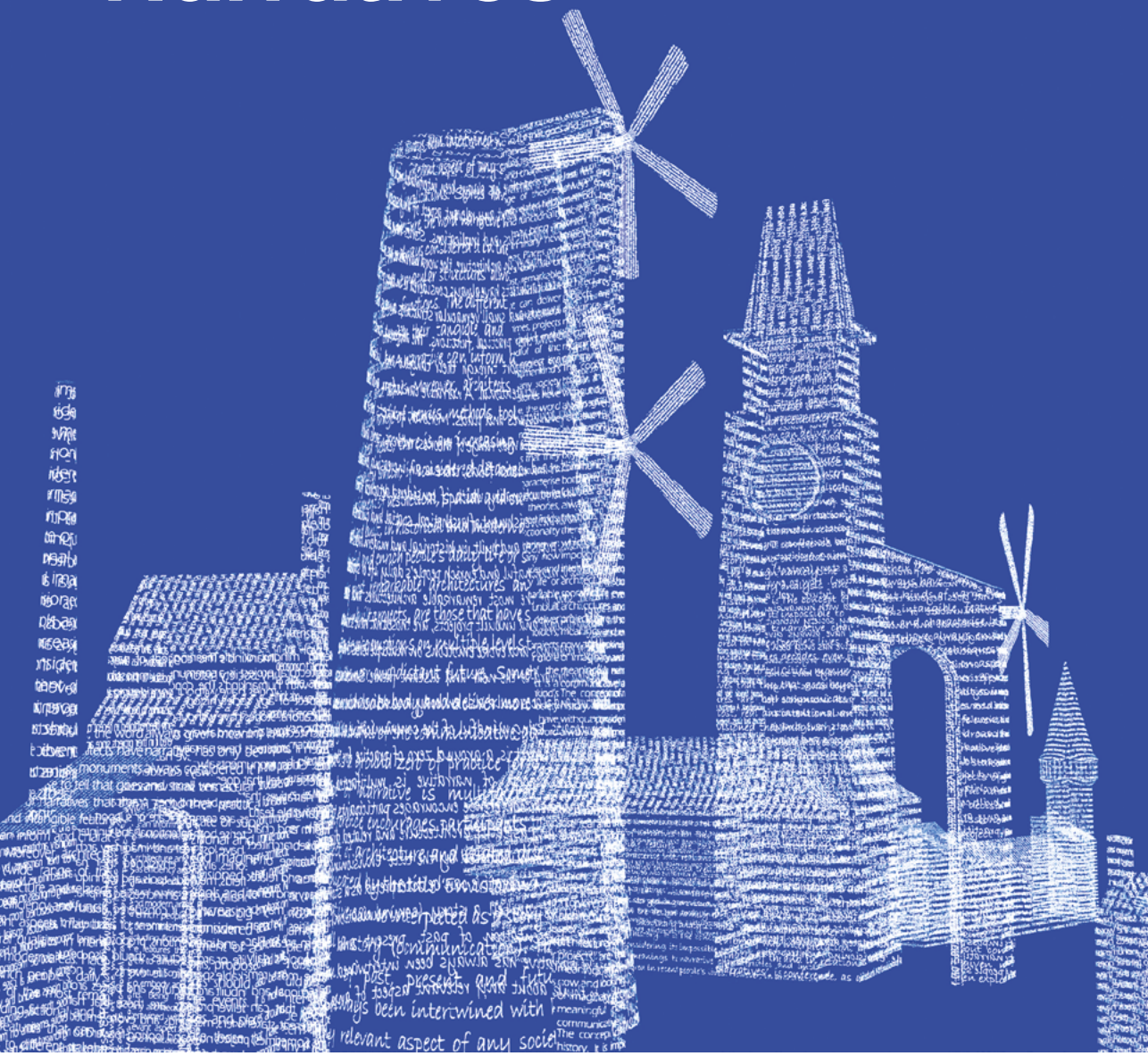
Envisioning Architectural Narratives



Edited by
Danilo Di Mascio

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EAEA15

Monograph of the 15th Biennial International Conference of the European Architectural Envisioning Association

