FORWARD
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Forward welcomes the submission of essays, projects and responses to articles. Submitted materials are subject to editorial review. All Forward issues are themed, so articles and projects are selected relative to the issue’s specific subject.

Please contact the Forward Director, Christina Noble, at Christina.Noble@gmail.com if you are interested in contributing.

FALL FORWARD 210
Landscape
# Architecture & The Body

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“In a transnational world typified by the global circulation of images and sounds, goods and peoples, the media impact complexly on national identity and communal belonging… Communities, societies, nations, and even entire continents exist not autonomously but in a densely woven web of connectedness, within a complex and multivalent relationality.”

Ella Shohat and Robert Stam

Our identities are no longer fixed to a specific place or time. As we have become increasingly transient, what we call home today is more than likely a different location from our home ten, or maybe even five years ago. Where we work today could be different from where we worked two years ago. In addition, our access to worldwide information via the Internet, television and movies has expanded our experiences beyond those that we have enjoyed directly to include those we have experienced indirectly through images on a screen. As a result, who we are is no longer tied to where we live, who we know, or even what we’ve experienced, but is instead an amalgam of all our own experiences combined with the experiences of others shared through various media.

As our identities are becoming more complex and our relationships with each other are more interconnected, what impact does this have on the relationship between architecture and modern experience, or Architecture and the Body? This month’s issue will explore these ideas from several distinct perspectives.

Materialist architects and designers such as Shin Azumi focus on the here-and-now of space or objects and our immediate sensual interaction between our hand and the weight of a material or the touch of a surface. In his article, ‘Physical and Sensual Communication,’ Azumi describes the interaction between an individual and a cup:

“[I]f you find a cup you like in a shop, you will buy it, and take it into your home. As you begin to use it, you will hold it with your fingers, touch it with your palms, and place your lips against it. The way to enjoy the object is unlimited. If you are satisfied, you may keep and use it until it is broken. It becomes a part of your life and you may even feel that it becomes a part of your body.”
The object seduces the shopper into a purchase as he identifies with it through physical touch. The cup becomes an extension of his hand at the same time it becomes an extension of his identity through everyday use. At its best, the materialist design approach creates objects that interact with people on an intimate level, making the fulfillment of their needs satisfying or fun – for example Azumi’s Air Switch AZ which dims and brightens as the hand moves closer to or further away from the light, creating a dynamic play between the user and the object. However, this approach can also expand beyond playful interaction into a designer’s desire for control. For example, Azumi describes his Upright Salt Shaker:

“The dispensing holes are not located on the top of the shaker. Instead they are positioned to the side, to invite the gentle gesture of shaking salt, while also providing better control. When you slightly tilt the shaker, the salt smoothly comes out. You do not have to turn the shaker upside down and shake aggressively. The way in which the product has been designed and subsequently used brings elegance and grace to the user’s behaviour at the table.”

The designer intends to influence the user’s movement and create a more refined atmosphere – not just by designing the table setting itself, but also by designing everyone’s movements and behavior around the table.

While a desire for a more graceful dinner setting is fairly benign, the power of space and objects to control people and their actions can become politically and culturally charged when institutionalized and used to represent an entire culture. Projects such as Azra Aksamija’s ‘Flocking Mosque’ seek to question larger religious and cultural institutions and how they utilize space to control their community’s members and the broader global perception of their people. ‘Flocking Mosque’ is a prayer rug that can be carried and laid anywhere to invite one or twelve worshippers to assemble. In addition, an unlimited number of rugs can tile and pattern to create an unending mass of worshippers unhindered by physical space. This simple object invites both the participating community as well as the world beyond to question “the territoriality and formal rigidity of the mosque, which can reflect both the rigidity of religious interpretations and cultural inflexibility” and understand Islam “not as a monolithic structure, but rather as a dynamic process of transformation and change that is spatially shaped by heterogeneous Muslim communities.” The physical presence of space, as represented here by a mosque, as fixed in the past
can lead to symbolisms and perceptions that also remain bound by the past. As a result, the community they serve is perceived by the world as a monolithic entity that cannot and does not change. This denies the Islamic community the flexibility to look toward the future and hides from the world a dynamic community with a multiplicity of beliefs and opinions. However, as Aksamija illustrates, individuals or communities need no longer be limited and controlled by their physical surroundings. Instead, they can re-appropriate spaces and generate new perceptions and new ideas through their actions outside the bounds of their institutions.

In other examples, performance artists such as Body Cartography question the rigidity of how spaces can be used through guerrilla-style tactics that re-appropriate public plazas and city streets. Their ‘Go’ project takes over public streets for dance and theater. Freerunning, a dance movement where performers adapt to and incorporate landscape elements and buildings into their performances, has inspired Marlene Imirzian’s study of dance and architecture as a means of creating adaptive and improvisational community space.

This issue of Forward asks many questions regarding the relationship between ourselves and our environment. What is the role of architecture in our everyday lives? What should it be? What if our spaces adapt to us rather than the other way around? Through a combination of the two approaches – one inspired by the materialist’s sensitivity to time and place combined with the more critical approach that challenges the meanings of our existing spaces and what they represent – we can begin to consider more thoughtfully and express in material terms of building how we perceive ourselves and others today and what we aspire others to understand about us tomorrow.

NOTES

1 Ella Shohat and Robert Stam, Multiculturalism, Postcoloniality, and Transnational Media

Christina A. Noble, AIA, LEED AP

Forward Director

has worked as an architectural professional for ten years and owns her own firm, Contour Architecture, in Phoenix, Arizona. She has worked on numerous high profile and large-scale projects in her career, including collegiate, mixed-use, government and private development high-rise buildings. Christina graduated from Rice University with her Bachelor of Architecture.
Making complex spatial conditions “sensible” is a key objective of my conceptual practice and it has two important roots – immigration and architecture. As the daughter of immigrants, my identity, my sense of place, and my sense of belonging are continually complicated by my extended family’s historic departure from South India in the early 60’s and the occasional returns to this place that is still referred to as “home.” As I suspect is the case for many children of immigrants, making sense of the world for me has required two very different types of intentionality. On one hand, my American born self has had the privilege of being rooted in real sites - hometowns, living rooms, classrooms, etc. In contrast, my American born Indian self has been very influenced by a cultural landscape that was carried to this country from
Here and There  
photography by Cynthia Pachikara
an abandoned land on the other side of the world. At an early age, I began to understand that this part of me doesn’t belong to a place as much as it belongs to a reference to this place. Practically speaking, this home has no mass. Contending with it presupposes some translation as well as an occasional sense of disorientation. And, most notably, the authority it wields on me is virtually invisible to my non-immigrant friends. It requires a kind of empty intentionality.

Equally important to my practice is that I was educated in architecture in the early 90’s at the University of Illinois in Urbana Champaign, when the National Center for Supercomputing Applications introduced the world to the MOSAIC web browser. Being educated at the time when terms such as Home Pages, Windows, Thresholds, and Navigation Tools were being co-opted from architecture and geography to illustrate how we might move through virtual space, it would be safe to say that I was prompted to puzzle over the codependence of physical and digital domains, to question and imagine analogies between the two environments, and to consider how one might build for, occupy, and bridge these radically different sites.

Through my studio work, I attempt to actualize and share the spatial riddles that these experiences have presented to me. Using installation art as a format, galleries and outdoor venues as settings, and projected light as building material, I attempt to suggest adjacencies between physical and virtual worlds, create connections between the real and the referential, and invite sentient, circulating bodies to locate themselves in the margin.

My works abide by a simple trick of light. Multiple projectors are situated in space, casting video and photographic projections to a fixed area on a wall. One of these beams is much brighter than the others, thus
MAKING SENSE OF PLACE

untitled

photography by Cynthia Pachikara

Most of my parents’ siblings were leaving yet immigrated to the United States. We had become immigrant children around the edge of the Pacific route. “Dad, I don’t want to stay in long night,” I told my father. “It’s dark.”

I remember he replied, “I wish it wasn’t black.”

I whispered, “You get to head to the cockpit and ask, ‘What is it like?’ Maybe later...

“...what I leave,” I continued. “In heaven.”
Pacing Yourself
photography by Cynthia Pachikara
dominating to the point of rendering the other allied layers invisible to the approaching visitor. As she steps into the gallery, the occupant unwittingly trips into the primary light and casts a shadow. With this move, her “shadow body” becomes a figurative aperture that reveals the underlying projections. Surprisingly, she encounters light and image where none should be – only inside the space of her own, familiar and engaged shadow. As she develops a level of comfort in her role as both seer and subject, as interference and editor, she engages in generative play, creating idiosyncratic permutations of the projected imagery. Imagining the observer’s body as such a gate, my work addresses not only the social contingency of her gazing in a space, but visualizes the notion of the body-as-screen. By depending on this circulation, I forfeit a certain degree of control in my work, setting up a transformative space that is described by motion, light, and image.

To be constructed vividly, the spatial analogy I seek to create requires a sense of real time, and to this end, it relies heavily on the circulation of the occupant. The shadows are filled with photographic stills and videotaped loops that reference moments of differing length and historical time. Meanwhile, the viewer’s serendipitous movement in the installation space continually regenerates these projected moments in terms of the present. Not unlike an encounter at a beach, where waves make way for wading bodies, the light projections envelop the occupant. The beams continually reshape themselves according to the spectator’s proximity to key points in the room and amidst a system of projectors by which the experience is perceptually constructed. The environment continually reinvents itself as new visitors reposition themselves relative to others already gathered there. As bodies travel through and out of the beam spaces, the displaced layers of light seem to “seal themselves up” and the room returns to the

![Conceptual Diagram by Cynthia Pachikara](image)

![Untitled Video Installation photography by Cynthia Pachikara](image)
The installations are designed as immanent spatial riddles, fusing real and referential sites and addressing, in a dematerialized way, the psychological dimensions spawned by a desired connection to an abandoned place. Light-based and lens-based projections imply the then and there and a physical site reinforces the here and now. In these works, I intend to make the viewer feel that she is standing not only within layers of light, and amidst conventional architectural planes separating immediate interior and exterior, but also in a thin space between distant geographies.

As the child of immigrants, this is what I experience. I recreate it to share it. While I move through a very real and immediate world, another distant landscape resides in me. It is as close as my body and yet also interminably distant. Over twenty years since the launch of the MOSAIC web browser, the sense of reach enabled by digital technologies initially perceived, “blank” state. In fact, all layers are still entirely present and active.

Using the viewer’s body as a bridge, I construct illusionistic continuity between the gallery space and a phantom destination. The projectors not only throw imagery to the wall, they illuminate it, obviating the physical reality of this immediate spatial boundary. While the shadow comingles with the projections, it also remains an unmistakable attribute of the spectator standing in the space. At the same time, I carefully locate vanishing points in the filler images so that – from the viewer’s perspective - vistas revealed inside her shadow appear to recede beyond the existing exhibition space. Enlarged to a body scale, they start to become impossibly near, like a dreamscape. However, as one moves toward the wall, the shadow shrinks and the visual gate closes, ultimately rendering the landscapes unreachable.
has prompted a familiar reality: a sense of closeness that is not bound by physical space. For immigrant families with these tools, the longing for a relationship to a past place is somewhat assuaged. Without these tools we may likely be lost.

