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Student's name: John C. Popa

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ARCHI[TECH]
MATERIALIZING IMMATERIAL DATA STREAMS
J. CHRISTOPHER POPA

SUBMITTED IN PARTIAL FULFILLMENT OF A MASTER OF ARCHITECTURE AT:
UNIVERSITY OF CINCINNATI
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J. CHRISTOPHER POPA
AUTHOR
B.S. IN ARCHITECTURE FROM THE OHIO STATE UNIVERSITY

JOHN HANCOCK
COMMITTEE CHAIR
PROFESSOR OF ARCHITECTURE

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The rapid development of digital media technology is changing social, cultural, and economic interaction from the traditional “space of place,” or material world, to the immaterial “space of flows,” undermining the traditional ways in which public space creates a dynamic relationship with visitors. This mutation from material to immaterial is deteriorating public space and its ability to manifest the connections among users, public space, and programmatic processes. This thesis proposes a direct response to the dematerialization of the space of communication through the innovative interaction of the space of flows (specifically crowd sourced social media inputs) with the space of place (Pittsburgh’s Market Square). As a piece of public architecture this hybrid spatial condition will act as a cultural and social bridge between the immaterial and material.

The design of this thesis will utilize communication and information from current Social Media sites (Twitter, Facebook, and Foursquare) to create and dynamically modify a set of architectural interventions. A dynamic conversation between the visitors and the space will be driven by constant information flows and responses. The dynamic dialogue will embrace temporality and constant change, common characteristics of the virtual realm, in order to intensify public activities, dialogues, and connections in the material world.
J. Christopher Popa was born in Pittsburgh, Pennsylvania. Before attending the University of Cincinnati’s College of Design, Architecture, Art and Planning to receive his Master of Architecture, he obtained a Bachelor of Science in Architecture at The Ohio State University’s Knowlton School of Architecture. In addition to post secondary education, J. Christopher has obtained professional experience at Kennedy & Violich Architecture in Boston, Massachusetts, William McDonough + Partners in Charlottesville, Virginia, and Kohn Pederson Fox Associates in New York City.
I would like to dedicate this thesis to my parents, Susan E. Popa and John E. Popa, and my family. Their unbridled enthusiasm and support has proved to be invaluable. I am grateful to my Thesis Advisor, John Hancock, for the insight, feedback and encouragement throughout this grueling process. It is also with much delight that I thank my previous professors at both The Ohio State University and University of Cincinnati whose stimulating wisdom and commitment to my education has had great impact. And, of course, I would like to graciously thank my friends and colleagues who have inspired and supported me, but most of all, kept me laughing each day.

J Christopher Popa
Architecture, in its most general sense, was never a real focus in the early years of my life. However, as the son of an Electrical Engineer turned Project Manager who has worked with NASA, Ford, and Eastman Kodak, corporations which have embedded their philosophies in the advancement of technology and interaction, I have been groomed, unintentionally so, to look at technology in the most positive sense. Using that childish wonder I have always looked for technology to enter into the most unlikely of fields. It is strong memories of conversations with my dad about advanced systems within the space shuttle that have inevitably shaped my ideologies within the development of technology in architecture.

With increased development of technology within all disciplines, architecture should not and will not take a back seat. The ability to allow interactivity, monitoring and digital technologies to embed themselves within a discipline that for so long has seated itself statically in society is becoming increasingly important. The technology now exists for this collaboration between the two only seen before in pieces of engineering, like the space shuttle. Architecture of the future will be expected to improvise, adapt, and evolve spatially and programmatically with the society it services.
ARCHI[TECH]

Materializing Immaterial Data Streams

Despatialization of Human Interaction

SM[Architecture]
Space with Embedded Computation

This Space of Place:
Pittsburgh’s Market Square

Trusting the Arts
Pittsburgh Cultural Trust

Materializing the Immaterial

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Currently as I sit at my desk, I am surrounded by a multitude of network driven-devices. Like most students, I work on a laptop, which I bring to and from home each day. I take notes with my tablet PC in class, and I am constantly on my Smartphone talking, tweeting and texting family and friends. Each device is networked together and connected to the world through the Internet. I rarely leave home without at least one of these devices and like most people, I constantly check my phone for media updates, new emails and global and local information. All of this is possible because, as long as I am carrying one of these objects, I am connected to the entire world. The Internet is making a presence into almost all aspects of our lives, arguably both a good and bad thing. Technology manufacturers boast of increased productivity and happier lives for consumers. However, as technology saturates into our entire way of life, its development is changing society at an unprecedented rate and in a palpable manner. The place and the way in which our common interactions occur is shifting from a true locality (where architecture lives) to the intangible realm of cyberspace.
So the question arises: What will be the architectural and spatial implications of this revolution?

It is quite safe to say that one will find a constant influx of new “technologies” that influence, transform, and even drive our social relations, culture, and environment. Manuel Castells, a leading researcher in the field of information sociology, communication, and globalization, rigorously examines the implications of technology on society in his book *The Rise of the Network Society*. Although our current cultural and societal needs are defined by a series of deeply interconnected social networks, technology is producing a shift toward more isolated engagements with culture and environment, like our nomadic ancient ancestors once had. Examination of the creation of social networks requires an interesting walk through history.¹

It is thought that our nomadic ancestors lived as individuals, rarely coming together. They feared nature and battled it constantly. As technology increased, allowing early humans the ability to farm and form diversified settlements, an increased dominance over nature and their environment began to emerge. Individuals or social bands began to form larger communities for strength, protection and greater survival.² As humans began to gain even more dominance over their environment, social sophistication ensued, producing unique individuals, with specialized skills or roles, who could now start to be defined by their matrix of social connections to other humans.

