Post-spatial Architectures: The emergence of time-like parametric worlds

Mahesh Senagala,

University of Texas at San Antonio

www.mahesh.org

A new trend is emerging in architecture today: dynamic and time-like architectures (a term derived from the language of Theory of Relativity) that are capable of moving, flexing and reconfiguring themselves through globally networked control mechanisms are emerging. Such buildings maybe "*plugged into*" the information networks and can be manipulated through remote interaction. Architecture can be published, literally. At this time there is no single theoretical framework available to address such architectural efforts and the paper is aimed at providing a framework under the rubric of "Time-like Architectures". The paper addresses the unprecedented transformation of the spatial and temporal foundations of architecture by a convergence of two technological developments: global real-time information networks and kinetic, pneumatic tectonics. Envisioned and in some cases built by a group of avant-garde architects, time-like architectures are poised to become a norm in a not too distant future. The paper will identify, define and outline few time-like works. The paper will also outline the historical, theoretical and ethical relationships between *post-spatial* (author's term), post-modern and modern architectures using Charles Jencks' structuralist classification, *The Evolutionary Tree*.

Contemporary architecture, digital networks, theory

Preface: A New Trend

In his ground-breaking book *Architecture 2000*, written nearly thirty years ago, Charles Jencks presented a coherent and captivating framework of various "trends" and "traditions" of architecture. He presented two frameworks: one derived from Claude Levi-Strauss' structuralist system of classification, leading to a now famous map of "Evolutionary Tree to the Year 2000." The other was what Jencks had called, a "cluster" of six traditions.

Jencks' system of classification and what he calls *prediction* makes it very clear that a *trend* is a "framework of continuities" that we can identify for comprehensibility. He says "there are, however, many inexorable trends, trends which will continue unless we decide to do something rather radical about them. The importance of these cannot be overrated since, besides affecting our future lives, they underlie our assumptions and actions in a very basic way. If trends did not exist we would have to invent them, because to a large extent they constitute that common framework of continuities on which we speculate and act" (Jencks 1971, P. 33).

What is interesting about Jencks' *Evolutionary Tree* is his prediction about the biomorphic tradition, which seems to be right on target including his mention of *Cyborg* (Steve Mann 2001) and *Chimera* (Kolatan and Mac Donald Studio: Zellner 2002). In many ways, what I am proposing is both an extension and a revision of Jencks' Evolutionary Tree. Bringing together a series of built and unbuilt works of architecture, I propose that there is an emerging trend with specific and identifiable set of characteristics. I would like to group them under the rubric of what I call "Time-like Architectures." Author-architect Peter Zellner made a similar attempt in his book *Hybrid Spaces*, to provide a common framework for a range of new works of architecture. However, in my view, both the term *hybrid* and the term *space* are inadequate, if not outmoded, to comprehend the magnitude and importance of the new trend in architecture. I hasten to clarify that here I use the term *trend* much in the same way Charles Jencks does in Architecture 2000. A trend is more than a passing fashion or a fad; it frames, akin to what a futurologist does, certain movements in the culture of building, thinking, imagining, viewing and envisioning architecture. A trend is a recognition and a coherent acknowledgement of those unique movements, and thereby crystallizes or manifests in the form of a critical framework what we already "sense" (but not quite able to articulate)

around us in the world today. Most notably, a trend is associated with a paradigmatic shift—as Thomas Kuhn pointed out around the same time Jencks' book was written—in not only the elitist spheres of the world but in all corners of life.

In the present paper, I will outline the notions of *Time-like Architecture* and *Real-time Architecture*, identify the aspects of techno-culture that enabled their birth and then go on to put them in perspective with respect to Modernist and Post-modernist trends in architecture. By situating the present discussion in the context of Jencks' legendary Evolutionary Tree, it is my effort to demonstrate continuities as well as marked differences exhibited by the new trend-in-making.

A Short Introduction: Time-like Architectures in a Post-spatial World [1]

A strange topology is hidden in the obviousness of televised images. Architectural plans are displaced by the sequence plans of an invisible montage. Where geographical space once was arranged according to the geometry of an apparatus of rural or urban boundary setting, time is now organized according to imperceptible fragmentations of the technical time space, in which the cutting, as of a momentary interruption, replaces the lasting disappearance, the "program guide" replaces the chain link fence, just as the railroads' timetables once replaced the almanacs.