Cynthia Pachikara is fine artist and Associate Professor at the University of Michigan’s School of Art & Design. She holds a joint appointment in the Taubman College of Architecture and Urban Planning. She has exhibited internationally in venues that include the Mackintosh Museum of Glasgow, Scotland, the Art Gallery of Nova Scotia in Halifax, the Forum for Contemporary Art in St. Louis, Consolidated Works in Seattle, the Fassbender Gallery in Chicago, SPACES in Cleveland, and at the Ann Arbor International Film Festival. She received her B.S. in Architectural Studies, her M.Arch and her M.F.A. (Sculpture) at the University of Illinois in Urbana-Champaign.
FLOCKING MOSQUE

by Azra Akšamija

Diagram by Azra Akšamija
Flocking Mosque is a modular system of minimal prayer rugs that can be used for Islamic ritual prayer. Inspired by the decoration from various religious monuments in Muslim societies, the project Flocking Mosque juxtaposes geometric patterns with the patterns of worshipper behavior. Questioning the conceptual foundations of the mosque, the project opens new possibilities for future design of Islamic religious spaces. The project aims to contribute to an architectural interpretation of Islam, understanding it not as a monolithic structure, but rather as a dynamic process of transformation and change that is spatially shaped by heterogeneous Muslim communities.

While the art of Islamic geometry links the material and the spiritual world, it simultaneously expresses the logic and order inherent in the Islamic vision of the universe – the infinitely repeating patterns can represent the Islamic doctrine of unity of all things, al-Tawhid. The design of the Flocking Mosque reinterprets Islamic geometry as wearable and mobile religious architecture, made of small, interconnected textile elements. The individual elements of a chosen pattern are assembled into flower-like circles. Each “flower-circle” consists of thirty-seven mini-rugs which provide clean surfaces for body parts that touch the ground during the prayer ritual: there are twelve pairs of slippers, twelve pairs of hand-rugs, twelve head-pillows, and a central circular bag, which contains twelve prayer beads. In this fashion, one “flower-circle” of the Flocking Mosque can accommodate prayer of twelve worshippers. The capacity and size of such a mosque can be infinitely expanded and adapted to any space though multiplication of the flower-circles, or through removal of individual components.

Although it represents a novel form of a religious space, the Flocking Mosque conforms to Islamic liturgical regulations: the starting point is the “Hadith,” an oral transmission by the Prophet Mohammed in the 7th century. According to Mohammed every location in the world has the potential to become a mosque through the enactment of the ritual prayer of a worshipper. While the word “mosque” itself comes from the Arabic word “masjid” and means literally a “place to prostrate” in front of God (Arabic “Allah”), prayer can be performed anywhere, at home or in a dedicated space – everywhere except for spiritually impure places.

Over the course of history, the mosque developed highly diverse architectural forms and typologies. This formal diversity has evolved out of the open-ended nature of Islamic spatial regulations, and also due to the geographical spread of Islam and the assimilation of different cultural influences and local architectural languages. While particular elements and form of the mosque are neither specified in the Qur’an nor in the Hadith, a range of functional and symbolic elements have been gradually established. Domes or minarets, for example, have taken on a representative and identifying role for Muslim communities, particularly for those
Flocking Mosque questions the territoriality and formal rigidity of the mosque, which can reflect both the rigidity of religious interpretations and cultural inflexibility.

Studying the history of Islamic religious architecture, while anticipating the stylistic and programmatic transformations of the mosque as a quality to be tested in different cultural and geographical contexts, I have created a set of five Generative Design Principles or spatial parameters that theoretically describe the notion of the mosque. These principles provide a conceptual framework for the formal mutation of mosque types, sub-types, and their elements. They encompass:

1. Directionality – refers to the requirement that the prayer space be oriented spatially toward Mecca.

2. Prayer Enactment – indicates that prayer can be performed anywhere, and that it is the very body performing the ritual prayer that transforms any space into a mosque.

3. Volume of Prayer – concerns the minimal space of the mosque, which, at its smallest, is defined by the space a person’s body occupies when performing a prayer toward Mecca.

4. Spatial Cleanliness – refers to the necessity of maintaining a spiritual and physical purity of the prayer area.

5. Programmatic Variability – a mosque’s function can switch between hosting religious and secular activities and vice-versa; this applies to historical mosques as well as, for example, contemporary major sports facilities that are used to accommodate Friday prayer or other larger religious gatherings.

Flocking Mosque picks up on this programmatic versatility in order to evoke a new interpretation of the mosque as a ritual space that “takes place” through
the very congregation of its worshippers, as well as though the spiritual interaction of their bodies and minds with their environments. The pattern of mini-prayer-rugs, which is collectively represent the mosque, is continuously recreated though its worshippers: when used for prayer, the circular formation of the individual rugs has to be reassembled and re-directed towards Mecca, the prayer direction. In this way, the individual elements allow any secular space to become a mosque. The absence of formal definition of the mosque, as in the Flocking Mosque, renders visible alternative mosque forms and concepts. Such architectural developments can only be possible if both architects and Muslim communities accept the foundational ideological elasticity of Islam that allows for the mosque’s formal transformation and cultural adaptability.

Azra Akšamija

is a Sarajevo born Austrian artist, architect, and architectural historian. Her interdisciplinary practice explores representation of Islamic identities in the West, spatial mediation of identity politics, Orientalism, and cultural interaction through architecture. She graduated from the Faculty of Architecture at the Technical University Graz, Austria in 2001, and received her M.Arch. from Princeton University, in 2004. She is currently a Ph.D. candidate at the Department of Architecture, Massachusetts Institute of Technology. Besides her academic research, Azra has been working as a conceptual artist. Her interdisciplinary projects have been published and exhibited in various international venues such as, most recently, at the Secession Vienna (2007), Manifesta 7 (2008), and The Stroom, The Hague (2009).
Over the past three decades the spread of global networks of information, commerce and socialization brought about radical transformations in the way we conceived of ourselves and the spaces we produced. As this new, connected world disintegrated, previously existing boundaries and social structures, architecture and urbanism were increasingly concerned with their sensuous and ambient qualities, exemplified in the writings of Juhani Pallasmaa and buildings of Peter Zumthor. Atmospheric spaces drew attention to themselves, “prioritiz[ing] direct experience, the sensory experience of space,
material and light.” The degree to which these spaces captured us by our own complicity betrayed an overwhelming desire for a simplified, yet powerful sensual experience in a world already oversaturated with objects and signs. Architecture’s focus in recent years on the experience of being in its spaces revealed a condition in which we are ensnared within a perpetual present – a concept of time that is defined by the perceptual limits of our own bodies.

Useful for understanding the spaces of the very recent past, the present, and possible near futures, this idea of being caught within a temporal present is detailed in Frederic Jameson’s 2003 essay “The End of Temporality:

Faced with the futility of any form of long term planning in an economic climate of chronic uncertainty, we are deprived of a future and left with a past that is irrelevant. In exchange we are provided with free-form space that lacks boundaries. Our habits, customs, and identities are less defined by locale or region than by arbitrary preferences formulated through global networks of consumption and media. Liberated from the idea of a self that has agency and purpose within a particular historical context, the new relationships we develop with our surroundings are largely based upon our individual subjective experiences of the body with artifacts in space and the varying degree to which we develop fictionalized temporalities to reassign meaning to space. Three examples of this are described as follows:

**Diffusion**

One impulse of being caught in a temporal present is to “give up” the body to space in a form of submission that involves perceptual synthesis into the surroundings. Roger Caillois observed this instinctual drive in humans and animals in his 1935 essay, “Mimicry and Legendary Psychasthenia.” AUDC brought this concept to the present in Blue Monday:

Caillios explains this as a relation in which an object’s fixed coordinates – to which the human’s own coordinates become transient or tethered in space – elicit a recognition of one’s separateness from the surroundings, resulting in a form of anxiety known as psychasthenia. Caillios provides the example of the schizophrenic:

If we take the schizophrenic and mirror him with the “saturated self” – a technological state of being in which disparate and
competing temporal and spatial demands, like talking on the phone while driving, lead to a form of psychic “vertigo” for the individual — it is evident how the environment comes to be viewed as a chaotic haze of ambient stimulation.

Examples of this condition can be found almost everywhere, perhaps most notably in the emergence of the contemporary city as the preferred setting for the hipster, the digerati, and even Baby Boomer retirees. The buzz of perpetual motion created by human bodies, traffic and infrastructure blends with the personal soundtrack of the iPod to create a trance-like state in which the individual effectively becomes the surroundings.

At the Lux Coffeebar, located in an area characterized as the revitalizing central spine of Phoenix, the diffusion of the body into space gestures toward an abstract conception of the recent past. Atmosphere is emitted as a blur of bass and background, furnished with an eclectic mix of semi-derelict designer artifacts from the last century. A DJ plays ambient music just loud enough to blend with the volume of natural conversation, providing accompaniment to video projections of mostly indistinct images digitized from reels of damaged celluloid. As diffusion is achieved on a perceptual level, the atmosphere suggests warmth and continuity within a process of slow decay; the patron — or inhabitant — loses cogency into gently stimulating space. Comforted by cool, yet familiar objects such as a George Nelson lamp or a Philippe Starck chair, the individual can be relieved of the psychasthenic burden of otherness as he or she slips into the dreamy imagery of a longed-for 20th century modernism.

**Veneration of the Aesthetic**

If diffusion describes a condition in which the distinction between the body and space blurs into a state of perceptual delirium, veneration takes the notion of a being within a perpetual present along a horizontal trajectory into an invented temporality, facilitated by the willing
subjugation of the body for the sake of the aesthetic. In January of this year The New York Times profiled an emerging lifestyle trend in which persons of various backgrounds opted to live in houses in cold climates that have few or no sources of heat. Janet Smith, The owner of three such structures in Ridgeway, Colorado, described her rationale:

“My stone buildings are so beautiful, I love living in them…. There’s a whole aesthetic of living close to natural materials.”12

One of these buildings - a 19th century stone rubble house in which she lives – has no insulation and stays only a few degrees above an outside temperature that plunges well below freezing for much of the year in the Rockies. In this instance, the woman is willing to subject her body to extraordinary discomfort for the experience of living in an antique. Her behavior is symptomatic of a fundamental detachment from place as the definer of historical and relational identity.13 The antiquated building is valued “merely because it has survived and thus become the sign of an earlier life.”14 As such, its inhabitant, who is devoid of a personal history that can be shared with others, projects herself into the building which serves as a relic. Her thermal discomfort becomes a form of devotion to the dilapidated space as she seeks to move beyond the present of her own body into the narrative of a bygone era. Much like the diffusion into a derelict Modernism experienced at the coffee bar, the practice of veneration asserts itself in the form of mythical ideas about place and identity. The desire for a contextually defined sense of being has nowhere else to go but into an alternate temporality of an imagined past.