Of course, all of these interactions between actors happened strictly in physical space, increasingly giving rise to and harbored by architecture. It is at this point in the history of civilization that one can start to recognize a more modern social network and the processes that build these networks.³ Within these social networks exist cultural, economic, and political processes that, until the past couple of decades, happened almost entirely in physical space. These physical interactions structured human community and shaped the physical environments where these interactions happened. This brings us to the present situation where our dominance over our environment is at an all-time high. We are in the midst of a new type of technological revolution, where digital means are infiltrating every aspect of our lives, our communities, and our environment.⁴

It is important to distinguish between the two types of spaces existing today. Manuel Castell’s differentiates space into two unique categories, the “space of flows” and the “space of place” or quite simply virtual space and physical space, respectively. It is apparent that these two spaces act in opposite realms. The “space of place” is a tangible space, materially bound, with a connection to history. Inhabitants live, work, and dwell in the “space of place.” The “space of flows” is diametrically different in all aspects. The “space of flows” exists

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³ Ibid.
⁴ Castells, 72
as an intangible flow of information, communication, services, and capital. Consequently, the “space of flows” is location free, continuous, and timeless. The differentiation between these two spaces is important for two reasons. For one, architecture exists in the “space of place.” It is tangible and material in nature, responds to history, and has a defined location. Secondly, as our daily lives shift more and more into the “space of flows,” traditional public space is less able to create a dynamic relationship with visitors.

The economic, cultural, and political processes that define our social makeup, previously existing in physical space, are now making a shift toward the virtual realm. Previously, these processes existed predominantly in physical space and gave birth to architecture. However, the digital technology revolution is dematerializing the processes rendering the spaces ineffective. Politically a new battlefield is emerging, the Internet. In fact, according to Borrell Associates, recent campaign budgets show that ad campaigns are focusing on the Internet. Comparing the 2002 and the 2012 U.S. Presidential Elections, one finds a 600 percent increase in total online ad spending. This trend is not likely to stop, as candidates see the need to reach out to people over a more national and connected realm. A similar change is happening in the economic sphere, as well. Recent numbers show a drastic shift to online banking. Many banks boast of the ability to do almost all banking tasks online. For example, J.P. Morgan Chase, one of America’s largest banks, advertises their online banking package as a service that allows you to manage money wherever and whenever you want. Convenience and flexibility have produced a 200% increase in online banking customers each year since 2008. Continuing in this trend is the amount of online shopping being performed. According to Pew Research Center’s Internet and American Life Project over 75% of online shoppers have made more than one purchase in the past year.

Cultural processes are not immune to the digital revolution. Today music and video can be easily accessed from the Internet. In fact, the world’s largest video database, YouTube, processed 48 hours of video every minute in 2011. These numbers are not likely to subside, as one’s life is being posted online for the world to see. No longer does the landscape exist where important public opinions are being molded and created by professional journalists. Now, anyone can publish and broadcast their opinion to the world through blogging websites and social media. As these processes shift from physical space to a virtual space, they leave our current public architecture unable to keep speed with our changing world. There exists the need for a public architecture that acts as a figurative bridge between the digital and physical worlds.
Designing for Anything vs. Designing for Everything

Architecture is deeply rooted in cultural and societal norms, processes, and interactions. In fact, it can be said that architecture is a product of culture and environment. As social processes shift from tangible space to intangible space, architecture needs to adopt a hybrid spatial definition to stay relevant. Consequently, this thesis promotes the need for a true interface-able building system and technology that uses the immaterial “space of flows” to make a “space of place.” This new type of public space engages data flows for the evolution and progression of architecture. By using rapidly changing needs, trends, and ideas as a stimulus, the architect can move beyond neutralization as a means to answer adaptation. For instance, if we examine two different buildings with the capability for adaptation, Lewis Tsurumaki and Lewis’s Arthouse at the Jones Center, and Rex’s Wyly Theater, their strategies will explain the difference between designing for anything, and designing for everything.

In brief, both buildings are cultural in nature. LTL approaches adaptability with a “design for anything” attitude in the Arthouse, while REX architects designed The Wyly theater with a “design for everything” approach. Although both spaces utilize kinetics for change, their methodologies are completely different. LTL claims that a moveable wall within the art gallery allows for the space to adapt to any type of show. However, they never closely examine the needs of each type of gallery showing. The wall’s position is a product of the type of gallery, but does very little to enhance the production itself. In fact, it forces the architect to neutralize the space and strip it of as much character as possible in order to accommodate different needs. On the contrary, REX’s Wyly Theater encompasses kinetics to enhance everything, or at least every type of performance in the venue. Understanding the various needs of each performance that could occur in the space, REX designed the theater to transform for acoustic and visual efficiency for each performance. This type of design methodology removes neutralization as a means for adaptability and celebrates transformation.

Digital Technology and Architecture

As one dives into the conversation about the influence of the “space of flows,” the discussion begins at architecture with embedded technology/computation. Michael Fox, founder of Fox Lin Inc. and the Kinetic Design Group at MIT, and his colleague Miles Kemp, a researcher developing the intersection of digital technology, physical architecture, and human interaction, have defined the history of responsive and technology driven architecture in their book Interactive Architecture. In general, Fox and Kemp outline the past and current landscape of adaptable building technology in order to develop an understanding about the physiological implications of embedded technologies on architecture and society. However, both authors generate a lighthearted skepticism that interactive architecture is a real solution to problems that the discipline is facing.

To them, interactive architecture “is architecture that converges embedded
computation and physical and spatial kinetics to satisfy adaptations with the contextual framework of human and environmental interactions." The authors compare interactive architecture to the way that many plant and animal species evolve to their environments. It is true that many animal species are constantly adapting to their environmental conditions to produce stronger and healthier species to ensure survival over time. Architecture too, is starting to adapt to its environment. For example, Kennedy & Violich Architecture’s Soft House in Hamburg, Germany, uses embedded computation to monitor weather and sun conditions and manipulate the formal arrangements of fabric photo voltaic strips on the façade. As the environment changes, the individual photo voltaic strips alter their positions to make sure that the building is collecting as much energy as possible. Although this is important, interactive architecture could be more effective in strengthening interactions between people and the space they inhabit.