The introduction of time and motion techniques into architecture is not simply a visual phenomenon. Another obvious aesthetic fallout of these spatial models is the predominance of deformation and transformation techniques available in a time based system of flexible topological surfaces. These are not aesthetic choices but technical statements of the structure of the topological medium. (Lynn 1999)

In the age of tele-presence and networked virtual worlds connecting us at light speed and in real-time, the notions of space, time and materiality have undergone dramatic shifts. The metaphysics of Theory of Relativity explicates the interdependence of space, time, and speed in an uneven field of forces. In the language of Relativity, where movement is relatively less, events become "space-like." Where movement takes precedence over stillness and approaches speed of light, events become "spacetime-like" and "time-like" (Born 1962). As speed increases, space contracts and time expands. Speed is the distinguishing factor between these three kinds of event readings. Through various digital communication and transportation technologies, we have moved far beyond the 2MPH speed of a walking human being to 186,000MPH speed of radio waves and telecommunications. We have moved from populating space to populating time. In the process, space-like architecture has lost most of its social, political, cultural and existential significance.

Today, in a world framed uneasily between zeros and ones, the dominant forces, things, networks, institutions and corporations are time-like. Computers are about time, not space: the true logic of computing is in its reliance on time: 600MHZ, 10MB/Sec, 56K BAUD, real-time (1/10th of a second), nanosecond, refresh-rate, etc. The measure of television broadcasting is time— the digital, technological time of the pulsating waves: 29 frames per second, time-based programming, etc. The success of a television program is determined by the number of people watching it at a given time (not in a given space). Time is the parameter that determines value in today's world. Even the wildly popular notion of cyberspace is not spatial. The word *space* in *cyberspace* is a simulation, a projection and a conjecture. The reality of cyberspace is time. Politically, we have stopped communing in a space—such as the city square—and started communing in time such as a television broadcast at a given time. The electromagnetic envelope around the globe shrunk the distances to a fraction of a second at the speed of light. It is, therefore, not surprising to realize that it costs ten-thousand times more to buy a 30 second slot on a television broadcast as opposed to buying a 30 year banner space on top of a building. Only 2% of the US economy is paper-based (Zach, 1999) and the rest is in an electronic, non-spatial form, flowing through the non-spatial channels that are not designed by architects. We live in a post-spatial world!

In the face of such fluid social, economic and political conditions, architects have begun to give up their millennial allegiance to the notion of *timelessness* and to working with resistance, erasure, deceleration and discrete phasing as the only temporal design strategies when it comes to working with fluid temporal forces. In this context I would like to point out a distinction: conventional space-like architecture where time is merely taken into account or responded to in a static manner differs fundamentally from time-like architecture where time-like events are the generative and intrinsic dimensions of its formal and ontological definition. For time-like architectures, handling, accommodating, channeling and manifesting speed of various data movements is a major concern. *Time-like Architectures* is a broad and umbrella term that is being introduced here to bring together a number of strands that are interconnected through formal, ideological or procedural characteristics. Simply put, time-like architecture is architecture of time-like events.

According to Peter Zellner, "time, perhaps once seen as an impediment to building, a source of delay and decay, has assumed a decidedly intimate role in an architecture that engages in a kinematic sculpting of space. Today, time and movement have been instrumentalized in architecture with the aid of powerful animation softwares [sic], which have enabled architects like Greg Lynn, Marcos Novak and Lars Spuybroek of Nox to develop dynamic, mutable and evolving design techniques and new spatial paradigms" (Zellner 1999)

Time is movement and change in various 'forms' or experiences. From electrons to people to stock values, *everything* in the universe moves. Parametric time-like architectures spring from such movements and link them directly to the definition and experience of an architectural environment. Not only is the form, program, skin and surface characteristics of an architectural space transformable using temporal parameters but also the figure-ground or field-object relationship are transformable, too. Unlike mere space-like design strategies which aim to rigidly fix static spatial conditions that persist against time (hence 'timeless'), time-like strategies aim to establish flexible and dynamic spatial conditions that fluidly spring from the flows of high speed time-like events.

Time-like architectures can be static in manifestation but not in design, or they can be kinetic in both design and manifestation. They can respond to local or remote parameters cybernetically and synchronously in real-time, or asynchronously in delayed time. Time-like architectures can be physical or virtual or anything in between. They can work at any speeds between zero and speed of light, but always have the option of moving at the speed of light for its generation, construction, functioning and ideology.