Appropriation

If diffusion and veneration both confer an individual’s submission to space, the practice of appropriation suggests acknowledgement of being within a temporal present. Notable in this context is Swedish designer Pia Aleborg’s jewelry, which incorporates overlooked materials found in ordinary environments, such as the office or the suburban neighborhood. By including incidental forms and disused objects such as electrical cords, balloon rubber, old makeup pads, and lingerie remnants into her jewelry, Aleborg calls forth an aesthetic of detritus that is appropriate to a wearer for whom jewelry’s traditional signification of wealth and status is inverted – a form of satire that exposes the sumptuousness of consumerism and wasted space in contemporary life. The jewelry allows its wearer to remain as an individual (the very act of wearing jewelry on the body is distinctly individual) while providing her with latitude to claim, self-consciously, the tedious and deteriorating landscapes that rightfully belong to her. This is a cynical recognition by the wearer that, in reality, the body in its present of being is the thing that matters even
we have brought upon the planet. However, existence within a temporal present throws our attention away from planning for a viable future into a perpendicular direction that suggests we become curators of our own temporalities, as though we are living our lives as characters in historical fiction and space is merely a stage set to be endlessly reconfigured.

NOTES:
1  (Castells 1996)
2  (Böhme, Atmosphere as an Aesthetic Concept 1998, 115)
3  (Ibelings 2003, 89-94)
4  (Jameson 2003, 712)
5  (AUDC: Robert Sumrell and Kazys Varnelis 2007, 128)
6  (Caillois and Shepley 1984, 28)
7  (Caillois and Shepley 1984, 30)
Melanie Shelor

After graduating with a Master of Architecture in 2003 from the University of New Mexico, Melanie worked in professional practice offices in Albuquerque, including Antoine Predock Architect and Devendra Narayan Contractor Architect. In the spring of 2006 she taught architecture studio at the Siddaganga Institute of Technology near Bangalore. After the financial meltdown in September 2008 she took her career in a research-oriented direction and expanded this trajectory the following summer by becoming an independent scholar with Kazys Varnelis’ Network Architecture Lab at Columbia’s GSAPP. Melanie is currently living in Phoenix where she is continuing research in network culture and raising her one year-old daughter.
SPACE TAKES TIME:
THE WORK OF OLAFUR ELIASSON
by Sarah Sobel

The Weather Project
Installation in Turbine Hall, Tate Modern, London
Olafur Eliasson
photograph by Jens Ziehe, courtesy Studio Eliasson
Olafur Eliasson uses light, space, and color to create environments and objects that relate to the human body through movement, reflection and refraction. His oeuvre’s approach to human physicality has developed through situations and devices that urge and demand interaction. By requiring viewer participation and making use of audience-members’ subjective experience, senses, and perception, installations such as *The Weather Project* (2003) and the *Serpentine Gallery Pavilion* (2007) propose new cultural programs. Through direct, experimental engagement, Eliasson’s viewers often spontaneously create the work’s resolution, which remains fluid and responsive.

Eliasson reaches out to his audience from the first moment of perception. In a direct statement of intention, many titles use the possessive pronoun “your,” for example, *Your Sun Machine* (1997), *Your Natural Denudation Inverted* (1999), and *Your Blind Movement* (2005). Calling for more than active engagement, Eliasson’s spectators take ownership of his works and become protagonists in its aesthetic production. *The Weather Project* at the Tate Modern in London - a moment when Eliasson’s work became more broadly known - compelled visitors to lie on the floor and experience their bodies in kaleidoscopic formations reflected on the ceiling, as if they were “catching rays on an industrial beachhead.” Museum visitors’ bodies could be understood as this installation’s essential material, acting as the bits that reshuffle each time the kaleidoscope cylinder rotates.

“For the visitors made the place - it was a beach and people picnicked; it was a place of bodily experiment, and often collectively so, with people you had never met before; it was a site for a brief demonstration through forming slogans in the mirror above. It was engaged with.”

By arranging the structural and ephemeral materials of space, material and light,
The Weather Project
Installation in Turbine Hall, Tate Modern, London
Olafur Eliasson
photograph by Jens Ziehe, courtesy Studio Eliasson
The Weather Project
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Olafur Eliasson
photograph by Jens Ziehe, courtesy Studio Eliasson
Eliasson created an atmosphere that was simultaneously familiar and strange, and that piqued curious exploration. Scale also influenced this provocation, helping to generate the movement and interaction of the viewers’ curious experiments with the space, whose strangeness necessitated bodily inquiry. Rather than being relegated to states of observational passivity, viewers’ bodies became instruments of spontaneous interplay within the project’s materials and atmospheric relationships. Forced into colliding experiences - a reminder of the way one behaves at a shoreline overlaid onto the ratified experience of a museum - The Weather Project illustrates how visitors’ engagement with Eliasson’s projects establish flexible variables, which result in new or different forms of social interaction. The Weather Project enabled a communal sense of discovery because it sparked the diverse relationships people have with the sunset, the beach, a sandbox, a hazy day, an airplane hangar, a vast field, and a museum or “cultural experience,” simultaneously. This intentional vagary of associations created the possibility for the body’s behavior to escape proscribed patterns for a museum setting, making available a frontier of public space, which required testing the various senses in the new environmental configuration.

An animating tension characterizes much of Eliasson’s public reception: the space between the seduction of immersive environments and the exposure of their (technical) apparatus. Two major interpretations of The Weather Project take social and embodied views respectively: a democratic interpretation, and perception of the work as the instrumentalization of phenomenological trends. The latter analysis focuses on the body becoming the primary vehicle for completing the work through interaction. However, often group behaviors are articulated, or the individual’s contribution is abstracted into a field of experience. The first, “democratic” interpretation, addresses impromptu group activities such as slogan formations, which indicate the space’s potential to create both a forum and a demonstrative petri dish for human behavior. By creating their own versions of “magnetic fields,” the unexpected conditions allow visitors to observe mass behavior as they participate in it, like iron shavings reconfiguring according to the introduction and movement of magnets. The triggers provided by strangely situated, yet familiar inklings lead each person to collaborate physically in the manifestation of an overall phenomenon or effect.

The Danish-Icelandic artist’s productions present new social and cultural programs
Serpentine Gallery Pavilion 2007 - Olafur Eliasson in collaboration with Kjetil Thorsen
Installation view at Serpentine Gallery London, United Kingdom 2007
photography by Luke Hayes, courtesy of Studio Eliasson
through their engagement of the senses and attitude about time. They challenge the traditional separations between the disciplinary categories of art and architecture and the positions of space and time in our collective consciousness. Eliasson combines practices that might alternately be called “art,” or “architecture,” into the overlapping term “spatial experiments.” These can be understood also as social conjectures, where “[s]pace ... is the dimension of the social ... that presents us with the existence of others.”

While Frederic Jameson’s *Postmodernism, or, the Cultural Logic of Late Capitalism* (1991), states that our culture is dominated by a paradigm of “space rather than time,” Eliasson asserts rather that “space and time are inseparable.” With the slow, winding slope of his *Serpentine Gallery Pavilion* (2007), completed with Kjetil Thorsen, Eliasson refutes the persistent, contemporary will for continual, instantaneous resolution. With this ramp, the experience of space takes time.

**Light and Space**

Situating Eliasson historically requires a look at the 1960’s and 70’s Light and Space movement and its co-extensiveness to the technophilic tendencies of that era’s scientific disciplines.

“By the 1980’s, the notion of immersion had gained widespread currency with the rise of virtual reality, computer games, and the attendant cybercultural literature: the experience of walking on the moon, trawling the depths of the ocean, or voyaging the cosmos was, to follow many contemporary accounts, elaborated as a virtual theater of the sensorium. By no means was this a passive theater, however. Immersion’s not-so-subtle paradox is that the illusionistic worlds into which the user plunges—weightless, disembodied worlds where time, light, and space...
Beauty, 1993
Olafur Eliasson
photograph by Poul Pederson 2004 courtesy of Studio Eliasson
are effectively suspended as so much techno-artifice—are de facto conjoined to the awkward mechanisms that produce their perceptual effects, whether VR helmets, gloves, motion simulators, or joysticks. Any phenomenology of this media would have to reject the euphoric claims made about the seamless and dematerialized interface between hard and soft worlds...to consider the movement between eye and body—the crux of the Merleau-Ponty’s chiasmic intertwining—as mediated by the terms of very contemporary technical protocols.”

Eliasson’s notion of the body in space has everything to do with the body interacting with its surroundings. Not providing subtle backdrops or detached, rarified art experiences, these are pleas for engagement and participation. Eliasson’s installations push the viewer into awareness of his or her complicities in the acts of perception and awareness of the body’s materiality.

Light and Space Influences

The Light and Space artists were directly influenced by collaborations with Dr. Edward Wortz and his perceptual experiments and technologies such as the Ganzfeld – a perceptual field in which no object can be grasped with the eye, but for 360 degrees, white light appears to have substance. These influences presented a “highly mediated and thoroughly technical approach to problems of human perception specific to [their] era’s technological desideratum.” These artists employed minimal gestures and used materials such as light, shadow, water, and fog. “Whether through steady manipulations of the optical field or the scantest interventions into the mundane surfaces of architecture, these artists, critics repeatedly claimed, were mining the ever-rich terrain of the sensorium.”

The Light and Space artists considered environment, but often dealt with photographically constructed versions of its qualities. Eliasson translates this continuum of work by not only acknowledging technological mediation, but openly addressing the “operations” of his works, making their mechanical underpinnings deliberate and revealing displays of technique.

Beauty, originally produced in 1993, uses a hose, water, an electrical outlet, nozzles, a pump, and a spotlight. Its means of production clearly exposed, Beauty “is absolutely dependent on and unique to each viewer’s position: certain colors in the rainbow are emphasized, or the arc may disappear altogether, depending on the angle between observer, light source, and raindrop, such that the piece cannot be seen identically even by two people standing side by side.”

Olafur Eliasson in collaboration with Kjetil Thorsen
Installation at Serpentine Gallery, London, United Kingdom
photograph courtesy of Studio Eliasson
Subjective perception is an embodied experience, as it depends on the vehicles of our senses. “How does my body’s trajectory shape the course of vision itself? In what ways does representation become reality?”

In _The Light Setup_ (2005), Eliasson illuminated the white walls of Malmö Konsthall in Sweden a gallery with different hues of light, forcing the viewer to perceive light’s influence and that there is no pure, normative experience of the color white. By embodying the experience of light, Eliasson grounds these projects in the Light and Space work, but liberates them from its dependence on photographic visual modes. The color white is one vehicle through which Eliasson’s work has taken on the changing space and role of the museum as a venue in which one participates in the orchestration of one’s own experience. “Eliasson and the museum envision perception as an action: purposeful, voluntary, and expressive of an individual’s autonomy... an art of incremental resistances that seeks not to change the world but to sharpen our perception of it.”