Most of the time, development of interactivity in architecture never moves beyond the concept. However, both Fox and Kemp speculate about the future context of interactive architecture and its impact in society. As proponents of this new way of designing space, both authors argue that "today’s intensification of social and urban change, coupled with the need for sustainable responsibility amplifies the demand for novel architectural solutions." In other words, they stress technology’s role in the advancement of architecture.

Diverging from the definition of interactive architecture studied by Fox and Kemp, Antonio Saggio shifts his attention to the productive meeting between high tech media and architecture. Saggio, an architect, scholar, and professor at the School of Architecture at the University of La Sapienza, and a media biennale speaker, focuses on the discourse of digital technologies and interactivity within the context of avant-garde architectural research. According to Saggio, "interactivity places at its center the subject (variability, reconfigurability, personalization) instead of an absolute nature of the object (serialization, standardization, duplication)." In other words, he argues for architecture to incorporate fundamental features of computer systems (networking and variability) to create interconnected models of information that can be constantly reconfigured. This changes the idea of both time and space in architecture that until recently has been consolidated. In this sense, architecture should no longer be a static snapshot of current social ideals, but an evolving metamorphosis that always embodies correct time and place.

Saggio makes the connection between old and new ideals of architecture. He states that earlier thoughts about good architecture sprang from the

10 Ibid., 150.
12 Ibid., 23-29
13 Ibid., 23
14 Ibid., 24
association of a problem and a specific solution to that problem. However, new thoughts stress that good architecture lives within the narrative of the “story.” In other words, Saggio makes the argument that predefined metaphors embedded in architecture should be replaced with ones that can be created by the inhabitant. Saggio makes it clear that interactivity is the catalyst from subjectivity so that today’s men and women can be liberated from the objectivity that was once a major consideration. In other words, there is a movement in architecture from production of a static object to one with variability.

It’s apparent that there is a fear amongst architects and designers about the real architectural implications of the current digital revolution. Scars left behind from previous revolutions are still obvious. It’s necessary that the revolution be evident in the architectural. To Saggio, manipulating how designers ask questions about space is key to integrating the technological revolution into architecture. He argues for architecture to shift its approach from creating solutions for a problem to creating narratives for the space. Unfortunately, this is a drastic measure to offset the implications of the revolution instead of allowing architecture to benefit from the deployment of interactive digital technologies.

Architecture should not look at the current rapid development of technology as a problem that needs a solution. Rather, it should be viewed as fuel for new spatial catalysts that allow the discipline to evolve current notions of space into interactive spaces that engages both visitors and architecture.

Instead of looking at interactive architecture as a means for a solution, interactive space becomes an interface for unexpected and intriguing scenarios. The proliferation of interactive architecture will change lifestyle patterns and behavioral awareness, shifting the notion of what architecture should, could, and will do. In other words, as architecture really begins to communicate with its inhabitants, the interface between architecture and inhabitants will completely shift our understanding of space.

Digressing from why architecture should implicate these technologies, the conversation shifts to how these technologies will actually impact the societies that they serve. Neither Fox, Kemp, or Saggio answer whether this type of research within architecture will actually have a profound effect on the discipline’s future. It’s obvious that if interactive architecture is to succeed beyond a fad, real proposals must be made that produce built space. Unfortunately, most interactive architecture rarely moves beyond the concept. It is fair to say that the profession is in the infancy of this type of research.

Each of the previous authors touches on the emergence of artificial intelligence or embedded smart computing in architecture. Architect Phillip Beesley, chair of ACADIA, and Omar Kahn, educator at the University of Buffalo CAST, both situate their research in the greater context of performance installations. Both
Beesley and Kahn actively converse about the manifestation of responsive environments in their Situated Technologies Pamphlet 4. According to both authors, there is a current duality in how responsive architecture actually expresses itself. On one hand exists the passive strategy where the architecture allows anything to happen. In the passive strategy, anything that happens in the space is ephemeral. On the other hand, the assertive strategy allows the architecture to be an active participant amongst its guests. The argument is made that neither has worked, and for similar reasons. Both strategies lack dynamic relationships between space and users where “higher” thinking, or smart infrastructure, produces collective sympathy. Essentially, both authors argue that lopsided relationships, seen in both the assertive and passive strategies, create the figment of responsiveness rather than a true responsive environment. Eventually, they argue for a space that stimulates a conversation between the opposing elements. The architecture and the inhabitant would read and react to each other, while the other does the same. Both agree that until this happens, true interactive architecture will not occur.

Undoubtedly, the discourse concerning responsive architecture is actually more theoretical than real. However, it is a very real discussion that will continue to transform from highly theoretical to highly plausible as technology embeds itself in physical space. The most compelling idea that emerging from the discourse is the notion of collective sympathy in space. Webster’s dictionary defines sympathy as an affinity, association or relationship between persons or things wherein whatever affects one similarly affects the other. Sympathetic architecture seems to suggest connection with dynamics amongst inhabitants and space. Unfortunately, the distinction between architecture and environment is not completely fulfilled. In fact the terms are frequently, but incorrectly used as one in the same. Although architecture creates environment, an environment is not always architecture. Without the distinction between how sympathy actually lives within architecture, not just environments, it lacks accountability and real relevance. In other words, the notion of responsiveness in architecture is vague and hard to pin point.