Huddersfield, United Kingdom, September 1-3, 2021

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Published by the University of Huddersfield
The University of Huddersfield
Queensgate
Huddersfield HD1 3DH

https://www.hud.ac.uk

First published July 2021

ISBN: 978-1-86218-189-2 (eBook)
ISBN: 978-1-86218-188-5 (Print)
DOI: https://doi.org/10.34696/xc3n-d030

Editor: Danilo Di Mascio

Cover Design & Cover Image (‘Notes for an imaginary city’), by Danilo Di Mascio

Design by 52 Degrees North (www.52dn.co.uk)

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Performance in Spatial Narratives

Introduction

The narrative potential of architecture is especially tangible on façades. As durable elements that define the exterior face of buildings, façades can act as canvases for communication that are accessible to a collective. Messages embedded in façades are present in the buildings of many different cultures and time periods in a variety of forms, such as ornament, imagery, materials, building techniques, compositional orders, and others. For instance, the ornate, sculptural, and polychromatic exterior walls of the Maya temples of Mesoamerica display representations of rulers, deities, supernatural realms, and other visual imagery emblematic of the Maya worldview (Fash, 2011, p. 4). Meanwhile, the geometrical orders and proportions that originated in ancient Greece have been and continue to be applied to the neoclassical façades of banks, libraries, and other civic buildings around the world, conveying an impression of solidity and connection to the past. The impressive stereotomic building techniques employed at the Gothic Cathedral in Milan communicate lightness, reaching to the sky by dematerializing the blocks of stone. More recently, the DeYoung Museum -- clad in perforated copper panels that naturally patina -- uses the inherent properties of materials to reveal the building's age and a connection to its wooded context, while Alvaro Siza's building at the FAUP reads as a face because of its formal composition. These messages can be achieved through different levels of abstraction. The use of symbolism in architectural design reached a recent apex of sorts with postmodernism (De Bleeckere and Gerards, 2017, p. 3), but the exuberance and self-referential outcomes of that era caused a backlash toward ornament and symbolism in facade design.

However, the relevance and resonance of narrative in façades remains a powerful driver for design and the experience of architecture. To re-enter how narrative plays a role in architectural design in our current context, it is worth highlighting the parallels and distinctions that have been studied between narrative and architecture. In storytelling, narrative is usually sequential, having a beginning, a middle, and an end, and it relies on the passage of time to develop those phases. On the contrary, in architecture, narrative can be seen as anti-sequential, since associative meanings emerge within the complexities that space and time afford (Coates, 2012, p. 31). Nigel Coates argues that what accounts for the non-linear trajectory of narrative in architecture is the permanence of the architectural artifact juxtaposed with the time where personal narratives are formed (Coates, 2012, p. 13, 15). To this well-reasoned perspective, we add another element of relevant nonlinearity to the picture, which is that the architecture itself can be in a state

of constant flux. This flux can take innumerable forms and can be perceptible (as with visible kinetic transformations) or imperceptible (as with energy harvesting) and still play a role in narrative. While the status quo in building envelopes tends toward the static and immutable, one of our research goals was to explore how dynamic skins add to the complexity of time and space architectural narrative. Our approach points toward the potential for narrative in architecture to flourish with building skins that have the capacity to change.

For us, narrative encompasses the many meanings that one may read into or impart onto a work of architecture, whether intended by the author or not, and the means by which that work came into being (Emmons et al., 2018, p. 5). In this way, narrative can be crafted by an author or designer, but it can also be read by an audience or bystander, and, importantly, it can be enacted by a living or inanimate participant. Furthermore, if we consider façades not just as flat and invariable canvases, but rather as dynamic and three-dimensional interfaces between interior and exterior, we can take fuller advantage of how façades can perform as catalysts for a rich experience of the built environment on either side of the skin. In our approach, we consider their ability to perform in two ways: as a functional exchange (including measurable characteristics like heat transfer, energy harvesting, or ventilation) and as an experiential one (phenomenological, haptic, or programmatic activities). As such, another research goal was to investigate how the two types of performances work in tandem to construct a narrative and to identify ways to promote this kind of thinking in design and teaching.

