Empathic Vectors

Fredrick H. Zal
Atelier Z: an.architecture and industrial design studio

This paper delineates a methodology, which endeavors to rationalize qualitative perceptions of space into quantifiable and constructive form through implementing a range of two-dimensional, three-dimensional, calculation and interactive physical modeling tools at varying scales. The presentation format of the paper cycles through a series of paired 'design intent' and 'process' elements. The purpose of this 'why' / 'how' pairing is to keep the focus of the dialogue connected with the empathic intent of design, and to not stray to less important tangents during the formulation processes. This methodology of weaving empathic vectors into and amongst the fields of force that create our inhabited world is currently in an experimental process of formation and is open to critical dialogue.

Introduction

Design gives shape to an environment where human activities are made possible, and has a responsibility to imaginatively speculate upon the ongoing drama of human existence, narrative, emotions and memories. Architectural technology must engage the mundane detail of everyday life at the same time that it addresses the sometimes vague and difficult questions of who and what we are as individuals and as communities. Architecture and Engineering is unique in this charge amongst the fine and applied arts to create spaces that engage the psyche by embodying our socio-cultural conditions. We must create specific active and passive spaces that allow both individuals and groups to engage their environment.

To speculate upon methodologies, which harmonize both active and passive verb-based spatial design to evoke humanistic feeling; my students, clients and I have speculated upon the fundamental and poetic concepts of sight, sound, touch, movement, and time in symbiotic relationships. I have been using this methodology in both my academic teaching at design institutes across the Pacific Northwest, and in my professional practice as an architect, sculptor and industrial designer. By developing this process, we have developed a strong foundation to our design work, which may fluidly respond to the morphological needs of a project whether a path of travel, moment of contemplation or a place for work. The process enables us to survey the existing conditions of a site, speculate upon appropriate interventions, test these ideas, reiterative the process as required, refine them based upon building requirements, and then verify their manifestation of the original empathic design intentions.

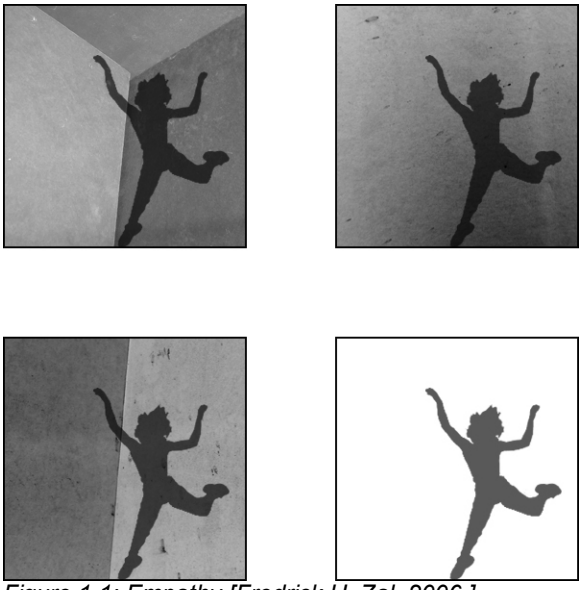


Figure 1.1: Empathy [Fredrick H. Zal, 2006.]

Design Intent: Empathy

Empathy can be understood to be the projection of one's emotional state upon a space or object, or the vicarious experience of a situation through identification, understanding and the internalization of such feelings about the space or object. Empathy spans the quantitative and qualitative aspects of how our world is perceived and translated by the human psyche to create degrees of passionate and visceral response. Respecting both the romantic and pragmatic implications of our design intentions, we can refine an idea to align with or challenge socio-cultural perceptions, as many of these cultural memories are tied to physiological roots. Body positioning in juxtaposition to mass and/or void evoke memories that trigger emotional reactions.