One question that remains in this discourse is how the “space of flows” will actually manifest itself in the future. It’s a mistake to believe that all architecture will exist with embedded computation and the ability to converse with its inhabitants, as suggested by Phillip Beesley’s work. A hybrid approach to this issue is the most plausible scenario for architecture. It is this approach that the book entitled Hybrid Space roots itself in. If the contemporary urban condition exists as a mapping of pre and post industrialization, or as Manual Castells called it, the “space of place,” the subsequent urban fabric dealing with the current digital revolution has yet to

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18 Ibid., 18.
19 Ibid., 21.
20 Ibid., 16.
As computing technologies embed themselves in physical spaces and objects, the question surfaces about what to do with them. According to Elizabeth Sikiaridi and Frans Vogelaar, the hybridity of space will materialize where "objects will be considered in the context of and in relation to the networked system with which they interact." The word hybrid suggests the merging of different ideologies. Hybrid urban space is no different. "Hybrid spaces are simultaneously analogue and digital, virtual and material, local and global, tactile and abstract." Sikiaridi and Vogelaar go to great lengths to describe a soft urban space that draws inhabitants with flexibility but maintains them through specificity. This is not too different from underlying thoughts discussed by previous authors.

If one distills the previous arguments down to the least common denominator, it becomes obvious that all of the transformations, embedded technologies, flexibilities, and networking within architecture are being harnessed to create a tangible conversation between the user and the space. It is through this conversation that these spaces will be used to relate to visitors in a more beneficial way. Also, this gives architecture the ability to inform the public, whether through literal or abstract translations. Whether one references Beesley’s embedded computation for a sympathetic architecture, Saggio’s interactive architecture as intrigue, Box and Kemps’ responsivity in architecture for novelty, or Sikiardidi and Vogelaar’s soft urban space for flexibility and networking, stress is placed on a conversation with dynamic dimensionality.

It can be argued, rightfully so, that there is always a conversation existing amongst built space and its visitors. However, current architecture, through stasis, fails to have a dynamic relationship with the visitor. Dynamics within a conversation describes a feedback loop where information is cycled through respective players. Within the loop, inputs cause responses and those responses become inputs continuing the cycle. This type of conversation is unlikely in architecture for many reasons, although recent technology has enabled designers to utilize these ideas at a small scale.

For example, Höweler + Yoon Architecture’s Light Drift project has successfully created a dynamic conversation between public space and users. Located in Boston on the Charles River, Fast Light focuses on the engagement between the user and the object. As the user manipulates the object, a light filled ball in the vicinity of the guest, the user’s direct environment, is changed with light. Congruently, the most intriguing interaction comes as the local object communicates with an inaccessible floating sphere in the Charles River. Corresponding floating spheres within the river are communicating with the object on land. As the object on land is played with, a signal manipulates the Charles River object, establishing a new connection between the user and an adjacent space. The objects, on land or in the water react to touch and...
sensation dynamically affecting the other.

Ultimately, using dynamic information flows within physical space is not a highly conventional idea. The speculative nature of the emerging social media in architecture is in many ways too theoretical to fully establish concrete paths to carry out. At this point multiple issues exist regarding interactive architecture as a solution for architecture’s relationship to the society it serves. Scale is a major issue, since most examples exist as installations because of the complexity involved in embedded computation in space. With the influx of social media and other tools where individuals have constant dynamic impact, users are demanding the same from their architecture. Architecture has the ability and the need to harness the “space of flows” to make an impact on the community in which it serves. Communities act as living organisms, always evolving, changing, and shifting. This is a strain that infrastructure has to grapple with. Peoples change in culture and beliefs appear instantaneously in the “space of flows”. Therefore this information will become a catalyst to kinetically change public space. Ultimately, a conversation surfaces amongst the user, the community, and the space. Each impacts and changes the others.

This thesis proposes the development of a hybrid urban space that utilizes information streams to create an adaptable public space.

The redefined space will be a cultural beacon for the community. By using specific data within the “space of flows” to transform the performance pavilion, this space will become a vehicle for a responsive and socially centric, cultural space. The pavilion exists to figuratively bridge the digital and physical world. Also, it exists to challenge the idea of locality by activating the space with global information streams. As data materializes and stimulates the public space, it becomes an impetus to strengthen global perceptions in the space. Configuration of the square and deployment of digital media encourage social interaction between all types of visitors and the space. Finally, by operating in the physical world and embracing temporal data flows, the square acts as new public forum that is both analogue and digital.

Consequently, it would be hard to develop a public space that focuses on media that is inherently new and exciting without actually studying the subculture that produces it. Therefore, this thesis requires a high degree of computer-based code writing in order to access information from social media outlets. In no way do I intend to discover a new type of information within the social media to input into dynamic conversation loop. However, typical data mining techniques, rarely explored by architects, will be used in order to gather information as inputs into the new public space.
As we investigate the broad topic of interactive architecture, the projects referenced are often highly conceptual. However, it is my goal to strictly reference projects that have been built for two reasons. First, this will help solidify the goals of each project with respect to actual results. Second, built projects are sure to adhere to strict building codes and physical constraints that the virtual world doesn’t have. Referencing built projects will go far in making the conceptual ideologies more tangible.

As has already been referenced, REX’s Wyly Hall in Dallas employs, arguably, one of the most diverse transformations of any contemporary building. Very simply put, the theatre has the ability to manifest itself in any performance configuration needed. Arrangement of the theatre space is defined by performance type ranging from Shakespeare, to rock shows, to corporate parties. Therefore, the building becomes a machine for adaptation. Wyly Hall continues to empower the establishment that it services by removing any boundaries that may exist. Through educated risk, they manifested the performance of the

Building through spatial adaptation. Because of its complete control, the theater becomes an effective cultural center that transcends small cultural pavilions. According to Joshua Prince-Ramus, the lead designer, the architecture actually does something both literally and theoretically.25 The designers describe the building as a performance piece allowing any configuration, yet the transformations are really staged sequences of possibilities. It fosters more than one application, but the applications or performances still have to adhere to preconceived notions of what previous performances needed architecture to do. Consequently, this means that the performances are still at the mercy of the architecture.