This paper aims to map the narrative potential of performance in the design process by drawing from the work of a graduate-level design studio co-taught by the authors where the act of telling a story informed both the conception and perception of façades. Within our studio, the spatial characteristics of façades and their relation to crafting narrative were studied according to their location relative to the ground and expanded beyond either side of the skin. Narratives were informed by the spatial conditions in which they existed such as being thermally controlled or exposed to the elements, set within intimate or urban conditions, or occupied by humans or other species. Façades were imagined as mediators, as registration and signaling devices, as elements for kinetic expression, as energy harvesters, and as hosts of species. In addition, the crafting of narrative and performance were investigated relative to various time spans, including momentary time, diurnal and seasonal cycles, annual and decennial periods, geological time, and the elusive but evocative time of memory.

Methodology

The methodology within the studio included in-depth case studies and the design of innovative dynamic skins situated in a cultural and climatic context, which were then explored and represented through drawings, physical material mock-ups, and digital animations. The way in which designs were evaluated depended

on whether the proposed building skin embodied both types of performance and whether the representational tools explored the type of transformations enacted by the skin from functional, phenomenological, and experiential aspects across various periods and scales of operation. For that reason, several types of assignments were designed to explore both notions of performance within the same project, enabling students to draw narrative into their work at different stages of the design process.

Case studies were analyzed to map a range of possibilities and underlying performance benefits. We examined built precedents that display dynamic qualities such as Ned Khan's Wind Veil Façade (Moloney, 2009, p. 65-70) which makes wind currents visible, or double skin façades that are used to provide insulation and to precondition air drawn into a building. Biological examples were also included, identifying how for example, human skins can act as a canvas for expression, sensation, or communication in the form of tattoos, make-up, wrinkles, or scarring. Various parameters relevant to the performance of these skins were documented to study the moments where both types of performance were evident or a latent potential. For instance, the functional characteristics of zebra skins -- which actuate the dark hair in sunlight in conjunction with sweat to create convective air currents to stay cool (Cobb and Cobb, 2019, p. 863-879) -- give a graphic identity to the skin of that animal. Or, the Muscatese window (Schiano-Phan, 2004, p. 1), which integrates lattice-like screens with clay pots filled with water in the hot arid climate of the Middle East, enacts a dynamic exchange rooted in both the cultural and climatic contexts in which it exists.

The prompt that followed, *Exquisite Chimera*, was designed to promote the conceptualization of narrative by generating chance encounters between species and buildings. Students proposed unexpected skins that hybridized two precedents, be they from the built environment or the natural world. For instance, one hybrid skin combined the wind-actuated tessellation of the Wind Veil with the thermal capturing and cooling characteristics of the zebra skin.

Through the *Context Meets Chimera* prompt, students were asked to engage and adapt the developed hybrid skins to the specific cultural and environmental contexts of Nuuk, Marrakesh, Kyoto, and Napo Province. Each context presented differences in climate, material availability, vernacular construction, and cultural influences that further informed the students' thinking. In Marrakesh, Morocco, for instance, students identified the courtyard building type, along with earthen construction as climatically appropriate vernacular. Influential strategies were discovered in the natural world in these contexts as well, like the Argan tree, which subsists by probing its roots deep into the desert soil to absorb groundwater, or the fennec fox, which uses the thermal mass of its subterranean burrows to both stay cool in the day and warm at night. Research also revealed the visual language of places and the people that inhabit them, as seen in the Berber textile patterns. Much like a literary narrative is enriched by contextualizing the plot, these influences contribute to the re-writing, reading, and enacting of narratives

developed through building skins.

