a nation prone to natural disasters, bamboo symbolizes strength of character.

Concept and design: Salvator-John A. Liotta.
Momiji Pavilion is essentially a shading device that materializes the natural phenomenon of daylight through a double layering of panels patterned with a maple leaf (momiji) motif. The shadow of real leaves overlaps with the one projected via the panels, resulting in the intensification of the two. The project favors the visualization of something as fleeting as light through the incorporation of natural and artificial shadows. Here, the dichotomy between nature and artifice is explored in its graphic and phenomenological potentialities. The panels are made of used wood. The pavilion revives a woodworking technique called sashimono that was used by Japanese craftsmen during the Edo period. Once its life cycle was over, the furniture was given new life: the wood was handed down from generation to generation, passing from form to form.

The idea for the project came from pine needles. A repetition of single elements thrown a little bit out of center, the pine needles are set to gently overlap, lending the façade a dynamic and lightweight character. The façade presents turbulences according to the interior building functions: as sunlight passes through the façade, the patterns create a delicate play of light and shadow. The design of the façade—a reference to Japan’s iconic tree—provides practical environmental benefits such as shade and natural ventilation for the interior. Pine is one of the most diffused species in Japan, symbolizing long life, immortality, and good fortune. Associated with virtue in both Japanese and Chinese art, the pine is a motif of winter and the new year.

In The Great Wave of Kanazawa, Hokusai depicts a gigantic wave, a boat with people out of control, and Mount Fuji in the background. Hokusai painted the Great Wave during the first period of his career and painted waves for the rest of his life. Above one of the last waves he made before his death, he painted a flock of birds—blurred with the wave as if they were drops of water—flying towards Mount Fuji. The flock of flying birds represents the concept of harmony for the Japanese people. With his image, Hokusai offers the possibility of thinking differently about the relationship between nature and human beings. It reminds us of the Japanese technique called Kyokai, a way to articulate space that makes use of filters and transparency, and which uses a pattern called Tsuyushiba or “dew on grass.” While the pattern reveals a great degree of aggregate diversity, its geometrical rule is very simple to aggregate, once understood.
The Chengdu Silk Museum pays homage to the culture of the southern Silk Road and Sichuan's silk weaving style using thin threads. The museum merges five cocoons in a configuration that shapes the grand exhibition spaces. Approaching the building in a relaxed temporal sequence, one notes the constant appearance and disappearance, broadening and narrowing of the façade's openings. The vertical slats are modulated in response to the site, environmental factors, and diverse internal functions. The varying degrees of transparency in the aluminum façade are obtained through a careful clustering of grids: when one looks perpendicularly, the façade almost disappears. Looking at the building diagonally, the sinuous sides of the slats are visible and collectively form an atmosphere similar to the surrounding landscape. This organic adaptation of the environment materializes as a delicate and ever-changing phenomenon.

The design for this pavilion originates from an accidental combination of two previous projects by Kengo Kuma: Chidori and Water Branch. The “water branch” is a customized plastic water tank in the shape of a jigsaw that is very light and easy to carry. The chidori, a traditional Japanese toy, is an assembly of wood sticks with unique cuts to form joints, which can be extended merely by twisting the sticks without any metal fittings or additional elements. Water branches are connected using the chidori system, enabling a variety of shapes. The pavilion is constructed by interlocking water branches to form a cubic grid. When the pieces are connected, water can flow into the adjacent blocks, producing an insulating effect. By using chidori structural connections, the water branch structure becomes rigid. This design manifests the possibility of creating entirely new ways of combining small units.

Symbolizing the outer world, cloud patterns are said to have been introduced to Japan by Buddhist monks, and simplified over time. The cloud motif used for this project is called yokeigumo, which means “horizontal cloud.” In the Cloud event space, the pattern covers all the surfaces of the building and is used as a unifying element. The “clouds” are made of foam and reinforced with recycled PET bottle fiber. Framed in modular panels, the clouds of the roof can be moved along simple rails, opening apertures for natural ventilation. The clouds on the vertical wall are extractible, and can be used as pieces of furniture. Once extracted from the walls, the clouds leave gaps in the wall, so that outside and inside become connected by an ephemeral border.

Concept and design: Salvatore John A. Liotta. Renderings: Massimo Angileri, Sergio Mezzapesa.
The project explores the possibilities of a movable façade for an open space. The vertical elements move and vary orientation according to wind conditions. The structure of a single unit, made from a steel rod, connects small, rectangular pieces of fiber-reinforced plastic filled with wood. Running in parallel direction, the structure’s pieces create a moiré effect that serves as a filter between the landscape and the interior. The checkerboard pattern used here has two names: ishidatami and ichimatsu. The first derives its name from its resemblance to paving stones known as ishidatami. The second is named for the popular Kabuki actor Sanokawa Ichimatsu, who used this pattern for his clothing. The ishidatami pattern was widely used in Medieval Japan on clothing, Noh costumes, lacquer ware, and as architectural decoration in the Edo period. The pattern was fashionable in the seventeenth century and became more popular in the eighteenth century after its use by Ichimatsu.

The idea for the design began with a simple module that could be used to create the entire structural system and façade for the house. Here, the gradual variation of sunlight intensity on the surface translates into a gradient transformation of the triangular component formation. The inside of the house is connected via a triangular pattern to its surrounding context. Walls are made from pyramidal elements created by turning the triangle-like unit used for the façade into a 3D element. Overlapping two- and three-dimensional elements lends the house a greater sense of depth. Associated with the powerful Hojo clan, the triangle is usually identified as uroko, meaning dragon (or fish) scale. According to legend, a woman appeared in a dream to the progenitor of the Hojo family. The woman prophesied the prosperity of the Hojo clan, then transformed into a dragon and vanished—leaving behind her three scales.

The diamond motif was a common textile pattern in Japan before the Heian period from the ninth to twelfth centuries, having been originally brought to the islands from China. It is named hishi, or "water chestnut," because of its resemblance to the leaf of this tree native to Japan. Diamond patterns were a favored decoration of courtesans and members of warrior societies. Composed of laser-sintered, diamond-like bricks, the project is aimed at developing a curved structure that geometrically adapts the depth and porosity of its skin beyond the superficiality of surface. The overall curvature of the system contributes to structural capacity, but also provides for different orientations and exposures of each element to applicable contextual circumstances. Each element has its own embedded function, such as lighting or ventilation pipes.

Cut into strips, Omikuji moves with wind, creating a serene image that is nonetheless full of movement. The project evokes the perishable nature of Japanese paper. At first glance, the structure appears highly irregular, though this is not the case with the original matrix: in fact, it is derived from a traditional Japanese pattern composed of a succession of waves. The design that emerges through a random population of strips attached on the supporting structure does not reveal the rule of composition, but instead conceals it. The project draws inspiration from the tradition of omikuji, strips of paper containing sacred fortunes available at Shinto shrines and Buddhist temples in Japan. If the prophecy is good, the omikuji is taken home. If it is bad, custom is to fold up the omikuji and attach it to a pine tree on the temple grounds.

Concept and design: Salvator John A. Litta.