This attention to perception distinguishes Eliasson’s work by creating situations in which light and the exposed apparatuses of its projection restructure the social and psychological interactions between humans and the material world. Collagic associations with familiar experiences recombine in the unexpected environments he creates, carrying their related corporeal experiences. The body in public becomes an instrument of engagement, refuting relinquishment to the status of disengaged observation. This status of involvement forces the participant – otherwise considered merely audience – to become aware of his or her role in creating perceived experience. The work also gently raises cognizance of the socially constructed nature of the various references it combines. While Light and Space artists engaged a particular interpretation of specific landscapes, work such as _The Weather Project_ and the _Serpentine Gallery Pavilion_ create conditions for simultaneous action and reflection. By generating spaces that ‘take time,’ these works encourage both play and thoughtfulness regarding the body and its complicity in human acts of perception.

NOTES

4. Lee 44-45
6. Massey
7. Ursprung
8. Lee 46
9. Lee 41,44
10. Grynsteijn 28
11. Lee 34
12. Grynsteijn 22

Sarah Sobel completed her architectural degree at the University of Michigan focused on spatial design inquiries at the intersections of scale and perception. Her masters research queried perceptual histories, western lenses, influences on identity and the American relationships with land. She has lived in Europe multiple times and traveled extensively. Born in Manhattan, mostly raised in Silicon Valley, she now lives in Pasadena, where she continues to engage problems of geographies, climates, and human networks. Through systems and design thinking, tools, and material tactics, she sustains interests in light, pattern and atmosphere.
BODY CARTOGRAPHY
by Olive Bieringa

1/2 Life by Body Cartography
photography by Sean Smuda
The BodyCartography Project’s work investigates the corporeal resonance of space in urban, wild, domestic and social landscapes through performance, dance, video and installation work. We use embodiment practices, being attendant to the feelings, sensations and actions of our body in real time, to create a framework for re-imagining and re-inhabiting everyday environments, spaces in which the body is so often rendered mute. Our site and context-specific work invites participants to enter their animal-like appetites and childlike curiosities for physical investigation and play through engagement of the sensorial. These practices unearth the physical potential of the sites in which we work. Anatomical and physiological readings of the body’s systems open understandings of our perceptual and physical choice making in a given context. Relationships between body systems and ecosystems are explored conceptually and physically as a way to build empathy and understanding for the environments we inhabit. The events we create activate public space, challenge social behavior and notions of physical freedom, and stimulate the imagination.

GO

“The skin acts as an interface, a permeable membrane, between our bodies and the world, our thoughts and our physical existence. By brushing up against the world, we define ourselves to ourselves.”

Go is a primary example of our work that investigates the ongoing journey between our inner and outer landscapes and the ecological entwinement of self, other, and environment. We explore these ideas through a context-specific solo utilizing a multi perspective relationship with public space, architecture and design. Go has been performed along city streets in Minneapolis, Seattle, Santa Cruz, Brooklyn, Paris, Kuopio, Helsinki and Zurich on a predetermined route for a very small or unseen audience with up to three solos taking place simultaneously. The audience is invited to walk individually or in small pairings, rather than forming into a larger visible group. They can follow the performer of their choice and watch from any perspective, create their own frame for viewing, and track sensation in their body.

GO is an investigation of the spaces in between. The aperture of space becomes a generator of physical response for the performer. As the space changes between myself, the performer, and my point of focus; a pedestrian, a car, a building, the marking on the road, a dog, I notice what changes inside of me. How I organize myself, inside and out, to manage these changing relationships manifests as a dance, a series of momentary duets.

GO is a practice in empathy with the public we meet, the pavement we crawl over and the streets we cross. It explores the relationship between self and environment physiologically balancing inner and outer sensing through the parasympathetic and sympathetic nervous systems. We are working with the kinesthetic response to what enters our body through skin, mouth, nose, ears, and eyes. Our skin and our brain develop from the same embryological tissue. Similarly, our sense of movement and touch evolve simultaneously. The skin demonstrates this intimate connection through reflexive expressiveness – blushing, for example.

“Spending time in the American public landscape can feel naked if one thinks about the thousands of potential eyes and ears from such sources as occupied buildings, surveillance cameras, and mobile pedestrians. Most people, I suspect, do not think about those watchers consciously, but rather hold themselves in a certain way in public subconsciously from years of training and societal pattern learning.”

The container of the street makes a channel, compressing the social landscape, making
it easy to engage with pedestrians. The work asks: “How can two strangers from different cultures/classes share this moment in time and space?” How do I engage you in a physical dialogue? Do we have time to find a breath together, a glance, a physical call and response? Can I read the space between us fast enough? Should I give you more space so as not to frighten you away or do I need to come closer? Should I offer a physical challenge, ask you the time, invite you to join me for a dance, convince you to take my gift of an empty box or a large block of cement, ask you to play me a tune or together negotiate a dangerous street?

GO provides space for time, embodiment and relationships in a cultural context where art, play, and creative process are undervalued. Audiences can walk away whenever they want. They are invited to value multiple meanings from their experience be it absurd, ugly, challenging, or hilarious. Audiences thus generate their own urban mythology: Here we stand on this empty street corner, all kinds of people, together for this moment, watching this person dance inside a cardboard box to the rhythm of the passing traffic as the sun drops below the cityscape behind.

Creating work in public spaces generates visibility through temporality. It remains in the public imaginations of its witnesses potentially longer than a fixed public artwork.
Holiday House

The award winning *Holiday House* trilogy (2005-2007) is site specific. We developed a film, stage work and site-work in response to commissions from Forecast Public Art works and the Walker Art Center. In this piece, we chose to work in our house to produce something in an everyday, private space. The house, a turn-of-century, wooden, two-story duplex with a fifties remodel, has its own agency in the work, constantly generating and framing the bodies of the performers and informing and transforming the sound score. A metaphysical blurring of past and present occurs within this architecture. The work investigates how, as the VHS generation, video plays a key role in creating our memories, recording our histories and building intentional family. Video is used to geographically locate the piece, move us in time to other locations and provide live sound and video feed of hidden moments. Events loop and bodies duplicate through life-sized video portraits projected on garages in the alley, creating perceptual shifts in time and action. Things expected to be inside the house, or the body, are outside and vice versa. The work transposes, deconstructs and reconstructs different formal spaces, geographies, memories and media.
1/2 Life by Body Cartography
photography by Sean Smuda

1/2 Life by Body Cartography
photography by Sean Smuda
½ Life

Work we develop for the stage or gallery questions the space between the real materials of the body, the architecture, and the immersive environment of video, light, sound, new technologies and set design. Our most recent work, ½ Life, was installed at Art of This Gallery and performed at the Southern Theater in Minneapolis and Performance Space 122 in NYC in early 2010. ½ Life investigates the survival of the body amidst a world of scientific research, data, and control. The work hovers geographically at the edges of the Pacific Ocean, connecting nuclear super power USA, atomic survivor Japan, and nuclear-free New Zealand. The work was developed with a team including a composer, visual artist, and physicist working alongside a dancer from each country and an ensemble of twelve local dancers. We probed the invisibility and immortality of radioactivity and plastic by creating a large amorphous plastic “ocean” that hung in the space, and an explosion of fake radioactive rocks from test and waste sites around the Pacific and USA. The set design also consisted of twelve luon panels that were manipulated into walls, decaying houses and subatomic particles. A small three-sided spinning house moved through the black space of the theater. Its blue tarp walls filled with landscape projections as dancers moved slowly inside. The blue sheet architecture of Japan’s homeless community inspired its form.

Closer

We are developing Closer, a new performance installation for an audience of one. The work will explore intimacy and aesthetic experience at the subtle edges of sensory perception. Visitors will enter a silent room empty of everything except for a microphone hanging from the ceiling, lit theatrically from above, and eventually a single performer whose movements are simple, minimal, and behavioral. The lighting and auditory environment
will transform in response to the audience and performer’s movement and sound. For example as the performer and audience get closer the room gets darker or lighter, louder or quieter. We aim to create a “living” space which empowers audience and performer to create change. Presence, proximity and causal action transform the conditions into a physical logic for engaging the audience in constructing their own experience and meaning.

NOTES

1  Job’s Body, Juhan Deane, Station Hill Press, 1987
2  This score was developed by Otto Ramstad and Olive Bieringa in 2005 originally performed as a duet and later as group work titled [ ]. As physical brackets the space between and around the performers expands, contracts, bends and transforms physically and perceptually for audience and performers alike revealing and accentuating the angles and volumes of the location in which it is performed.
3  GO performer Bryce Beverlyn II, email correspondence, August 30th, 2006
4  Olive Bieringa, “Between Landscape, Self and Other” in Site Dance: Choreographers and the Lure of Alternative Spaces, ed. Melanie Kloetzel and Carolyn Pavlik (University of Florida Press, 2009), 132-141. The GO text is reprinted with permission of the University of Florida Press with additions provided by the author.

Olive Bieringa is founder and co-director of the BodyCartography Project with partner Otto Ramstad. They were named Artist of the Year 2007 by the Minneapolis’s City Pages and are St Paul Public Art Environmentally Sustainable Art Fellows for 2008. Their work has toured across the USA, Canada, New Zealand, Japan, Europe, Russia and South America. They have just completed a new work titled ½ Life that culminated from five years of research into the cultural, scientific, geographical and historical metasite of the nuclear Pacific and a commission for the Lyon Opera Ballet. In addition Olive is pursuing art and science initiatives with SEEDS Festival and Public Art St Paul.
BODIES IN MOTION
by Marlene Imirzian

At Schouwburgplein in Rotterdam, a sloped concrete “roof” allows rolling over it.

Image courtesy of West 8

Bodies in motion are the unexpected inspiration to redefine public space. Through design for dance architects can re-imagine community spaces that provide new social potential by connecting people with each other, with information, and redefining ‘art’ through surfaces intended to be modified or used in interactive, spontaneous ways.

Public spaces are typically focused on gathering areas for a specific use – to listen to a concert, a speech, or enjoy landscape and water. Plazas are primarily known for their neutral void framed by buildings, with the surrounding buildings’ design as their most important element, a picturesque frame for the plaza within, like a set in a theatrical production. Both are passive backdrops. Similarly, spaces for the visual and performing arts are housed in ‘arts centers,’ or ‘centers for the arts’ or ‘theaters,’ employing designs that encourage passive watching of performances and convey a sense of specialness, needing to belong, needing a high education, or needing to afford the high
cost of admission. Such spaces are usually focused on curated events or shows, all highly planned and choreographed. They often provide a fixed location for viewers to see a fixed performance. Performing arts spaces are highly engineered to allow acoustic and visual control, utilize elaborate staging sequences and constructions, and, due to high performance requirements, demand high costs to build and maintain. Access is highly controlled, limited, and costly.