The challenge then was to synthesize these influences into a façade with material qualities. A deep connection to context including its physical realities (evaporation, thermal processes, solar orientation), was investigated through the *Material Manifestations* prompt. Students proposed material assemblies that could perform multiple roles. For instance, one project proposed two types of skins that worked together when placed in different positions relative to the ground. One skin was set inside the ground inspired by the turf houses of Nuuk, Greenland, and used local stone as thermal mass for insulation, thus responding to the extreme temperatures of the context. The other skin incorporated phospholuminescent processes to harvest daylight to glow in the dark, attempting to offset the psychological effects of light scarcity during some portions of the year in Nuuk's latitude.

After examining material opportunities, the zone of exchange between inside and outside was expanded in an assignment called *Beyond the Skin*, which introduced the programmatic and experiential potential of space into the equation. Students were encouraged to embrace the depth of the façade, to absorb activity and invite exchanges from both sides of the skin from the inhabitants' perspectives, dissolving its borders in favor of porosity where appropriate. For example, one proposal in the rainforest of Napo, Ecuador, used the skin as a means of hosting plant and animal species that became active pedagogical agents of a school embedded in the natural context. The amorphous contours of the skin created pockets that expanded in and out at different scales and levels, responding to the needs of different species that inhabit the varied strata of the forest, from the floor to the canopy, thus inviting the full extents of the natural world to participate in the life of the skin.

The performance of the skin was examined over a variety of time spans through the *Animated Skins* prompt, which was developed in parallel with the other exercises. Simulations and animations were used to infer how humans would perceive and behave in the extended area beyond the skin. They also described how the skins worked in relation to stimuli, whether human or environmental, and to visualize the phenomenological transformations that occur at the interface between the interior and the exterior. In many cases, the operative time span emerged from the climate, such that projects in Kyoto, Japan considered annual cycles related to its four seasons, while those in Marrakesh focused on a daily cycle responding to the stable annual conditions but large diurnal temperature swings. In other cases, the time span was shorter and enabled communication of messages and effects in real-time. These differences are evident in the following student projects, which exemplify a range of means by which narrative can be read, crafted, and enacted through design.

Fig. 01. Inside Out Museum Seasonal Transformations, Kyoto, Japan.

Source: Student work by Ian Wallace and Cameron Rebidue.

Inside Out Museum

The facade of this museum enables multiple readings that transform depending on user and environmental inputs. The skin features two-sided floor-to-floor panels that pivot 180 degrees. One surface is reflective while the other contains works of art driven by the museum's curatorial ambitions. This double-sidedness allows the immediate reorganization of content through kinetic transformation. When the panels reflect the environment, the building camouflages within its context. At other times, its facade allows it to stand out by exposing art, such as traditional prints, from its interior outwards. The skin enables the building to transform from icon to chameleon but when in its fragmented state, to act as a canvas where the artwork (ancient or contemporary) is juxtaposed with real-time images from the shifting environment in which it is sited. In the various arrangements, seemingly disparate content is positioned to be read as a cohesive whole, which is perceived from both inside and outside the building (Fig. 01).

The fluid relationship of interior and exterior draws from a deep connection to the landscape that exists in Japanese culture and architecture, which is enabled by Kyoto's mild climate. This influences the unfolding of a dynamic visual and spatial narrative due to both changes brought by seasons and the curated cultural content. Thus, the very program of the museum contributes to the meaning and the pace at which the narrative changes. In turn, the kinetic transformation inverts the typical museum condition -- an inward-looking repository of collections -- and takes the museum outside, expanding the audience who perceives the narrative. Meanwhile, the opening of the panels also enables functional circulation between inside and outside, and passive natural ventilation by providing a pathway for airflow. In their closed position, the panels provide an insulated thermal envelope to buffer the interior from the mild winters and swing seasons of Kyoto. The fluctuating functional demands for airflow or heat retention inevitably translate into different readings of the facade, be they intentional or unintentional, as the panels are opened and closed. The possible arrangements of the skin create either a boundary between outside and inside, spatial connections, or frame outdoor space, enabling a reading of continuity or discontinuity deeply informed by the program of the building and its context.