Even though the transformation of the main theater helps the performance itself, the transformation does not involve a dynamic conversation between the building and visitors. Instead, the building transformation becomes a background performance unobtrusive to its visitors. With the theater’s adaptation back grounded, probably due to safety and complexity, the visitor is unable to sense the dynamics of the space until the next time they return to the theater. Therefore the alteration becomes more about an efficiency of space for the building rather than a direct dynamic conversation between the program and the space.

Searching for a more foregrounded approach to integrating information as a stimulus for architectural transformation leads us to a transportation hub in America’s largest city. The Boston firm Kennedy & Violich Architecture, LTD was commissioned by the New York City Economic Development Corporation to design the East 34th Street River Ferry Project as a means to develop the city’s major urban sustainable transportation initiative. Typically, KVA’s work is strongly influenced by the integration of new technology into their building systems. Principal Sheila Kennedy, a professor at MIT, has been praised for her innovation in material research and its implications within their architecture.26 Their design for the ferry terminal engages the function with the need for a constant stream of data to be projected to the visitors. Instead of displaying the information of ferry times in a traditional manner, KVA allows the tensile, cloud like structure to project the information about river currents. The cloud like structure, seen in the picture above, changes color based on information regarding the currents within the river.

Although the 34th Street Ferry terminal incorporates the idea of interactivity in physical space, its biggest downfall is the shallow and singular manner in which it achieves this. However shallow the approach, KVA manages to achieve an outcome that pushes the actual intent of the building itself. In other words, they achieve great impact out of developing the cloud as an informational projection system because it both informs individuals and changes the behavioral patterns at the site. In theory the building becomes more about a beacon for travel in the city.
and less about a shelter and place to wait. The projection of activity into the community serves a functional problem, of course, but now activates the site and area with a constant influx of knowledge.

Ultimately, Wyly Hall and the 34th street Ferry Terminal can be commended for the complexity and scale at which they change. However, as we begin to search for projects with a true dynamic conversation, scale drastically shrinks. In Seoul, Korea the designers of the Living Light project attempt to create a cyclical information stream between inhabitants, the environment, and the built installation by translating environmental factors and requests for environmental quality into physical space. Tapping into air quality surveillance systems throughout the city, the Living Light Pavilion utilizes this information to inform locals of air quality. Requests for this information begin to show through the intensification of different light quadrants in the canopy. Thus the pavilion itself begins to have a direct exchange with people in and around the canopy. As air quality and requests change, Living Light accepts and receives this information, then broadcasts it through with light. One of the most dynamic parts of this pavilion occurs as the cyclical information stream transforms information into light. The architecture creates a vibrant space out of information that is typically negative in nature. This type of translation and transformation is positive, achievable and ideal in its conceptual ideology. Unfortunately, the alteration caused by any one individual is so abstracted that it can rarely be attributed to that individual.

Although the next project does not address a specific cycle of information where individuals and the space continuously feed off of each other, its three-dimensionality and its ability to inform the adjacent space are intriguing. The OMS stage in Winnipeg, by 5468796 Architects, is a multi-use performance pavilion. Its special aluminum skin made of uniquely designed “pixels” allows the pavilion to transform into various sub typologies. As the actual function of the pavilion changes, the pixels project different colors. As a whole, they create a backdrop for a performance or projective screen that speaks to visitors. As designed, the pixels themselves connect to each other to create a large metal fabric similar to chain mail. The configuration and connection of the pixels allow for fabric like motion by the facade. This motion is important because it permits the skin to deform for performances. When the performance is finished, it can return to its standard orthogonal form, best for projecting to viewers. There exists a duality of form in the pavilion in order to execute shows and inform the visitors within the space.
Webster’s Dictionary defines a locale as a place where something happens and thus has a particular event associated with it. Through the bombardment of the Internet, specifically social media sites like Facebook, Twitter, and Instagram, perceptions of locales are shifting from the “Space of Place” to the “Space of Flow.” As our locales figuratively dissolve into midair, it becomes imperative to invert this dematerialization in order to allow architecture to relate and converse with inhabitants today and tomorrow.

Here, we look specifically at one of the most notorious American cities of the industrial revolution, Pittsburgh, Pennsylvania. Settled in 1717 and founded just 40 years later by President George Washington, Pittsburgh grew into the quintessential blue collar American city. At the confluence of the Monongahela and Allegheny Rivers, Pittsburgh flourished to become a world capitol of steel production.

It is through this simple understanding of Pittsburgh that one can start to comprehend the city’s strong cultural history. Rapid industrialization brought economic and population prosperity to the city, and,
like many American cities, it attracted a melting pot of residents looking to thrive on the American dream. However, the lack of homogeneity amongst new settlers (traders, industrial workers, and retired soldiers, immigrants etc.) created segregation between the inhabitants.27 "Theater emerged in Pittsburgh, as it does for all communities, as a vehicle to merge identities of the world and to express cultural identity." As author Lynne Conner explains, "Drama has long been a powerful metaphor for illuminating the human condition and creates a persuasive tool for influencing public opinion."28 That couldn't be truer for Pittsburgh, which was searching for illumination and influence during the nineteenth century. Pittsburgh's population ballooned from twenty thousand to over six hundred thousand people in a period of one hundred years.