In contrast, dance is part of human life. Cultural communities have a long history of dancing as an integral component of public engagement and celebration. Everyone dances - communities, professionals, youth/school groups, diversely-disabled people, and multiple generations. People dance on the street, on-line, and on-screen. By considering all public spaces as opportunities for dance and movement, dance terms and techniques can inspire architects to design public spaces that incorporate ease of access, movement, physical expression, and engagement.

For example, new thoughts about dance include parkour, a term coined by Hubert Koundé and derived from the French parcours du combatant, the classic obstacle course method of military training proposed by Georges Hébert. Parkour is the art of moving, the physical discipline of training to overcome any obstacle within one’s path by adapting one’s movements to the environment. It is a non-competitive, physical discipline of French origin in which participants run along a route, attempting to negotiate obstacles in the most efficient way possible by jumping and climbing. The object is to get from one place to another using only the human body and the objects of the environment. It is
Both *parkour* and *freerunning*’s emphasis on improvisational movement and incorporation of built landscape and building as an element of complete physical engagement can remove financial and educational barriers to develop a cultural economy that uses participation, planned and unplanned, scheduled and ad hoc, as a linking nexus for community activity.

These two terms can inspire the design of public space. Public spaces can incorporate art, buildings, and landscape that are not purpose-built, but can be co-opted, transformed, and made mutable to create *transformable* and *permeable* connections between interior and exterior spaces. These spaces need no longer be service-based, focused on a single, defined action, but can allow for flexibility between an entire community of performers, observers, and artists as they explore the varied and changing roles of who is dancer and who is audience. Both *parkour* and *freerunning*’s emphasis on improvisational movement and incorporation of built landscape and building as an element of complete physical engagement can remove financial and educational barriers to develop a cultural economy that uses participation, planned and unplanned, scheduled and ad hoc, as a linking nexus for community activity.
Paradise Valley Community College Life Science Building

For example, the Paradise Valley Community College Life Science Building in Phoenix, Arizona, science as a collaborative activity. A public portico consisting of a bridge from the older portion of campus through a new sequence of exterior pods offers varied orientation and connections to a new campus green. All portico elements are designed to be claimed and used for interaction, occupation, and engagement.
School for Dance

Buildings and landscapes for dance activity can develop concepts for moving on, through, over, and above, singly, in a line, and in groups through built environments. For a graduate studio project at Arizona State University, Hoge Day developed a school for dance as a permeable container: a public space whose surfaces, framed by a multi-sloping ground/wall/roof, encourages engagement and occupation in innovative ways. The multi-sloping surface creates and frames an elevated practice room, making dance practice a free performance for street passers-by. This move considers daily practice more than mundane exercises, but an entertainment spectacle for all to enjoy and indirectly participate.

These examples show integration of interiors to exterior performance/use, allow changing uses and roles for viewing and performing within interior and exterior built environments, and pursue the design of all elements of a built public space as opportunities for engagement. Bodies in motion become an important conceptual basis for design of the public space to bring individuals together. Movement is a vital new component of public spaces that can strongly enhance community.
Simon Dove
Simon Dove is the Director of the School of Dance at Arizona State University Herberger Institute for Design and the Arts. He came to ASU after an extensive career as an arts curator, festival director and educationalist. He was Curator and Artistic Director of Springdance, the international dance festival in the Netherlands for eight years. Prior to that he ran one of the first National Dance Agencies in the U.K., the Yorkshire Dance Centre in Leeds, was the founder and Artistic Director of Vivarta – the first contemporary South Asian performance festival in the U.K., contributed to national dance policy development with the Arts Council of Great Britain, and programmed an innovative arts centre in London.

Marlene Imirzian, AIA
Marlene Imirzian is principal of Marlene Imirzian & Associates Architects, a regional practice with offices in Phoenix, Arizona and Escondido, California. She is a faculty associate at the School of Architecture and Landscape Architecture at Arizona State University Herberger Institute for Design and the Arts, serves as an alumni board member of the University of Michigan Taubman College of Architecture and Urban Planning, as a Trustee of the American Institute of Architects Trust, and as an Advisory Group member for the AIA Committee on Design.
HAVANA'S NATIONAL ARTS SCHOOLS
by Hansel Hernandez-Navarro

National Arts School of Modern Dance
Architecture by Ricardo Porro
Photography by Jim Larson
The National Arts Schools in Havana, Cuba, “speak of the power of architecture to be inspired by political and social change and of the power of architecture to instill trepidation in those who seek to set limits upon such change.”

In 1960 the revolutionary government in Havana decided to build what has been described as the most spectacular and polemical architecture of the Cuban Revolution. The Cuban Revolution ushered in a new generation of architects inspired by a call made by Team 10 for a new humanism in architecture, one that would address the complexities of a new and pluralistic society. Their architecture would respond to the tropical environment with expressive local elements, recovered from colonial tradition and executed with materials and forms of high sophistication. A search for “lo cubano,” what is Cuban, became the symbol and new identity the new Revolution would strive to achieve. Through their designs, the architects of the National Art Schools sought to create a new architectural language responsive to the Caribbean environment, one that expressed the trans-culturalization Cuba has always enjoyed, as well as the euphoria, passions, and romanticism of the new revolution.

Shortly after the Revolution and after a day of golfing at the Havana Country Club golf course in the affluent suburb of Country Club Park, Fidel Castro and Che Guevara questioned the use of a spectacular landscape for a leisurely activity often associated with the privileged. Instead, they sought to inspire their country with the ideals of the revolution through the development of a school for the arts. With the schools, the new leaders sought to adhere to their revolutionary agenda of increasing literacy through a campaign to build primary and secondary schools throughout the country. The government enlisted the design expertise of Cuban architect Ricardo Porro, and the Italians Vittorio Garatti and Roberto Gottardi to design the new school complex.

The three architects sought to design the Art Schools using traditional building materials with modern technology within an organic design language. They agreed on a set of common principles which would unify their work: the schools would be responsive to and integrated with the landscape; the principal materials would be brick and tile and the ancient art of the Catalan vault would be the primary structural system. The designers also elected to combine reinforced concrete elements in compression and tension with load bearing brick walls and piers, utilizing traditional building materials for their economics, practicality, and aesthetics.

The U. S. trade embargo was imposed on Cuba beginning in October of 1960 and at that time there was some Portland cement produced in Cuba, but with little steel, wood, and other finishing materials, concrete became the most economical structural building material to be used in Cuban construction. In addition, Porro insisted on the use of fired clay in the form of bricks and tile because of their special, sensual texture and appearance, and because the fired clay permits the aging of the building to resemble a living organism that changes over time. The fired clay was employed in the construction of the Catalan vaults, which became the primary structural system to cover wide spaces with a minimum of structural support. Although this was a practical solution to a structural and economic problem, there was also a fortuitous coincidence when the architects came upon an old mason in Havana whose father had worked with Antoni Gaudí and had learned

The School of Modern Dance by Ricardo Porro
-built between 1961-1963
The building’s angularity, fragmentation and shifting geometries are a reflection of the euphoria and fear felt in the early years of the Revolution. Euphoria came from new found freedoms and idealism and the idea of a new utopia; fear came from the unknown, incertitude about the future, and also from the Bay of Pigs incident of April 1961. In plan the building is like a mirror shattered into hundreds of pieces.
National Arts School of Modern Dance
Architecture by Ricardo Porro
Photography by Jim Larson
the craft of the Catalan vault from the master. This man taught a new generation of Cuban masons the old technique.

The three architects rejected the predominant preference for the International Style of previous decades by architects prior to the Revolution – an earlier preference heavily influenced by Gropius, Breuer, Neutra, Mies van der Rohe, and Wright. Instead the schools would be influenced by the tenets of Team 10, created in 1956 as a challenge to CIAM who was synonymous with Le Corbusier, the International Style, and alienation. Team 10 insisted upon architectural humanism that addressed a multicultural society. Led by Porro, the schools would be conceived in an architectural language that would respond to the lush Caribbean landscape of the site, the diverse cultural roots of the Cuban people, and the passion and enthusiasm of the Revolution during those first five years. Originally the government and designers conceived of the National Art Schools as...
one large building housing all disciplines. However, this was soon abandoned for five separate, self-containing and self-supporting structures. These were to be urban in concept, featuring corridors or streets, pavilions, and central squares or plazas. Porro’s design for the School of Modern Dance and School of Plastic Arts ties together the heavily charged cultural symbolisms of Cuba’s Spanish colonial heritage, African heritage, the more recent revolutionary euphoria, and the trans-culturalization of Cuba. The Cuban anthropologist Fernando Ortiz coined the term Trans-culturalization as a multi-directional and endless interactive process between various cultural systems. It is a process of mutual interactions between cultures, despite the unequal distribution of power characteristics of trans-cultural relations. Traditionally in Cuba the colonial white population is represented by the Spanish colonization of the island dating back to the 16th century. Later, black Africans were brought as slaves to replace the indigenous population, which had almost been exterminated. Beginning in the mid 19th century, and continuing through the first three decades of the 20th century, large migrations to the island originated again from Spain in large numbers, and to a lesser extent, from mainland China, Haiti, and Jamaica. In the Arts Schools project, trans-culturalization is primarily seen in Porro’s School of Plastic Arts. The building was organized to resemble

*The School of Ballet by Vittorio Garatti*

*built between 1962-1965*

The cluster of layered corridor vaults spreads across a ravine marking the start of the architectural promenade, a path that becomes an organic, intertwined system of pavilions and passageways. The path also leads to the roofs intentionally making it part of that promenade. The volumes move with the descending ravine. The aim was to mimic the art of dance with the curved volumes that enclose the corridors and pavilions.

There is one cultural reference, aside from the domes. The glazing harkens back to a popular feature of traditional colonial architecture in Cuba, the mediopunto or fanlight with panes of colored glass. In designing the layered corridor vaults and the way they admit light, Garatti’s design recalls the reinforced concrete vaults of Max Borges, Jr. utilized in the 1950s in Havana.

By 1965 the school was 90% finished, but it was abandoned and never used. At one time it housed the National Circus School. It has suffered vandalism, encroaching vegetation, and occasional flooding of a nearby river.

*National Arts School of Ballet*

*Architecture by Vittorio Garatti*

*Photography by Jim Larson*
HAVANA’S NATIONAL ARTS SCHOOLS

National Arts School of Ballet
Architecture by Vittorio Garatti
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HAVANA’S NATIONAL ARTS SCHOOLS

National Arts School of Ballet
Architecture by Vittorio Garatti
Photography by Jim Larson
a village more than a single building. Porro harkens back to vernacular forms utilizing arcades in the architectural promenade and main central plaza or patio. With the design of this school, Porro sought to create a synthesis symbolizing Cuba’s ethnic heritage: the white and the black races. On the one hand, the cupolas and entrance portal with three entry vaults allude to the Spanish Baroque culture of the white colonizers. On the other, the curvilinear and round forms of the undulating plan evoke an African village belonging to groups such as Mali’s Dogon people, as well as Afro-Cuban rhythms. Porro wanted to celebrate African culture and its eminent contribution to the culture of the island and its music. This population had found expression in the popular arts of Cuba, but never in architecture.