By imaging what your feelings would be in differing physical settings, you can illustrate the principles behind empathy theory. If one is alone in a vacuum, with no external stimuli, they would feel a certain amount of unrest. To then have a simple plane in space near them, a sense of relativity can anchor us to feel a bit more comfort. As this plane folds or curves to create a concavity, we begin to feel a sense of directionality. There is an area in front / behind and inside / outside as space is defined. Then, as this concavity builds up overhead to envelope us, a sense of stability is reached and we are sheltered within its form. Knowing of a place within and without, we can make choices to our placement in space dependant upon our emotional desires and needs for environmental protection.

Process: Experimenting

To initiate this process, let us begin with the most simple of our primordial tasks as designers; the act of sheltering. Key to human existence, it is considered to be one of our three minimal needs; along with eating and wearing protective clothes. It is important to understand that the root of our work is not the static noun form of 'shelter' espoused by Abbé Marc-Antoine Laugier since 1755, but rather to provide a sense of shelter, a perceptual verb / action base for spatial design.

Depending upon the local climate, the way in which this space shelters will differ. Be it an element to screen, shield, block or guard; the interior must foster a sense of protection from the external environment. It is this perceived sense, the design, definition and creation of this feeling which is important, and it does not matter what the element is built from, or which platonic geometry it echoes. This protective gesture of "sheltering" could be perceived under a single blade of grass, the wisp of a feather, the web of a spider, or the mass of an overhanging rock. In each case there is a complex balance between the dualities of solid / void, light / shadow, and inside / outside. The mind interprets the gradation between dualities to form a perception of the space, and in turn is what makes us feel 'comfortable', 'vulnerable', 'suffocated' or 'empowered'.

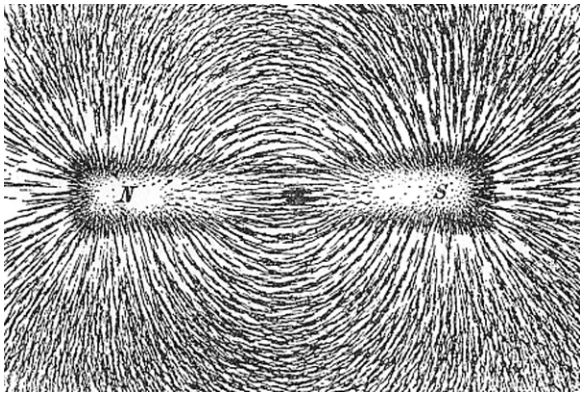


Figure 2.1: Magnetic Phenomena [Michael Faraday, 1831.]

Design Intent: Embodying

These dualities create metaphysical fields of force in our perception of space much like the positive / negative flows of geomagnetics, which is a commonly accepted example of metaphysical forces interpreted visually. These metaphysical lines of force were illustrated by Michael Faraday in 1831 by scattering metal

shavings around dipole bar magnets. The metal shavings follow the lines of force and create a series of discrete arcs radiating from each end of the magnet. Faraday believed that these lines of forces fill the space in which we live, which would otherwise be a perceptual vacuum. The lines of force are not just metaphysical, but have a physical sense, just as we now understand how light can behave like a particle. But, popular science of the time rejected his qualitative metaphysics in preference for the quantifiable mathematical theorems of William Thomson and James Clerk Maxwell. Society was transforming from a legacy of spirituality to the age of rational thought, and therefore rejected all propositions that could not be labeled and quantified. In our current age of optimism, these and other principles are being rediscovered. The principles of physical / metaphysical hybrids hold true and may allow us to better understand the multiphasic world in which we live and design.

Process: Forming

Our orientation in space, and relationship to mass and void through our bodies is the key to understanding the empathic forces and forming appropriate inter-relationships between orders of scale and sequences of spaces. When the body is moving through space, standing still, gazing about, sitting down or laying at rest there are different physiological needs. Our need for a sense of comfort will unconsciously orient us toward the sun's warmth or place the protective mass of a rock behind us much like the needle on a geomancer's compass. Distances between floor and ceiling or opposing walls will augment a sense of comfort or oppression. Angling or modulation of these elements in reference to the binocular field of vision will further enhance the sense of movement. Creating spaces that are specific to body positioning or paths of movement are quintessential to this tact of design and is what makes empathic design most profound. After all, a space designed for working is certainly not the same physical and phenomenological space needed for quietly contemplating or traveling.