The general opinion of the public was reinforced through cultural performances that reflected current modes and attitudes of living. It is through these opinions, interpretations of opinions, and reiterations of opinions that citizens in their new locale started to meld their ideals into a collective identity.29 Using theater as a vehicle for collective identity, Pittsburgh developed and fortified the character of its people. In the 1840's Pittsburgh cultural traditions started to transform from small cottage affairs to corporate sponsored events. Synchronously, the city itself began an economic transformation from trade to that of production. Just as this shift was changing Pittsburgh's identity, the city's Northern Bank of the Allegheny grew into an industrial production center. Farms once located along the bank reformed into factories, while surrounding streets within the Penn – Liberty corridor assumed a commercial and residential attitude. Residential zoning split the corridor into two districts. Liberty Avenue was commercial and city activated. The North Bank of the Allegheny maintained industrial production and ultimately attracted skilled iron ore workers. Demographic shifts in the city produced a shift of political power amongst the people. Pittsburgh leveraged its economic condition to develop better living conditions for people within the Penn-Liberty corridor. Between 1840 and 1865, the corridor saw a 500 percent increase in theater seating capacity. This rise in theater capacity, plus the introduction of new local libraries and churches, generated the most culturally rich area in Pittsburgh.

Naturally, public interaction and opinions were not confined to the theaters of Pittsburgh. Situated within the heart of the downtown was Pittsburgh's Market Square. Housed on the square were two large barn type buildings used for local commerce. Just as today's grocery stores cultivate unanticipated conversations amongst locals, Market Square attracted a plethora of people. The space was a breeding ground for interaction and helped strengthen the community as a whole. The Square was a fertile place for public debate and became.
an important communal space, not only for the economy, but cultural and political reasons as well.

As the industry continued its prominence in the area, especially along the banks of the Allegheny, Pittsburgh continued its growth and cultural fertility. However, the end of WWII brought serious economic destruction to Pittsburgh as a whole. Growth that was based on steel manufacturing began to decline. Local businesses were forced to lay off many workers. Also adding to the economic downturn of Pittsburgh’s central business district was mass exodus of urban citizens to the suburbs where they could live out their American dreams. As Pittsburgh’s population declined, so did the need for public theater and cultural centers. The decline and disuse of the city’s cultural centers, especially in the Penn-Liberty Corridor, triggered a new type of transformation, from that of class, knowledge, and experience, to the city’s forbidden red-light district. Theaters that once projected grand operas became backdrops for XXX movies and uncased Burlesque shows. The Penn Liberty corridor manifested itself as a forbidden district in Pittsburgh until the early 1990’s. Market Square was not immune to the city’s decline. Through a series of modernizations, the square lost its commercial presence and gained empty space. Unfortunately this new space, advertised as manicured public space, was used more frequently as a parking lot than public forum.

Currently the Penn Liberty corridor, now understood by the city as the Cultural District, has seen a series of renovations attempt to capture its original theatrical spirit. The Pittsburgh Cultural Trust, the body responsible for overseeing the funding and renovations of its theaters has helped regain seating capacity. Through renovations, a capacity of 24,000 seats, spread throughout many theaters, now exists in the district. The progressive attitude that the Cultural Trust has taken is creating a significant difference in the district. The area is well on its way to revitalization.

Focus on revitalization, through the renovation of many culturally historic buildings in the Penn Liberty corridor, has shifted the district’s presence from negativity to positivity. However, the Trust has only aimed their goals at revitalization of the district itself, not further growth. According to the Pittsburgh Cultural Trust, their revitalization has attracted two million local visitors to the Cultural District (Penn-Liberty Corridor) each year, attending events that range from Opera to Gallery Hops. The attention is also influencing a range of new commercial and residential activity within the corridor.

However, while the Cultural District is starting to thrive again, Market Square has not returned to its powerful past as a facilitator for cultural engagement. Although recent renovations have reduced vehicular traffic, and added more modernized and aesthetically pleasing hardscapes, the space does not facilitate cultural activities or promote public use enough. Rarely is there enough foot traffic and population within the square to actually act as a public forum as it once did. However, this can be changed.
This thesis rejuvenates Market Square as a hybrid space ideal for a public forum of today’s and tomorrow’s society. The Square will utilize communication and information from current Social Media sites (Twitter, Facebook, and Foursquare) to create and dynamically modify a set of interventions in the space. This will allow the space to embody, project, and promote current local, regional, and global opinions, headlines, and developments to visitors. Ultimately the space will regain its strength as a powerful cultural catalyst in Pittsburgh. Through engagement of digital media, the Square can act as a dynamic embodiment of a range of feelings stemming from local to global sources.
Works of architecture are created for sociocultural “institutions” that, in turn, define the values and the landscapes of cultural meaning throughout a society. It becomes clear that the Pittsburgh Cultural Trust is responsible for the core values developing within the Cultural District. The Trust itself has not always guided the area; in fact, it is only quite recently that they have taken a strong hold of its revitalization. The recent revitalization of the district has come to fruition because of the Cultural Trust’s attention to the importance of this development for the better good of the city in terms of education and cultural development.

The P.C.T. was born as an institution dedicated to overseeing the urban revitalization, through the arts, of the downtrodden Penn-Liberty corridor. Originally conceived by H. J. Heinz II in 1971, the Pittsburgh Cultural Trust was a new non-profit organization looking to turn around a city that was in severe decline. Heinz, who started the Howard Heinz Endowment in 1941, was a believer in the arts and saw its importance for improving the quality of life of Pittsburgh. The Endowment still exists and has over 1.5 billion dollars in assets. As a whole the endowment was developed to take a closer look at the city, and help it prosper as a premier place to both live and work. They connect economic feasibility, i.e. their
Pittsburgh’s Cultural District

Distribution of theaters and galleries in the Cultural District

Fig

money, to advance education, culture and ecology. Ultimately, the money funnels into five grant programs, Arts & Culture, Children, Youth, Education, and Community, all of which are present and beginning to prosper in the Cultural District. It is the driven partnership of the Pittsburgh Cultural Trust and the Endowment to which the district owes most of its success.