The two Italians’ designs, Garatti’s School of Ballet and School of Music and Gottardi’s School of Theater, reflect more of their European origins. The School of Theatre is a medieval town or a Venice of the Caribbean. Garatti’s School of Ballet features Baroque pavilions with domes, but make reference to one element in Cuban vernacular architecture: the medio punto or fanlight, which is the principal motif in the rehearsal studios.

These two projects also reflect the Italian architects’ malaise for, and repudiation of strict rationalism of the post-war years in Italy. On the one hand, Garatti, who studied under Ernesto Rogers in Milan, took cues from history and authentic traditions to design the School of Ballet and the School of Music. Gottardi, on the other hand, had studied under Carlo Scarpa and Bruno Zevi in Venice, and advocated an organic language with attention to detail and craftsmanship for the School of Theatre.

Unfortunately, this moment of new expression in Cuban architecture didn’t last long. The Arts Schools were erected as the government was shifting towards favoring pre-fabricated construction systems, a narrow and excluding focus which eradicated any other possible alternative that would point towards industrialization. At the same time, the symbolism of the school complex was associated with individualistic tendencies, incompatible with the collective character of peoples’ revolution. Thus, the Arts Schools went from being a virtuous symbol of the creative capacities of the new government to being cursed, unwanted, and hidden.

Several factors made it difficult to complete

The School of Plastic Arts Ricardo Porro
built between 1961-1963
The building embodies the White Spanish Baroque and the Black African culture of Cuba. The winding and curbing architectural promenade is like a Cuban conga. Its curvilinear, round forms also reflect the heightened sensuality of the tropics; a representation of eros in the form of the Cuban goddess Oshun, an open expression of sexuality. The art studios are breasts and the promenade leads to the center where one finds the female sex in the form of a fountain shaped like the female sex. And all around her are limp phallic-like drains atop brick piers paying homage.
HAVANA'S NATIONAL ARTS SCHOOLS

National Arts School of Plastic Arts
Architecture by Ricardo Porro
Photography by Jim Larson
the project: the program lost relevance as the government placed more emphasis on building more schools and housing in the island’s interior; the area lacked skilled labor because of the need to send workers to the provinces, many migrated from the island, and essential building materials grew scare due to the economic embargo.

By 1965 $13 million had been spent on the Arts Schools and only Porro’s two buildings were finished. Construction of the remaining three schools halted that year leaving some in ruins. For forty-five years the site suffered lack of maintenance, lack of security, destruction from the encroaching vegetation, flooding from a nearby river, ill-conceived additions, devastating human vandalism, and illegal habitation in the spaces.

To some critics the project moved away from the needs and agenda of the Communist government at that moment, and reflected an elitist exclusivity alien to Cuba’s economic and social panorama. Since the Revolution, the Cuban state adheres to socialist principles in organizing its largely state-controlled planned economy. Most of the means of production were and are owned and run by the government and most of the labor force is employed by the state. During the first five year plan, the revolutionary government made it its mission to primarily build much needed new schools and large-scale housing in provinces away from the capital, Havana. The centralized government began to remove personnel, which had originally numbered in the thousands, from the Arts Schools project and send it to the eastern provinces. The project saw the supply of materials reduced to a bare minimum. Construction of the art schools lost its relevance.

In addition, the symbolism of the school complex was associated with the architects’ individualistic and elitist tendencies, incompatible with the collective character that a revolutionary architecture should have. As a result, the architects were severely criticized and their designs attacked as being megalomaniacal and monumental, which placed them in the dangerous position of incorrectness, even in political terms.

Since the Art Schools’ abandonment, it has become increasingly evident that the Art Schools’ isolation and termination was a setback in Latin America’s avant-garde architectural movement. Governmental leaders yielded to a program of rigid pre-fabrication throughout the country that came to be seen as inexpressive, quantitative, and monotonous. This not only limited creativity
in Cuban design, but also contributed to obliterating the traditional building arts. Porro went into exile in Paris in 1966, followed by Garatti who returned to Milan in 1974. Gottardi remained in Cuba teaching and designing a limited number of projects.

Despite almost fifty years of neglect, these remarkable buildings have endured and taken their rightful place within the historiography of 20th-century architecture. In 1997 Cuba’s National Commission on Monuments declared the site a “protected zone.” Porro and Garatti were invited back to Cuba to conduct charrettes and seminars for architecture students. In 1999 historian John Loomis published Revolution of Forms: Cuba’s Forgotten Arts Schools, distributed worldwide. In 2000 the site was included on the World Monuments Watch List of 100 Most Endangered Sites.

From 2007 to 2009 the Cuban Ministry of Culture restored and rehabilitated Porro’s Schools of Plastic Arts and School of Modern Dance. Approved by Porro, the Ministry’s architects in charge of the restoration collaborated with the Italian firm MAPEI. Work has been limited to cleaning and refurbishment, not yet restoration, for the three remaining schools. However, it is projected that they will also be restored, and to a certain extent, have their unfinished portions completed. Gottardi is in charge of the restoration and completion of his School of Theatre. In addition, Garatti is doing the same thing for his School of Ballet and School of Music.

Cuba’s current economic reality makes it difficult to funnel funds for the restoration and rehabilitation of this large and architecturally important school complex. Despite the original architects’ involvement in finding the best solutions with minimum resources, locating and training specialized workers to reproduce lost construction techniques presents a daily challenge.

The five buildings comprising the National Arts Schools constitute a significant richness of expression in modern Cuban architecture, one that sought to define a unique, regional building language. In the National Arts Schools one finds building traditions, architectural creativity, an excellent arrangement of forms, outstanding workmanship, and the Cuban concept of trans-culturalization. The buildings communicate aspirations for a new society, echoing Cuba’s political, social, and economic transition of the 1960’s. Work on the National Arts Schools constitutes a step towards integrating Cuba’s rich history into its continuing cultural transition.

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Hänsel Hernández-Navarro is an architectural conservator specializing in the preservation and rehabilitation of historic buildings and monuments, and cultural resource management. He lives in New York City and has worked for the New York City Landmarks Preservation Commission, the Getty Conservation Institute, the National Park Service, The American Academy in Rome, and is currently doing research for the curatorial staff at the Museum of the City of New York. He received his Master’s in historic preservation from Columbia University’s Graduate School of Architecture, Planning and Preservation. In 2000 he successfully nominated Cuba’s National Arts Schools to the World Monuments Fund’s List of 100 Most Endangered Sites.
I design tools for life.

I always ask myself the question, ‘What is the advantage of product design as a media to communicate with people?’ I believe one answer is the duration of the physical/direct contact between the product and the person using it. For example, if you find a cup you like in a shop, you will buy it, and take it into your home. As you begin to use it, you will hold it with your fingers, touch it with your palms, and place your lips against it. The way to enjoy the object is unlimited. If you are satisfied, you may keep and use it until it is broken. It becomes a part of your life and you may even feel that it becomes a part of your body. In some cases the object has the potential to be passed on to the next generation. Through the act of passing an object on we can create a long-term dialogue between the user and the object, across a much longer period of
time. This allows us to communicate a subtle but bold sensual experience that can only be achieved through this long-term relationship.

I always consider the best way to communicate with people physically and sensually, and think about how to improve the quality within my creations. I believe my respect for the sensual quality within a design comes naturally as I am often creating objects that are so closely related to the human form, such as furniture.

In today's virtual media information society, where so many objects are bought and sold via the internet, we look at a picture of a new product and read the associated text, from this we believe that we ‘know’ and ‘understand’ the object. However, that visual information does not provide the real experience of the product.

I try to think of my creations as live phenomena rather than recorded ones. The most important thing is the moment of excitement when we physically experience an object for the first time, and the vivid feeling of pleasure such as comfort / discomfort, surprise and so on. If an object is providing nothing more than the visual image, I feel it is missing an important opportunity.

I always try to think that my design is complete when people use it.

**Nextmaruni**

Within the Nextmaruni design I tried to create the simple pleasure of finding a hidden comfort and surprise. The real pleasure of the chair is only revealed to those who interact physically with it. From the front, the Nextmaruni dining chair looks paper-thin. A large chamfer on the chair’s side structures creates this illusion. There is an upholstered seat and back padding hidden within the thick wooden frame. A layer of leather is inlaid flush into the frame covering the seat and backrest. The chair looks as hard as a plastic laminate surface, but the user only discovers the softness and comfort of the seat and backrest when they sit on and use the chair.
Upright Salt Shaker

‘Upright Salt Shaker’ is a hand-blown, glass salt shaker. The base of the shaker is funnel-shaped to allow for ease of refilling. The dispensing holes are not located on the top of the shaker. Instead they are positioned to the side, to invite the gentle gesture of shaking salt, while also providing better control. When you slightly tilt the shaker, the salt smoothly comes out. You do not have to turn the shaker upside down and shake aggressively. The way in which the product has been designed and subsequently used brings elegance and grace to the user’s behaviour at the table.
Air Switch Az

In this work, I attempted to create a connection between the physical gesture of the user and the control of the lights’ function. Turning the light on and off, higher or lower, becomes a small, intimate performance. ‘Air Switch Az’ is a floor lamp with an integrated motion sensor. By moving your hand sideways through the air above the light, you can turn the light on and off. If you move your hand vertically away from the light, it becomes brighter. Lowering your hand causes the light to become dimmer.

Interactive Zoetrope

‘Interactive Zoetrope’ is a furniture manufacturer’s trade-fair stand featuring ten zoetropes spinning and powered by a person pedaling a bicycle.

Within this installation, I firstly wanted to take the zoetrope, one of the oldest techniques for creating moving images, and present looped pictures of furniture in a physical way to reflect the furniture’s strong physical existence. Secondly, I wanted to express the structure of the furniture industry in an amusing and entertaining way – the light-hearted nature of the child-like toy emphasizes this quality. In addition, I used the bicycle to power the zoetropes as an image reflective of the craftsman to show that there is always a level of effort involved in creating the final result. I used the powerful expression of the human body to create a tension within the space and as a performance to capture the attention of the trade-fair audience.