Activated Earth

This project illustrates the potential that a building skin has to organize space and inhabitation while also achieving cultural and climatic resonance on multiple levels. The scheme matches the diurnal patterns of domestic activity in a courtyard house with a strategy for heating and cooling through the facade that is tailored to the climate of Marrakesh, Morocco. In the dry, sunny heat of the daytime hours, the building skin keeps itself cool with shading devices and initiates a misting system, which, when coupled with prevailing breezes, allows evaporative cooling to bring comfort to interior spaces adjacent to the skin. At the same time, these shading devices provide visual privacy, supporting cultural practices in this place. Meanwhile, portions of the dwelling that are inhabited primarily after sunset, such as bedrooms, benefit from an exterior skin that retains the heat of the sun and releases it slowly to the interior spaces overnight (Fig. 02). This skin itself thus becomes a protagonist and partner in orchestrating the daily rhythm of occupation. Furthermore, it is through an understanding of locally available material (baked clay and rammed earth) that the skin can regulate thermal radiation and humidity. The project goes further by arranging the elements of the skin in such a way as to invite human actuation of its pores by opening and closing air pathways that would allow a user to fine-tune that regulation. Through the careful use of scale and pattern, these same elements evoke geometries of cultural significance found in Berber textiles produced in the region.

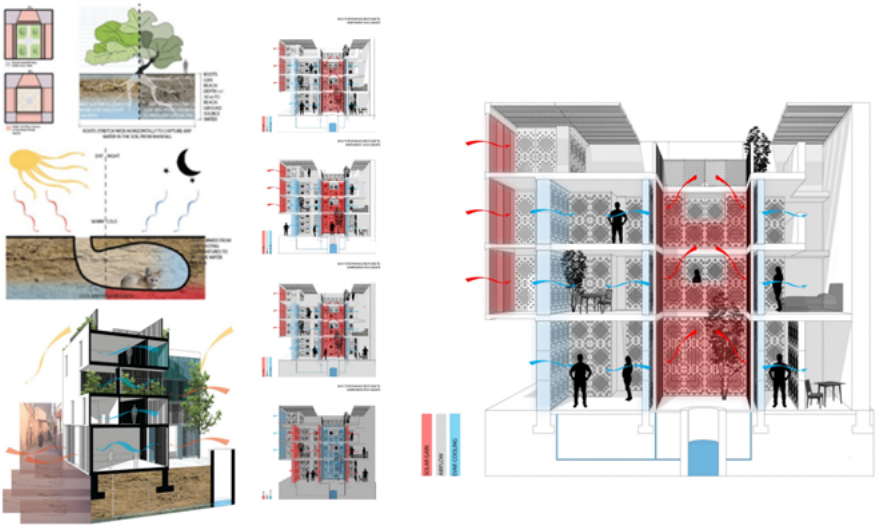

Fig. 02. Activated Earth Diurnal Performance, Marrakesh, Morocco.

Source: Student work by Rachel Kelly and Michael Montano.