The Trust has not only emerged as the face governing the advancement of the arts but also as an economic and cultural force in the city. They act as the ambassador between almost all of the performing and visual art groups in the city. With the interests of the entire district in mind, the P.C.T... Ultimately decides what, who, and how many interventions occur within the Cultural District. Currently they are managing over one million square feet of real estate, and have a responsibility to public art parks and gallery space throughout the 14 block area close to the bank of the Allegheny.

The radical adjustment to the District is truly commendable. The shift from a dead zone of the city, to a place to enlighten oneself is producing a buzz for the city that is ultimately important for its continued growth and second renaissance. Currently, The Trust has moved full steam ahead on a “restorative” approach. They applied pressure, economically and politically, to restore historic gems to their former glory.

As the Trust continues its development, it is important to consider their direction within the framework of their core values. After all, they are the largest Arts and Performance organization in the city, which involves a certain amount of responsibility. It is never good enough to just restore something to its former greatness if remaining is not economically and culturally viable into the future. As they look to engage hundreds of artist, thousands of students, and millions of people, the current trajectory will take them only so far because it fails to develop a relationship with the current modes of social interaction. So far, the P.C.T. has only focused on bringing the city’s assets to just above acceptable current standards. This process has proved to be profitable and stable. However, they have not dealt with the future and the current landscape of innovation. They should not only focus on revitalization but also on a new chapter for empowerment that takes into understanding local, regional and global forces and trends all available through social media. They have upgraded streets and sidewalks, and added sporadic greenspace within the corridor to promote serendipitous interaction between visitors, yet as the landscape of empowerment changes because of the space of flows, cultural enlightenment will also need to find a new direction for advancements.
Architecture is generated to satisfy a specific “need” for a “client” within a specific “locale.” How it mediates these three variables with relation to its global, cultural, and typological position become of utmost importance. As the Pittsburgh Cultural Trust upgrades its thinking from revitalization to growth, they have an opportunity to strengthen their core value of engaging artists, students, performers and guests by using performance and digital media as a catalytic cultural force in the community. This can be achieved through a hybridization of public space through the introduction of information flows into physical space. This is not a typical relationship in architecture because of the intangible nature of information. However, by using specific data within the “space of flows” to transform the Market Square performance pavilion this new urban space can become a vehicle for a responsivity and socially centric cultural activities. Although the information and configurations of the square are essentially spontaneous, the goals and reasons for hybridizing the space are quite deliberate. Most importantly, the pavilion exists to figuratively bridge the digital and physical worlds. Concurrently, it exists to challenge the idea of locality by
constantly evoking global, national, and trending opinions, information, and/or headlines in Market Square. As global data materializes and rises to the forefront of this public space, it becomes an innovative stimulus to strengthen Pittsburgh’s global perspective. Still, public performances within the square will continue to mature and reinforce Pittsburgh’s cultural identity. Configuration of the square and deployment of digital media promotes social interaction between all types of visitors, local, regional and international, while also linking guests of the space to the world. Finally, by operating in the physical world and embracing temporal data flows, the square acts as new public forum that is both analogue and digital.

As a performance venue, the square is first and foremost a public place, adding more public seating and public performance capacity to the Pittsburgh Cultural Trust’s current assets. The emphasis within the square will always be on public presentations, and public information. This is in contrast to the Trust’s other venues, where emphasis is placed on private, highly cultivated events. The dichotomy exists to offer and attract both new and existing people to performance arts as a whole.

Just as information flows operate at different spatial scales such as global, national, and regional, this performance pavilion delegates its translation and transformations to three interrelated but independent interventions. Specifically, the interventions can be understood as simple architectural manifestations in Market Square (roof surface with access above and below, columns, vertical digital surfaces and a suspended media cloud. Although they act as more complicated versions of their static brothers, their data-affected forms maintain their general composition. Functionally, each architectural object aims to choreograph itself with functions in the square, but maintain a sense of spontaneity and real-time dynamic flow. Hierarchies are not relegated to information flows only. Each architectural piece is subject to defined allowances of transformation connected to time of day, defined performances, local events, global events, weather, emergencies, and natural interaction.
THE DANCING COLUMN(S)

This proposal for Market Square incorporates columns, but unlike columns of the past, they dynamically parse information flows in an abstract manner. The abstraction is in place for three reasons. First, and most importantly, the interpretation changes the immaterial data into a series of actions that activate material architectural objects and return real tangible consequences on physical space. Second, the data conversion permits any information stream specified by the P.C.T. to trigger the column into motion, not just content, or frequency of content. As discussed previously, different event conditions within the square will permit the P.C.T. to specify strategic information categories to mine within global data streams. This ensures that the data stream parsed by each column is not merely confined to social media but will tangibly affect Market Square. Data mining, or scanning social media sites for information like location, frequency, and content, for the appropriate type of information will ensure the most meaningful materialization of the “space of flows” in the “space of place.”

For instance, let’s assume that on a winter night the Pittsburgh Cultural Trust has scheduled the Pittsburgh Symphony Orchestra to perform a small sampler event in the square to create buzz for an upcoming, more formal performance. The P.C.T. will have to define the demographics for the performance. In this case we will assume that the concert will attract more affluent attendees in their 40’s to 60’s. From that information we can define the categories needed to start mining the global and regional “space of flows.” Due to the defined demographic, the P.C.T. will mine Facebook status posts and twitter activity because they are the most used and developed streams of information by this user type. As the space of flows is mined, the resulting data will be materialized in different architectural objects (dancing columns or the digital cloud) to strengthen the performance, and promote social interaction.
Digital media surfaces in the square operate closest to the virtual world. Like typical screens, they offer a visual portal into the “space of flows.” Even though the information parsed by the square and projected into physical space through the digital surfaces lacks tactility, the projections excel in legibility and impact. Whether the data is in the form of social media messages, headlines, graphics, or something else, it will transform the space and inform visitors in a language that they currently understand.