I often see similarities between my creations and ‘live’ media such as theatre and performance. Within my work, I create the plot, props and direction of people’s lives. The user of the creation can be seen as the performer as well as the audience. The work always requires the interpretation of the performer and audience.
AZUMI was born in Kobe, Japan in 1965. After finishing his MA in Industrial Design at the Royal College of Art in 1994, he started working as ‘AZUMI’ and in 2005 he established his own office ‘a studio’ in London. Shin Azumi’s work has received numerous design awards in Europe and Japan, including the Jerwood Applied Arts Prize in 2004, the Blueprint 100% Design Award in 2003 and “Product of the Year, 2000” FX International Design Award (for the LEM stool). His works were acquired as permanent collection by Victoria & Albert Museum (UK), Stedelijk Museum (Holland), Crafts Council (UK), Die Neue Sammlung (Germany), and the Museum für Angewandte Kunst Frankfurt (Germany). Azumi is a visiting professor of Osaka Univ. of Arts and a lecturer of Vitra Design Museum Workshop. He also took part in the jury of numerous design awards such as, IF Design Award (DE), DT Design Award (JPN), Design Report Award (DE / IT), FX International Design Award (UK), and Kokuyo Design Award (JPN).

From this interpretation there is always the possibility for the work to go beyond the imagination of the director. No matter how technologies develop, these forms of live media will always remain and maintain a strong style of expression and communication. I extract a vast amount of inspiration and stimulation from this type of live media, a lot of which can be converted into my own creations.

The physical and intellectual / visual qualities of an object do not oppose one another, but in fact complement each other. When we can find the point at which these factors are in harmony, it is then that we may be able to provide a deeper satisfaction for the people who experience it.
The design-research experiments developed by Hyperbody, TU Delft, Faculty of Architecture, focus on the emerging field of Interactive Architecture as an inter-disciplinary, bottom-up attempt focusing on developing real-time information exchanging architectural bodies. These interactive bodies demonstrate a fusion between the material, electronic and digital domains through harnessing a synergistic merger between the fields of ambient sensing, control systems, ubiquitous computing, architectural design, pneumatic systems and computation (simulation techniques). Interactive bodies are visualized as complex adaptive systems, continually engaged in activities of data-exchange resulting in physical and ambient adaptations of their constituting components in response...
to contextual variations. Equally critical is the underlying interactive process involved in the creation of such dynamic architectural bodies. A collaborative and strategic co-evolution of technical knowledge between the Industry (specifically Festo, a pneumatic engineering company), Praxis (ONL a multi-disciplinary design firm, The Netherlands), and Academic research (Hyperbody for spatial and information design) gives shape to these interactive constructs, hence developing an information bridge between three critical knowledge sectors.

The collaboration process between Industry, Praxis and Academia for such projects typically involved a series of associative brainstorming, simulation and prototype testing sessions focusing on pneumatic and electro pneumatic technologies, interaction design concepts, appropriate control systems, structural stability and performance aspects concerning the conceptualized spatial configuration of the system. A key focus of our research involved experimentation with material systems to analyze their flexibility, shape retention and strength ratios, coupled with kinetic structural systems, which themselves serve as dynamic skins of the constructs. Parallel research and development in interaction design, ubiquitous communication, and creating computational routines via game design software also partake in these collaborative design initiatives. We use software such as Virtools and Max MSP as well as develop project-specific sensing networks.

Interdependent nodal networks, where every node/junction of a spatial prototype becomes a potential information hub, is a critical outcome of our inter-disciplinary way of working. Nodes embed within themselves the ability to collect, process and communicate contextual data. They also work as actuated details by kinetically re-positioning themselves in three-dimensional space. Thus we embark on a strategy apt for binding fabrication and material logistics with the digital. Real time data exchange between the prototypes and their contextual settings allow dynamic spatial behaviors to materialize.

Understanding context as a dynamic information field of intensive and extensive parameters is essential to the development of a meta-system. Context for such interactive bodies, instead of being understood as physical attributes such as fenestration, scale and aesthetics, is understood as a dynamic data set of continually monitored parameters such as density of people, temperature variation, humidity levels, noise levels etc. In other words, we create ‘soft’ computationally enriched open systemic frameworks (informational) which, interface in real-time with the ‘hard’, material component and the users of any of the interactive architectural body we develop.

**Prototypes**

At Hyperbody, we have built a series of prototypes to study the intricacies of research-driven design of interactive architectures. The first in the series, called the NSA Muscle, was specifically built for the NSA (Non Standard Architecture) exhibition in Centre Pompidou, Paris, in 2003.

**NSA Muscle**

The NSA Muscle is a pro-active inflated space, its surface populated with a mesh of 72 pneumatic muscles, which were all addressed individually by means of regulating the amount of air pressure induced within them. The prototype is programmed to respond to human visitors through its sensing, processing and actuating enhancements. To communicate with the observers, the NSA Muscle has to transduce physical quantities into digital signals (sensors) and vice versa (actuators). People connect to the NSA Muscle by 24 sensors attached to reference points on the structure. These input devices convert the behavior
of the human players into data that acts as the parameters for changes in the physical shape of the active structure and the ambient soundscape. The input setup comprises eight sensor plates with three sensors each: motion (for sensing the presence of possible players from a distance of 6 meters), proximity (for sensing the distance of the players to the NSA Muscle within a distance of 2 meters) and touch (for sensing the amount of pressure applied upon the surface). The analogue sensor input channels are converted to digital audio signals (MIDI) and transferred to the computer.

The NSA Muscle is programmed to behave within predefined bandwidths of emotional modes and within these modes it is free to act and to develop a personal mood. Emotional modes include jumping (excited), retracting (scared) and shivering (anger) tactile variations attained by volumetric alterations of the external form, by changing the length of the tensile muscles accompanied by the emission of pre-designed sounds of variable pitch.

A three-dimensional visualization of the MUSCLE rendered on a flat screen informs the people about the nature of this being. This model is the computational process itself. From this model the state of each muscle is determined. The activity of the muscles is displayed in three colors in the model: red / inflating state, blue / deflating state, and gray / passive state, and in the internally used organizational 72 digit string.

Also represented in the model are eight sensor plates changing scale and opacity upon the activity and overall behavioral state of the MUSCLE. They are visualized as a gradually changing color background. Images of architectural applications using muscle technology complement the graphical display. The real-time model is actively viewed from multiple camera positions so as to feel the behavioral patterns at work. Viewed in combination with the physical model the graphical interface contributes to the public’s understanding.

**Muscle Re-Configured**

The Muscle Re-Configured project succeeded the NSA Muscle and focused on materializing a real time, responsive, habitable space, utilizing pneumatic fluidic muscles from Festo. With the objective of experimenting with an interior space, the prototype is conceived as a 3D habitable Strip: a three dimensional section in space, programmed to respond to its occupants through its sensing (proximity and touch sensors), processing (graphical scripting for real-time output) and actuating (fluidic muscles) enhancements. The construct uses a flexible composite panel’s (Hylite) property to bend and the fluidic muscle’s property of linear compression in interaction with each other, to transform the otherwise hard-edged (visually) spatial strip into soft, luxuriant variations. Each Hylite panel is coupled with two fluidic muscles to form the basic unit of the strip. Panels join together to create a closed 3D loop, in the process creating series of nodes at the panel’s junctions. These nodes are linked in space via their actuation members in a highly interdependent manner, constantly exchanging information in terms of air pressure variations, thus behaving as a collective whole to attain varying spatial reconfigurations.

This dense network of nodes has two typologies: external and internal. The external (constituting fluidic muscles at the junctions)
The three spatial elements constituting the 3d loop of the Muscle Reconfigured: Floor unit’s construction and usability scenarios, Ceiling units (displaying controlled opening behavior), Wall units bending to create projection surfaces. Photography by Hyperbody.
The Muscle Reconfigured being tested for cumulative curvature variations of all three elements (seating, walls and roof). Bottom: The Muscle Reconfigured inviting users to interact with it with its pro-active behavior at the TU Delft, The Netherlands. Photography by Hyperbody.
Emotive InteractiveWall

The Emotive InteractiveWall is composed of 7 separate wall pieces (herein referred to as nodes) that display real-time behavior by swinging back and forth, displaying patterns of light on its skin, and projecting localized sound. The primary synchronous behavior of the InteractiveWall is movement. The nodes of the InteractiveWall will bend independently of neighboring nodes in response to the presence of a user. Although responsively independent, each InteractiveWall node synchronizes by constantly readjusting its position in order to align itself with the position of its nearest neighbors.

Augmented modality of the InteractiveWall’s behavior is light. The skin of each InteractiveWall is covered by a unique, irregular distribution of dynamically controlled LEDs that form a highly reactive interface. The LED skins respond directly to user presence by glowing brighter when users are near, and dimmer as they move away. In addition to dimming, the LED skins pulse rapidly and slowly in relation to node position, having a tendency to flash together when the nodes are in sync.

The third modality of the InteractiveWall is localized sound. Moments of synchronicity are represented by calmer sounds, while asynchronous behavior results in more intense sound. The propagation of the sound from high to low intensity is varied throughout the InteractiveWall; thus, each node is a member of a choir that sings a complex pattern of oscillating chords. Although similar, the physical movements of InteractiveWall, and the light and sound patterns change independently, reacting at varying rates.

The synchronous behavior between the InteractiveWall nodes predominantly deals with sets of sensors and actuators, and the internal (corresponding air valves and their array sequence in the graphical script) deals with computation and data processing elements. A rule-based control algorithm developed in Virtools binds the two node typologies together to produce the desired data exchange and output scenarios (amount of air pressure to be released to the fluidic muscle). The Muscle re-configured project works by means of cumulative coupling of the basic unit mentioned above. This componential interactivity is utilized for developing specific behaviors (in terms of kinetic movements), giving rise to three distinctly behaving elements: responsive floor, ceiling and walls joined together in a closed three-dimensional loop.

These elements are linked in space in a highly interdependent manner, constantly exchanging information (such as occupancy of the seating units, proximity of people, local topology variation of the three elements, etc). Yet, they behave as a collective whole to attain specific spatial configurations. Seating occupancy triggers a topology modulation in the ceiling and wall units to provide a feeling of being engulfed by the curvature of the ceiling and creates a comfortable viewing angle for projections cast on the wall units.

Following the MuscleReconfigured project, Hyperbody as an Information, communication and technology-driven research and design group has focused on exploring a variety of real-time interactive bodies, each providing a different avenue for understanding the role of interaction in binding architectural spaces and socio-cultural trends into one seamless, inter-activating whole. The latest in the series of our interactive bodies is the Emotive InteractiveWall. The project was commissioned by Festo, a leading worldwide supplier of pneumatic and electrical automation technology, for their presentation at the Hannover Messe 2009, the world’s leading showcase for industrial technology. The Emotive InteractiveWall was a collaboration between Festo, Burkhardt Leitner constructiv, and Hyperbody, as part of the Festo Bionic Learning Network.
The skin of each InteractiveWall covered by a unique, irregular distribution of dynamically controlled LED's that form a highly reactive interface. Photography by Hyperbody.
contrasts with the behavior produced by user presence, resulting in a series of complex wave patterns that propagate through the InteractiveWall structure as a whole.