From Space and Time to Time-like: Changing Agenda of Architecture

A building is made up of other spaces within it that move and change, even if its own walls remain fixed. The idea of the mobility of building and within building is one possible idea of Deleuzian thought that might be of tremendous value in architecture. Building is not only a movement of sedimentation and stabilization but also a way of opening space and living. (Grosz 2001, p. 7)

In her book *Architecture From Outside*, Elizabeth Grosz makes an argument that attempts to communicate the shifting agenda of architecture: "My central argument throughout is that architecture, geography, and urban planning have tended to neglect or ignore temporality or to reduce it to the measurable and the calculable, that is, to space. It is central to the future of architecture that the question of time, change, and emergence become more integral to the processes of design and construction" (Grosz 2001, p. xix). However, the notion of time, which is distinct from the notion of *time-like events* has always been puzzling and perplexing to architects. There is a paucity of a rigorous yet clear discourse on this topic.

As Henri Lefebvre proposes in his seminal work *The Production of Space*, the notion of space is a social construct, colonized by physicists, mathematicians, philosophers, economists, architects and urban planners during different times in the past. Lefebvre shows how the notion has changed over time. The

most important contribution of his work is that space is a construct, produced and formed. Lefebvre also showed us how there are multiple notions of space operating at any given time: "We are thus confronted by an indefinite multitude of spaces, each one piled upon, or perhaps contained within, the next: geographical, economic, demographic, sociological, ecological, political, commercial, national, continental, global. Not to mention nature's (physical) space, the space of (energy) flows, and so on." (Lefebvre, 1992, p. 8).

Einstein's and Minkowski's notion of "*space-time*" and their central focus on the notion of event (which incorporates *space-time* and observer in a relational framework) are not mere extensions of Cartesian notion of space within a dialectic of dualism of object and subject. Theory of Relativity proposes that events *designated* as *space-like* or *space-time-like* or *time-like* depending on their speed are always to be seen with reference to a self relative to another. Whereas, most of the world of architecture that is still mired in the Cartesian concept of space, is deeply entrenched in the now outmoded Enlightenment metaphysic.

Time-like architectures embrace a different metaphysic and a different approach to architecture. Instead of working within a dualistic and outmoded framework of space and time (or timeless space), the new architectures altogether dump that framework. Time-like architectures recognize the world that has gone beyond space and time. The world is now a colloidal network of time-like events organized, coded, folded, unfolded and experienced as, what Bergson calls "*simultaneity*."

The Post-spatial Con-techst: Place Displaced and Context Rewoven

In Cinema 2: The Time-Image, Gilles Deleuze shows us how the post WWII cinema is structurally different, and how it has grown to explore its own narrative privileges that are highly pertinent to architecture (Deleuze, 1989). Deleuze's framework about early days of narrative cinema was that time was built frame-by-frame in a linear past-present-future manner with the camera merely recording a series of "movement-images" that tell the story. However, with post-war cinema, there was a sensibility and use of the cinematic medium. Time was manipulated, chopped, montaged, dilated, contracted, and fragmented in a non-linear fashion. While Deleuze ascribes this shift to the postwar Europe with its spaces that could no longer be described or inhabited in a rational way, I submit that today we dwell in a world where each point on the globe is animated by invisible strings of movement tied across the globe in a rhizomatic manner, that can only be described through a logic of time, not space. In architecture, this coexistence of, in Deleuze and Henri Bergson's term, *durations*, is what is leading to a potent new conception of time-like architectures. What cinema began doing over fifty years ago, architecture is beginning to do now. Architecture has so far presented time as a linear unfolding within a static set of spaces, surfaces, materials, light, information and connection. Time-like architectures now present time as a non-linear, fragmented, non-geographical tapestry of spatially distant but temporally adjacent spaces, surfaces, information and global connections.