There are two distinctly different digital surfaces types in the square. One type of surface, the vertical media screen, is only accessible to visitors in the square. The second, a projection unit suspended above the ground plane, is not attainable through touch but can be controlled by both global and local citizens. Vertical media surfaces exist on the market’s ground plane offering visitors a chance to interface with information, videos, and graphics specified or unspecified by the P.C.T. These surfaces are direct connections to information outside of the square. Visitors control their viewport and are in turn given direct access to the media cloud suspended in the space.

The media cloud acts as a projection screen communicating with anyone in viewing distance of the cloud. This includes but is not limited to viewers in the square, employees in vertical office buildings near the square, vehicular traffic, and pedestrian traffic circulating around the pavilion. The media, information and/or data stream projected onto the surface is specified by two user groups. Most access will be gained through the internet where global users are able to interface with the cloud through typical digital means. However at any moment their interaction can and will be overridden by visitors in the square. Through the vertical media surfaces, visitors are able to override anything being projected in the square. This gives the ultimate power to visitors physically in the space. For instance, global business may elect to advertise on the media cloud just as they would on a highway billboard. By tweeting their company advertisement to the square, their logo or advertisement will be projected on the media cloud. However, that advertisement can be changed by visitors in the square to reflect other information, media or statistics chosen or specified by the visitor. Ultimately the cloud becomes virtual battle ground for screen time where visitors in the physical space have a massive advantage over global users.

Each digital surface has immense potential in delivering a message. It is through a directness in language and image, that these surfaces strengthen Pittsburgh’s global perspective and link guests in the space to the world.
One of the most important components to the proposed performance pavilion is the roof surface. Although it does not directly transform, it gives the square the ability to cater to different types of performances and events. In turn, the surface dynamically activates the square with cultural performances throughout the year.

Beyond its functionality, the performance surface acts as a new datum in the composition of the square. The datum is only interrupted in specific moments to harbor major functions. Touching down only to accommodate event stage seating, the performance space mediates between everyday use and special events with simple formal strategy.

The two unique performance spaces add roughly 500 seats to the P.C.T.’s current capacity of 24,000 seats. However, unlike the Trust’s other venues, the added capacity is strictly for public events. The emphasis within the square will always be on public presentations, and public information. The diversion from private performance arts to public performances will attract both new and existing people to cultural art in order to intensify Pittsburgh’s cultural identity.
As each architectural object interacts uniquely with information flows, the individual transformations come together to create a new public forum that is both analogue and digital. Hybridization of this particular public space ensures that Pittsburgh’s Market Square will emblematically bridge the digital and physical world. As the Pittsburgh Cultural Trust upgrades its thinking from revitalization to growth, they can strengthen their core value of engaging artists, students, performers, and guests, by using performance and digital media as a catalytic cultural force in the community. The intangible nature of information creates atypical relationship between architecture and technology. However, by using specific data within the “space of flows” to transform the performance pavilion, this pavilion is able to become a vehicle for a responsive and socially centric cultural space. Although the information and configurations of the square are essentially spontaneous, the goals and reasons for hybridizing the space are calculated.

Again, the pavilion exists to figuratively bridge the digital and physical world. Concurrently, it exists to challenge the idea of locality by constantly evoking global, national, and trending opinions, information, and/or headlines in Market Square. As data materializes and rises to the forefront of this public space, with varying degrees of directness, it becomes an innovative stimulus to strengthen Pittsburgh’s global perspective. Still, public performances within the square will continue to mature and reinforce Pittsburgh’s cultural identity. Changing configurations of the square and deployment of digital media can promote social interaction between all types of visitors, while also linking guests in the space to the world. Finally, by operating in the physical world and embracing temporal data flows, the square acts as new public forum between people and the world around them.
In order to gain awareness for a new symphony asset, the Pittsburgh Symphony Orchestra has developed a small concert to showcase their current trends. The concert will act as a live advertisement to gain public interest for shows at Heinz Hall.

The Pittsburgh Ballet is holding a ballet competition with the local ballet schools to discover the best ballet performance and school. With a cash prize at stake, local ballet schools will compete in the competition that strives to see the public stage as a prop.

A Pittsburgh middle school has written and produced a modern interpretation of Romeo and Juliet. Although the play has been modernized, its roots are still present allowing the site to be a perfect backdrops for the performance.

The University of Pittsburgh’s Dance team is performing to benefit the local Make-A-Wish foundation which holds strong roots in the city. They have partnered with local businesses to see the buzz in the city to define the amount of monetary commitment they make.

Trinity Episcopal Cathedral is using their choir to gain awareness for the church itself and spread their beliefs. They will be singing their favorite songs during lunch hours and on the weekend for a week.

Old rock legend site has decided to do a small tour around the United States. They will be putting on their private/biased show at the Market Square Piazza. They will cater the performance to all ages, new and old fans, etc.

High Schools and Middle schools looking to promote the arts in the schools, decide to put on a night-time concert at the infamous market square pavilion. Each school will perform on a different night for one hour.

Local businesses in the retail district of Pittsburgh have commissioned a dance group to choreograph a flash mob during the Christmas holiday. The Dance Mob will draw interest to market square for the local cities and tourists.

Pittsburgh City Council uses the stage to announce the construction of new public buildings. They rent will accommodate the Media outlets in a positive manner.

Pressing the ineffective government spending and environment, inefficiencies, Regional citizens protest in the square. Using the backdrop of the pavilion to enrage the cause and shape, all types of people use the stage to explain their frustrations.


Bullivant, L. “There has always been a relationship between design and technology”: Ron Arad on Interactivity and Low-Res Design. Archit Design, 75, 2005: 54–61