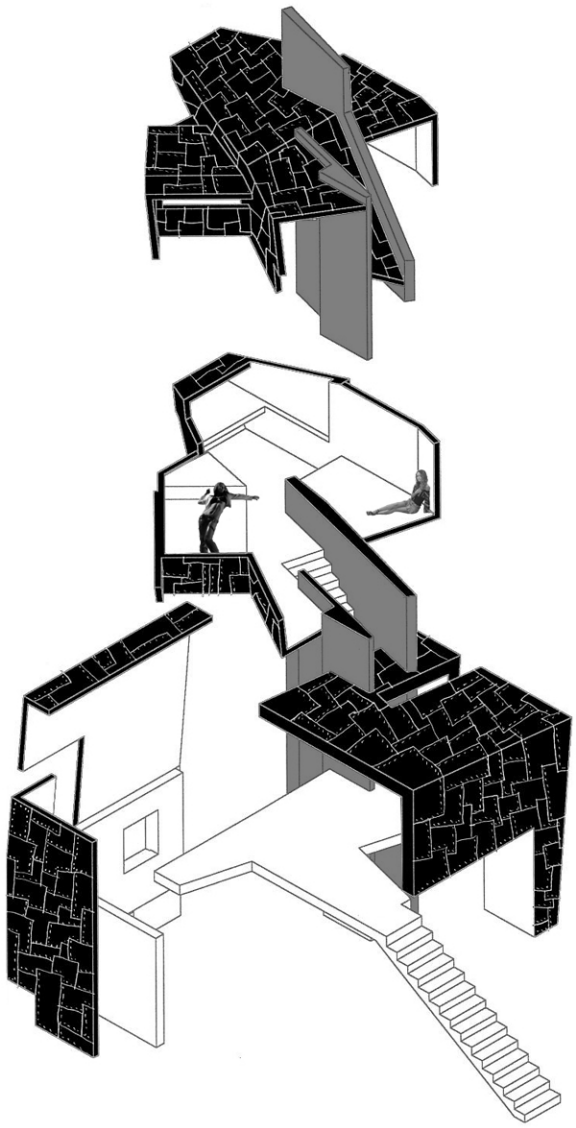


Figure 3.1: Honme Dwelling [Atelier Z, 2004.]

To converse in the complex sensory perceptions tied to physiology, we may engage the field of ergonomics. Ergonomics is the study of interactions between the human body, space and objects for the optimization of comfort and performance. The Honme Dwelling [2004] was designed through a reiterative process that integrated careful ergonomic studies of the clients' body dimensions, range of motion and comfort preferences. This

existing residential structure will be augmented with a number of pre-fabricated shards. The largest shard is a tower on the Northwest corner that parasitically springs up from the ground plane. Its form is derived from the integration of two separate paths of travel. One path being of speed and verticality, so that the shy partner could flee the cacophony of company when needed. The other is extroverted, and allows for a sense of grand entry, promenade and even pontification when desired. As the paths converge into one, they reach up towards the sky and sunlight. The upper chamber is divided into a place for sleep, work and study directly proportional to the bodily engagement required for the action or inaction. The ergonomics are mediated by a vertical support, protective skin and solar filters, which combine to create a sumptuous experience.

Design Intent: Purity

In sculpting the desired form, it should remain pure, and must not become over analyzed or self-referential. To ensure that this purity remains, it is important that the designer work quickly and does not need to have tangential tasks that would sway the mind's focus, such as precise measuring or cutting, while creating a physical version of the design intentions. As we move into physical space formation, there is a potential to misinterpret or loose some of the purity understood from our enteric nervous system or gut. If possible, the designer should fully engage this intuition, and leave the logical left side of the brain in a state of calm meditation. The paradox being that anything physical by definition eschews being ephemeral, let alone phenomenological. Further, as inventors of physical artifacts, we of course need to design and propose ideas that may be constructed. But for now, these aspects need to step aside, and patiently wait for an appropriate point in the evolution of the design process for their implementation.