The word context means weaving together. Time-like architectures conjure up a wholly different notion of *context* and *place*. Architecture at large is still wedded to the conventional notion of place as a construct of physical, local and immediate environs. In addition to sun, wind, climate and other geographical conditions, architecture has so far adhered only to the local parameters. Time-like architectures argue for a reconfiguration of "what really matters" in a critical construction of a context. In a world where one's stock portfolio is directly linked to Japanese economy than what would happen couple of blocks down the lane, context has become non-geographical. Now, context is *con-techst* that comes into being in time, chronographically, tying together a number of disparate places in real-time via the global communication networks (satellite networks, underwater cable systems, etc.). Temporal contiguity and temporal connectivity have taken precedence over spatial and geographical contiguity. The strands that animate our life today emanate from spatially distant but temporally contiguous/connected places. Post-spatial

approaches to architecture acknowledge this new reality and situate their time-like architectures in such a *con-techst*.

Peter Zellner notes that "our international telecommunication networks have become characterized by agitated, irreversible super-connections that operate outside conventional human understanding of time and space. We no longer communicate with friends, family or associates exclusively in a particular place; rather, we communicate both in the local context and across time zones and cultures. A seamless virtual geography of informational interchange has replaced locale as an indicator of space and rearranged 'natural' temporal sequences along the earth's surface…Hybrid space architects claim this ambient, symbolically rich and multidimensional world-space as an extraordinary context for architectural exploration." (Zellner, 1999).

In a project for *transPORTs2001* by Kas Oosterhuis, the building's space frame is composed of pneumatic bars that flex the double rubber skin according to the data dynamically linked to a website (Zellner, 1999).

In a radical departure from the locational metaphysic, time-like architectures forward a temporal metaphysic. Instead of or in addition to responding to local parameters such as sun and wind, architecture begins to respond to the non-local parameters of "data wind."

The same spirit could be found in a speculative project, *The Muscle*, by Kas Oosterhuis and Ole Bauman. This pavilion, which can be used as a virtual interpretation center, meeting place, disco and television studio, among other things, is an attempt by Kas Oosterhuis and Ole Bauman to use the latest technology to create a building that moves, contracts, braces itself, and relaxes. The basis is a pliable structure, grounded in pneumatic framed construction with a rubber outer skin and an electronic inner skin that turns the interior into a "virtual hallucination" (Ibelings, 2000).

The parametric design of "*Sound Contour Dwellings*" by Nox for a housing development in Eindhoven, Holland, is the result of dynamic balance among five systems that impact one another in a complex pattern of interferences, torsions, and deformations that turn the residential area into an undulating urban landscape. (Ibelings, 2000)

Modernism, Postmodernism and Post-spatialism

Table 1: Modernist Architecture and Time-like Architecture

Modernist Architecture	*Time-like Architecture*
Space	Space + Time
Materiality	Softeriality
Pure, minimal	Hybrid, Messy, optimal
Mass production	Mass customization
Transparency	TransPRESENCE
Form	inForm
Resistance	Response
What does a brick want to be?	What does a vector want to be?
Zeitgeist	Datageist

Architecture has always been concerned with space, spatial configurations, spatial transformations and spatialization of intangible realities of human worlds. Architecture has mostly treated time as a constant, and hence time-less. For the first time in human history, architecture has the potential to go beyond space, and become, what I call ***post-spatial***. To put time-like architectures in a historical perspective, let us look at their distinguishing characteristics compared to modernist and postmodernist architecture, which are summed up in the form of three tables (words in italics are coined by the author for the lack of better alternatives):

Table 2: Post-modernist Architecture and Time-like Architecture

Post-modernist Architecture	*Time-like Architecture*
Mannerist complexity	Cybernetic complexity
Decorated shed	Data shed
Historicism	Ahistoricism
Communication and double coding	e-Communication and e-coding
Text	Techst4
Context	Con-techst
Learning from Las Vegas	Learning from Lagos and Alias®
Timeless	Time-like
Space-like Architecture	Time-like Architecture
Blank, ornate, textured surface	Dynamic, interface, techstured surface
Grounded, founded, static structures	Connected, plugged, kinetic structures
Civil engineering	Mechelectronic engineering
Figure - ground	Field - space-time
Site	Sci-te
Metaphorical, representational	Hyperlinked, presentational
Nostalgia	No-stalgia

Table 3: Architecture in General and Time-like Architecture

Architecture in General	*Time-like Architecture*
Passive Resistance	Active Response
Analog memory	Digital ± analog memory
Local Vs Remote	Local ± remote
Euclidean	Euclidean ± Non-Euclidean
Nouns, adjectives	Verbs
Revolution/Retro-volution	E-volution
Configure space	Configure space-time
Master Drawings	Virtual master models
5-100 MPH	186000 MPH
Slow	Fast
Here Vs There	Here ± There
Space is	Space is simulated/projected
Being	Doing
Shape grammar	System grammar
Linear, sequential, simple order	Nonlinear, rhizomatic, complex

Time-like architecture can be transmitted, remotely accessed, published, projected, compressed, encoded, licensed, rebooted, archived, upgraded, evolved, interfaced, compiled, flexed and folded.