Deep Shadows

This project re-interprets the craft and dynamic narrative embodied in the traditional Japanese house while addressing a contemporary set of parameters. Bringing characteristics of Japanese shoji screens -- which are lightweight, operable, and translucent -- to a dense urban context, this project proposes an operable double skin that provides a space for insulation or airflow depending on heating or cooling demands. It is in this space where internal and external activities converge in a performance of sorts. Through a daily play of light and shadow, the life of the city and its landscape animate the skin from the interior during daylight hours, while intimate activities that take place indoors at night are projected onto the skin and perceived outside (Fig. 03). An ever-changing narrative is thus constructed as moving content is projected onto the translucent sliding scrims of the facade. The light qualities associated with these cycles as well as the particularities of exterior and interior occupancy transform the facade in a rich and variable way, whether by the minute, hour, day, or season. The polycarbonate screens used on the building's skin blur objects and bodies, sometimes abstracting them into soft shadows and sometimes into sharp silhouettes, depending on the arrangement of the screens, and their distance from the projected objects. The play of shadows on the exterior surface has a resonance that encompasses the full spectrum of time occupied by the traditional Japanese house. As such, the project stands as an example of culturally derived building practice that intersects with environmental context, where phenomena, program, and materiality, elevate the familiar to the theatrical and engage our internal recollection of stories through memory.

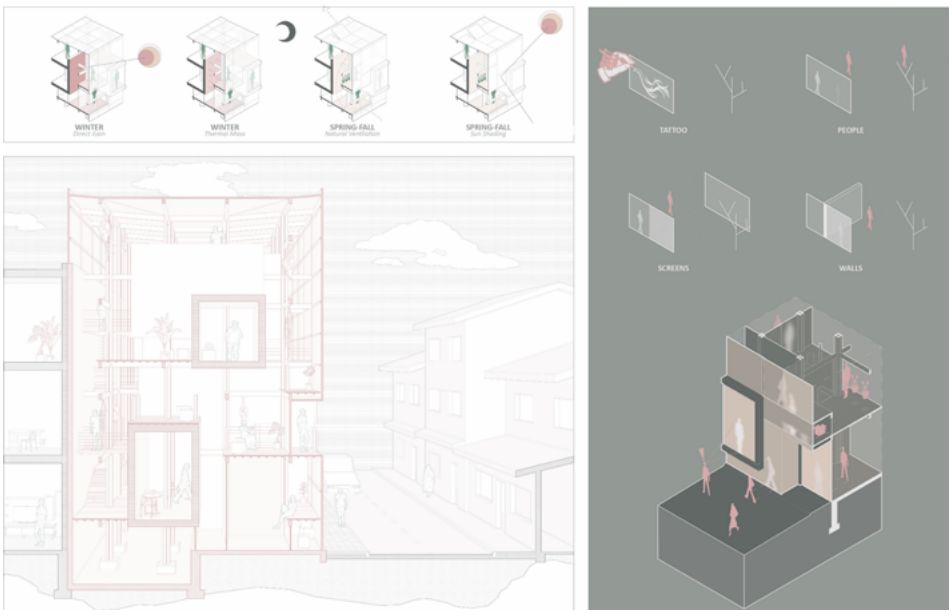

Fig. 03. Deep Shadows Seasonal and Diurnal Projections, Kyoto, Japan.

Source: Student work by John Dye and Sean Flannery.

Harvesting Tendrils

Sited in Nuuk, Greenland, this project engaged the issue of food scarcity in this remote community where low temperatures and barren soil conditions preclude outdoor agriculture. The building skin embraces a high-tech approach in the form of an array of thousands of protruding piezoelectric photovoltaics that harvest the abundant wind energy through their kinetic side-to-side motion, and the solar energy, which at certain times of the year lasts nearly 24 hours a day. These forms of environmental energy are transformed into electricity, which in turn powers interior LED growing lights, enabling indoor agriculture to thrive. The program of the building is not only a productive food generator that can be visited by the public but also the locus of a marketplace for food and social exchange (Fig. 04). The drive to harness wind energy shaped the massing of the project, which evolved into a form that would increase wind speeds using the building as a large funnel. Interestingly, for reasons having to do with efficiency and energy harvesting, the project attains a level of visual and textural interest uncharacteristic of an industrial facility and, in so doing, draws attention to itself in a way that is conducive to community pride and engagement. The high-tech piezoelectrics fan across the exterior faces of the building like the fur of an arctic animal, appealing at some level to a child-like sensibility. The horizontal skin of the building is deployed as a landscape for recreation, inviting sledding on its sloping surfaces. This humorous and playful aspect also strikes a chord with the psychological needs of the inhabitants in this place where the harsh environment and extreme daylight conditions stretch the capacities of humans.