Frank Lloyd Wright tried to clarify one of the primary lessons espoused by his mentor Louis Henry Sullivan, that "form ever follows function" as it is still misunderstood by the majority of the professional and lay public. Wright clarified that "form and function should be one, joined in a spiritual union". This speaks to an understanding of the inter-relationship between physics and metaphysics in architectural space. It is important to further understand that the "function", to which they both refer, is speaking about the passive or active verb engagement of the space, and not the banality of economics or industrial standardization. Both of these Architects worked closely with craftspeople to create unique and customized designs for their clients. Sullivan's intention was not that we should design based upon the geometry of a plywood sheet, 2x4, brick, or any symbolic nomenclature, but that we should harness the power in both the practical and phenomenological. The function of the space must remain true to the intended use of the space at all cost, even if new methods of construction or calculation must be invented to satiate these needs.

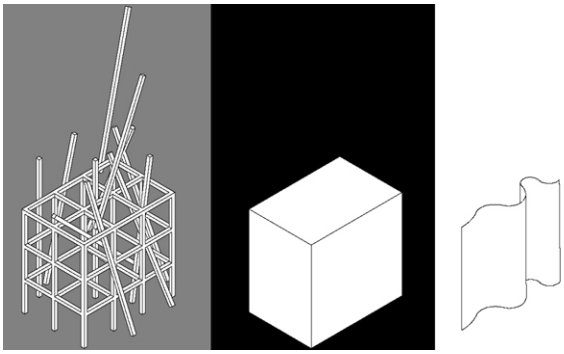


Figure 4.1: Frame / Mass / Skin Language [Fredrick H. Zal, 2002.]

Process: Tools

Today we could design using the zero-volume of Non-uniform Rational B-splines [NuRBs] in digital space that can be fluidly sculpted and later quantified with Building Information Modeling [BIM]. But, such technology still has a few limitations due to secondary interfaces and output devises, and is not readily available to all

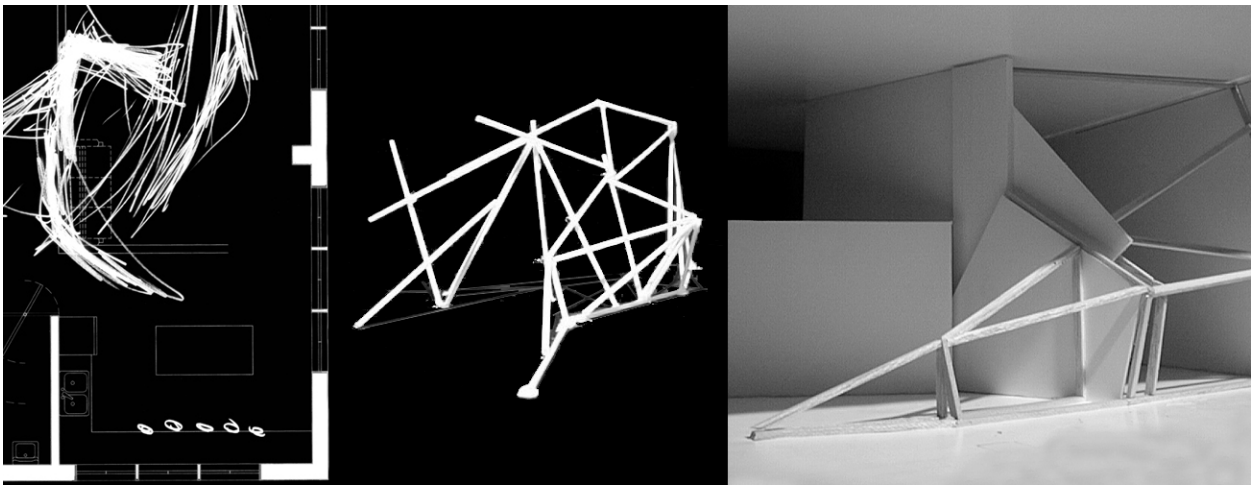
demographics. As it is the mind and the design idea that needs to be forefront, and not the tool; I have been searching for other primitive and humble design methods that share the same potential.