Time-like architectures range from Marcos Novak's virtual data spaces to dECOi's parametric physical environments. Pongratz and Perbellini write about Novak's Transarchitecture: "'Trans'=neither modern nor post-modern. The term 'TransArchitecture' is intended to break down the polar opposition of physical to virtual and propose in its stead a continuum ranging from physical architecture to architecture energized by technological augmentation to the architecture of cyberspace" (Pongratz, Perbellini)

At the other end of the spectrum is a work by dECOi. In 1998, dECOi won a competition to design an interactive art piece for the foyer of the Birmingham Hippodrome. The piece functions as a mediator between events happening in the theatre and outside it, forming a link between the public plaza and the theatre itself. *Aegis Hyposurface*, was conceived as a responsive surface which reacts physically to events happening around it. It was, in effect, a three-dimensional screen, taking the calculating speed of the computer out into the built environment. The architect describes the concept as a piece of 'dynamic architecture', made of a pliable material or skin stretched over a large number of highly responsive pistons (known as actuators). These computer-controlled actuators generate movement across the surface,

allowing it to create complex patterns which rapidly reconfigure its appearance in response to a variety of electronic sensors such as movement, light and sound. (Zellner, 1999)

Future Directions: Parametric Design versus Parametric Architecture

While both of these notions come under the rubric of *time-like architecture*, it is necessary to distinguish between these two virtually identical terms. A parametric model employs a number of parameters in order to define/modify geometry dynamically. When the parameters are changed (length of a wall, for instance) then other parameters that are linked to it also change, resulting in a change in the overall geometry (wall thickness and window size, for instance). In other words, a parametric geometric model is a constant offspring of mathematically and logically interlinked set of parameters.

Parametric design employs parametric modeling during the process of design only. Take for instance, Greg Lynn's design for *Korean Presbytarian Church*. The process of design, as Lynn describes it, involves consideration and interlinking of a variety of contextual parameters. However, once the final result was frozen, the architecture of the built work became non-parametric. In contrast, dECOi's design for Aegis Hyposurface involved parametric design to produce parametric architecture that responds to stimuli even after it was built. Lynn's building was designed parametrically but ends up being a static building, whereas dECOi's project was designed and built to become parametric architecture.

Barring the experimental works by dECOi, there is a woeful void (no pun intended) of parametric architectural work. This is partly due to the overt emphasis so far on parametric design processes that take place only within the realm of the computer and not in the physical world.

Real-time parametric architecture would interactively respond to various parameters (local or remote) in real-time. Real-time has been defined as events occurring within 1/10th of a second. In order for architecture to cybernetically respond in real-time, it needs to be connected to communication networks and mechanisms that are capable of responding synchronously to local or remote data streams. Much research and design experimentation is needed to develop computational and mechanical-structural devices to make such architecture possible.

End of File

As prophetic as Jencks' Evolutionary Tree maybe, it is limited in its adherence to architecture as a spatial practice. Perhaps that is why his evolutionary tree prudently stops slightly after the year 2000. The effort of this paper has been to identify a new trend, outline its characteristics and clarify a number of key ideas that make it radically distinct from space-like architectures. In that sense, it would be a radical extension to Jencks' mapping of trends.

With the emergence of such fluid, responsive, kinetic, data-driven worlds, architecture faces a radical reshuffling of a number of its principal underpinnings such as context, place, orientation, boundary, space, adjacency, contiguity, connectivity and materiality. Architecture that can parametrically and in real-time respond to remote data through kinetic tectonics holds the most promise. Much research and experimentation needs to be done in that direction. Instead of putting together spaces, connecting them, transforming them and configuring them, the new architectures put together space-times, transforming them and configuring them. Such architecture can be transmitted, remotely accessed, published, projected, compressed, encoded, licensed, rebooted, archived, upgraded, evolved, interfaced, compiled, flexed and folded.

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