Starting from a clear interactive design concept, we developed a one-to-many interactive system that exhibited emergent behavior and performed like a living system. The result is an independent system built on synchronous behavior that is interrupted by the game-like response of multi-participant interaction. This layered system encourages the intended cycle of observation, exploration, modification, and reciprocal change in the participant, reinforcing believability in the system, and providing a sense of agency to the user.

Conclusion

The aforementioned techniques of developing interdependent nodal networks, which double up as actuated details of interactive bodies, stress upon scripting localized relations between constituent details, thus actualizing the performance of the built form as an emergent, communicative exchange between the network of components. Information flow becomes a continual process in such real-time interactive prototypes, converting them into executable processing and reacting systemic entities. Such architectural constructs eventually acquire the characteristics of living entities, sending and receiving information, processing this information locally, and producing optimal global output. The intrinsic design decision of enriching the nature of architectural detailing and establishing an inter-disciplinary work process has significant impact on the nature of architectural space and its structuring principles. Such design-informatics-based hybrid typologies can be seen as highly logical systems, which pave the path for performative responses to contemporary contextual complexities. These research experiments initiate an intuitive interaction, inclined towards seamless information exchange, transforming everyday utilitarian space into an inter-activating responsive organism.

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Dr. Nimish Biloria is an Architect and Assistant Professor at Hyperbody, Faculty of Architecture, TU Delft, The Netherlands. After being involved with investigating the inter-relation of Media and Architecture throughout his formative educational years at CEPT, Ahmadabad, India, he furthered his interests in the interdisciplinary realm at the Architectural Association, London, UK, where he specialized in the field of Emergent Technologies and Design. He further attained a Doctorate at the TU Delft, Netherlands, with a focus on developing real time adaptive environments. He continues experimenting with the idea of formulating intelligence aided relational networks for the generation of performative morphologies.
Architecture is a technology whose primary role is creating a synthetic skin around its human creators and inhabitants, to optimize the immediate environment and exclude the hostile elements. Historically, the best materials have been inert and belligerent to the environment. This choice of materials from prehistory has set the standard for materials that we use in building practice today and has caused the technological functions of our buildings to be very inwards looking, since we are most comfortable within a very narrow range of physiological parameters.

However, the technology of architecture also has an outward facing surface. It is this part of technology that is most underdeveloped despite building exteriors providing a unique interface and opportunity to connect with the natural world. Biology has often been used as fabric for architectural practice, as in the case of the living bridges.
of Cherrapungi, which are created from the trained roots of trees that stretch to over thirty metres, can support the weight of fifty people, and take fifteen years to grow. In an industrial age though, biology has too many limitations to use in construction. In order to create more life-like buildings, architects have looked for materials that can incorporate some of the ‘drivers’ of biology. Whilst R. Buckminster Fuller supposed that these drivers were mathematical and looked to digital computing to explore generative forces, Antonio Gaudi explored the physical and chemical imperatives of materials that underpinned biological systems through his unique architectural style. To conduct his experiments Gaudi created a set of unique and individually crafted elemental forms by suspending clay in hanging cloths during the construction of La Sagrada Familia and let the physical forces of gravity shape the material. These material self-organizing imperatives were then used to generate his unique style of ‘organic’ design. Unlike most architecture, which normally follows a top-down blueprint, Gaudi controversially assembled the architectural components using a bottom-up approach. He allowed the rules of gravity to generate the cathedral’s design rather than impose his own personal inclinations. This technique created a completely different look and feel to his architecture, which designers from all disciplines are still trying to reproduce today.

In a more contemporary setting, artist Roger Hiorns has used the intrinsic growth imperative of crystals over a course of two weeks to create a beautiful, vivid blue interior in a derelict building using copper sulphate solution. Hiorns employs the same bottom-up approach as Gaudi, but at a much smaller scale of assembly by harnessing the self-organizing molecular driving forces that underpin crystal formation by introducing a system that is capable of generating structures that are contingent on the environment during the crystallization process. The final appearance of Hiorns’ unique architectural interior is not generated by the instructions specified by a blueprint; yet a repeatable outcome is possible owing to the artist’s understanding of the material system. Hiorns’ choice of context and selection of material system underpins the predictable yet simultaneously surprising and tantalizing architectural scale environment. Strikingly, large crystals appear on the surfaces of glass and enamel in the derelict building that are chemically responding to the smooth surfaces of these materials that facilitate crystal growth yet poetically suggests that the agents are able to identify man-made objects in the landscape.

Contemporary architects have imagined how they could use the unique qualities of biology to create new kinds of architectural experiences. NY architecture firm Hollwich Kushner (HWKN) developed an urban utopia for the twenty-first century on a grand scale. Their project, MEtreePOLIS is set in Atlanta in the year 2106, where owing to advances in biotechnology and green facades, the designers envisage plants being able to produce electricity for the entire city. The global design and consultancy firm Atkins has created concept designs for four new buildings in Kuwait including a slim-line high rise office building that seems to sway in the breeze. And, the Office for Robotic Architectural Media & The Bureau for Responsive Architecture architect Tristan d’Estree Sterk is designing shape-changing ‘building envelopes’ that can, for example, shake the snow from their roofs.

But is it possible to create truly biological architectures? Or are these kinds of projects destined to remain representations of biologically-derived processes using traditional materials to copy the shape and forms of nature. In the practice called Biomimicry, architecture has limited engagement in embodying the unique properties of biological systems. Architecture currently lacks an appropriate technology or materials that may be able to bridge
the gap between durable, inert materials and nature in order to more fully explore what a truly biological architecture may be.

My research investigates the potential use and implications of a new group of materials in architectural design that may prove to bridge this divide between inanimate and living matter. These materials are referred to as Living Technology¹ and possess some of the unique properties of living systems. I am particularly interested in the remarkable ability of these materials to respond to unpredictable situations coupled with a material flexibility when they do so.

Working with a simple set of chemicals that consist of very few ingredients including olive oil, water and an alkali to assemble primitive systems that are capable of a surprising range of complex behaviours such as being able to sense their environment, move around it, modify it with the waste products that are taking place at the surface of the agent at the oil/
water interface and undergo complex physical changes including the shedding of skins or precipitation of crystal complexes to form the building blocks of new materials. Thus, the experiments create prototype systems that inhabit a twilight zone of biology. These materials are born from entirely artificial generative forces and may be thought of as a form of ‘bottom-up’ synthetic biology where life-like properties spontaneously appear in simple chemical systems independently from any materials that are derived from existing biological systems. This component-based assemblage of molecules constitutes ‘wet’ artificial life and does not aspire to replicate biological processes but to generate new complexes and processes, yet they share the same basic drivers of biology but produce different outcomes.

When these new materials interface with biological systems, they share a common chemical and physical language based on connectivity, energy transformation, and flow through a process called metabolism where one group of substances produces another through the absorption or release of energy.

The particular system that I am working on is called the protocell. These are chemically programmable agents that are based on the chemistry of oil and water. Protocells are able to move around, sense and modify their environment and even communicate with each other in a way that can only be described as ‘living.’ Protocells can also undergo complex reactions, some of which are architectural.

Protocells use chemical energy that naturally exists at the oil-water interface and possess an internal chemical program, which they compare with chemical cues from the environment. All of this is done without any DNA, which is the information processing system used by biology. Yet, the process by which protocells create skins and solid materials is incredibly biological, being remarkably reminiscent of the way that corals or tubeworms secrete their shells.
Because the protocell uses general chemistry as its information programming system, the chemical components can be changed and engineered to make skins, shells and microstructures using different kinds of materials.

Protocells are able to act as a medium through which it is possible to orchestrate existing chemical reactions, or provide a platform for the synthesis of new reactions through man-made products. The naturalness of the products depends on the choice of the chemicals that are added to the matrix, or ‘body’ of the protocell during their synthesis in the laboratory and are selected by the designer. One protocell system that I have been working on exploits a natural process by using calcium ions to produce a limestone-like shell from carbon dioxide dissolved in water. This Living Technology can produce humanly-instigated, solid materials with biological-like properties, such as, carbonate crystals that are found in shell and bone matrixes.

In order to demonstrate the potential of the technology in an architectural setting, we designed a project to employ the unique properties of protocells. In our experiment, we challenged ourselves to grow an artificial limestone reef under the city of Venice to sustainably reclaim it from its tempestuous relationship with the sea. We collaborated with the architecture firm GMJ to create visualizations to explore possible outcomes. In this scheme, we programmed the protocells to move away from the light in the canals. Light aversion being a property that has been observed in the laboratory, the protocells would consequently move towards the darkened foundations under the city, where they gradually petrify the woodpiles. With time and monitoring, an artificial limestone reef would help spread the point load of the city, redistributing the city’s weight on the soft land underneath as well as offering new niches to the marine ecology. In this way, the architectural intervention connects the marine environment directly to the city through living processes.

The “stop mechanism” of these living technologies depends on the availability of food and energy in the environment. When protocells run out of substrate to complete their chemical interactions or if their surface, which provides their energy source, is obstructed by the accumulation of crystals then their dynamic properties cease. It is thought that protocells will interact with existing biological systems according to their chemical composition. In simple systems made from oil and alkalinized, hungry animals may eat them as food. Otherwise, it appears that the toxicity of protocells will depend on the chemistry from which they are designed and composed. Ongoing experiments are investigating the interaction of protocells with simple algae and the potential combination of protocells within existing multicellular organisms to create a hybrid living system. As with all terrestrial life forms there is the possibility of creating protocells with an invasive potential, or ones that are environmentally dangerous. But currently, these chemical agents are fragile, exist within very narrow ranges of environmental conditions and do not possess any DNA through which they could mutate and possess an unexpected metabolism that was harmful. It is expected that in the next ten years that protocells will be able to divide and reproduce and it is necessary to prepare for this eventuality and ensure that there is appropriate discussion and consideration of the cultural, ethical and social consequences of this novel technology.

New living technologies such as protocells help us imagine how it may be possible to construct buildings differently; but more importantly protocells have the potential to change the relationship that exists at the heart of the building industry, namely the negative impact of making a building on the environment. With living technologies it may be possible for us to create architectures with a positive impact on natural systems, which in
turn look out for us in a very architectural way - for example, by removing carbon dioxide or other pollutants from the environment. These new technologies may indeed be our future guardians against some of the unpredictable consequences of climate change and may also help us adapt to and survive an unpredictable future.

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Dr. Rachel Armstrong is an interdisciplinary practitioner with a background in medicine who has collaborated extensively with artists, scientists and architects to create a new experimental space to explore scientific concepts and re-engage with the fundamental creativity of science. She regards the discipline of architecture as holding a unique place in the cultural imagination being simultaneously iconic and personal, and which offers an ideal forum to engage with and reimagine our experience of the world so that we can reinvent our role within it. She is a Senior TED Fellow, Visiting Research Assistant at the Center for Fundamental Living Technology, Department of Physics and Chemistry, Southern University of Denmark.