Fig. 04. Harvesting Tendrils, Nuuk, Greenland.

Source: Student work by Sean Flannery, Benjamin Pizza, and Noah Scavetta.

Conclusions

As interfaces between inside and outside, and as artifacts where the passage of time is registered, façades present great opportunities where narrative can be read, written, and enacted. Within the context of narrative in architectural history, we argue not for the irrelevance of visual communication, but rather that when we conceive of façades as dynamic three-dimensional entities and consider the many ways in which they can change, we add yet another dimension of rich complexity between time and space in the service of narrative. The skin itself expands its role in the construction of narrative as an active participant, and this participation is further enhanced when we consider the performance of dynamic skins as both functional and phenomenological. The broad range of possibilities explored in the studio demonstrates the richness and promise of architectural facade design that simultaneously considers functional performance as well as the sociocultural and communicative potential of narratives as agents of meaning and change over time.

Both types of performance work together in the elaboration of meaning and narrative through the perception and interaction with the facade at various scales and time periods. The enactment of narrative occurs when the skin transforms, and the result can be read by whoever perceives such changes. By understanding how skins react in response to human and environmental factors, inhabitants can gain a deeper and more meaningful understanding of the context in which it exists. In addition, as the skin performs, it not only participates in the construction of narrative but also enables other participants (humans and other species) to contribute to that narrative through inhabitation. As the work of the students shows, different types of transformation that engage in both types of performance can support different narratives with varying time spans. For example, kinetic skins offer the opportunity for nearly instantaneous changes to visual communication, spatial relationships, and thermal conditions, as we see in the Inside Out Museum. While other less visible changes like solar heat retention with thermal mass can influence the activities that take place relative to the skins by offering diurnal comfort, as seen in the Activated Earth project, or by providing favorable conditions in relation to changing seasons, as seen in the Deep Shadows project. These instances of dual performance can also simultaneously reach back into the ephemeral time of memory, tapping into the cultural and material roots of a place and its people, as we see in play with the reference to the lineage of shoji screens, or the reference to Berber textile patterns.

Relative to teaching methodology, façades usually stand as products of engaging other aspects of architecture such as program, structural logic, or space. Yet, recognizing the skin as a mediator and its capacity to perform at multiple levels lead the co-authors to prioritize the skin as a potential generator within the creative process of the studio. This was seen not superficially, but as a rich way to re-enter spatial ideas that emerged from the aforementioned notions of performance, at various scales and at various time spans.

In the illustrations and descriptions above we continue to see great promise for design that considers façades not as static entities, but as dynamic participants in the lives of people and other species. We see façades communicating meaning visually while enabling ventilation, reinterpreting deep cultural practices while capturing internal heat gain, choreographing human behavior by utilizing diurnal thermal cycles, or playfully drawing together community while harvesting solar and wind energy. When change over time becomes an operative parameter in this process, rich and meaningful stories emerge in the process of designing façades, in the communication and representation of that design, and ultimately in the perception, use, and inhabitation of those designs.

Acknowledgments

We wish to thank Steve White, Dean of the *School of Architecture, Art and Historic Preservation at Roger Williams University* (RWU) for supporting the development of our graduate-level advanced studio titled: *ARCH 515: Dynamic Skins*. We thank all the students who participated in this studio, and especially those who contributed with images of their work to this publication: John Dye, Sean Flannery, Rachel Kelly, Michael Montano, Benjamin Pizza, Cameron Rebidue, Noah Scavetta, and Ian Wallace. We also want to acknowledge that this research was partly funded by the *RWU Foundation to Promote Scholarship and Teaching*. Finally, we are grateful to our families, for their patience and encouragement in the development of this research.

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