Many have worked with a kit of parts arranged in Cartesian space. But their predictable nature leads to a repetition of exactly what we want to transcend. The rectilinear spaces, though seemingly provocative, were no more suited as space for working then they were for sitting, standing, sleeping, gazing, or running. The process was predestined for failure with the given materials, and needed to find another tool with greater potential. As a drop of ink on mylar can transform into anything that the author desires to render in two-dimensional media, we needed to devise an interactive three-dimensional form that would have the same degrees of freedom. Building a detailed digital topography for the Armadillo Zen House [2002], I was fascinated by how all complex forms were rationalized through a series of triangulated facets. This concept of rendering organic form started with the study of Crystallography by Giovanni Struver in 1888, and was later brought to the fine arts by Michael Heizer's "Chaotic Geometrics" in 1987. The language of organic abstraction continues today in the work of Coop Himmelb[l]au and Daniel Liebeskind, amongst others. While as the designed forms are not geometrically pure, the design premise is both descriptive and constructible from standardized sheet goods. It seems like a strong compromise between the logic needs of the left brain and the holistic narrative of the right.

To experiment with these ideas, hundreds of random-sized triangles are tossed upon the table. Then, as the designer envisions a gestural response, pieces are quickly hot-glued in place. Like a wave breaking upon the ocean, a global form is envisioned. Each particle of water is pulled towards the force of the wave's motion, but does not need to follow the geometry of the crest exactly. This form of modeling was a partial success, as the elements were able to describe the intended holistic narrative of the space without getting hung-up on precision of the parts. The designs balanced between the vague and the specific to allow the mind to interpret perceptions laden with phenomena. But, the balance was still a touch off, since these design iterations share a fractured and angular aesthetic; which was keeping with the misunderstanding of Sullivan, but not the pure purpose of design. The module of design was wrong and their geometrical bias caused them to be labeled critically.

Figure 5.1: Wall of Amir [Atelier Z, 2002.]

Alvar Aalto would emphasize that to use any constructive module larger then one millimeter will cause us to limit the potential of our design. This is because every unit of measurement or physical module has an implicit geometry and prescribed set of defining conditions that engage the left side



Figures 6.1, 6.2, + 6.3: Viellet Loft [Atelier Z, 1999.]

of the brain. So that every time we start designing with a quantitative system of measurement; whether it is the modular, golden section, cubit, ken 間, foot, or meter, we loose grasp of the pure intent of our design. Therefore, we needed an element, which could geometrically describe point, line, plane and curve equally well. We needed a physical version of a NuRB, something pure and without any associated labels. Then one day, the simplest of things occurred to me. A plane is defined by the intersection of a line with a point. Hyperbola are described through a series of lines, much like the sculptures of Naum Gabo. And a line, when viewed from its end, transforms into a point. The solution therefore was to build out of pure lines. To physically construct gestural line drawings full of raw energy!

This breakthrough has been extremely successful! Empathic stick vectors may be easily experimented with by building from toothpicks, straws, dowels, rebar, galvanized conduit, timber bamboo, pine 2x2's, or any other linear element appropriate to the scale of the interactive modeling.

The first professional application of these empathic stick vectors was the Jean-Pierre Viellet Artist Loft [1999]. This remodel of an industrial warehouse space into a mix of artist studio, fabrication shop and personal living space needed to have a clear demarcation between the differing uses. A path of travel and light was determined, against which forces were exerted by the

Figure 7.1: Shade Catcher [Fredrick H. Zal, 2005.]

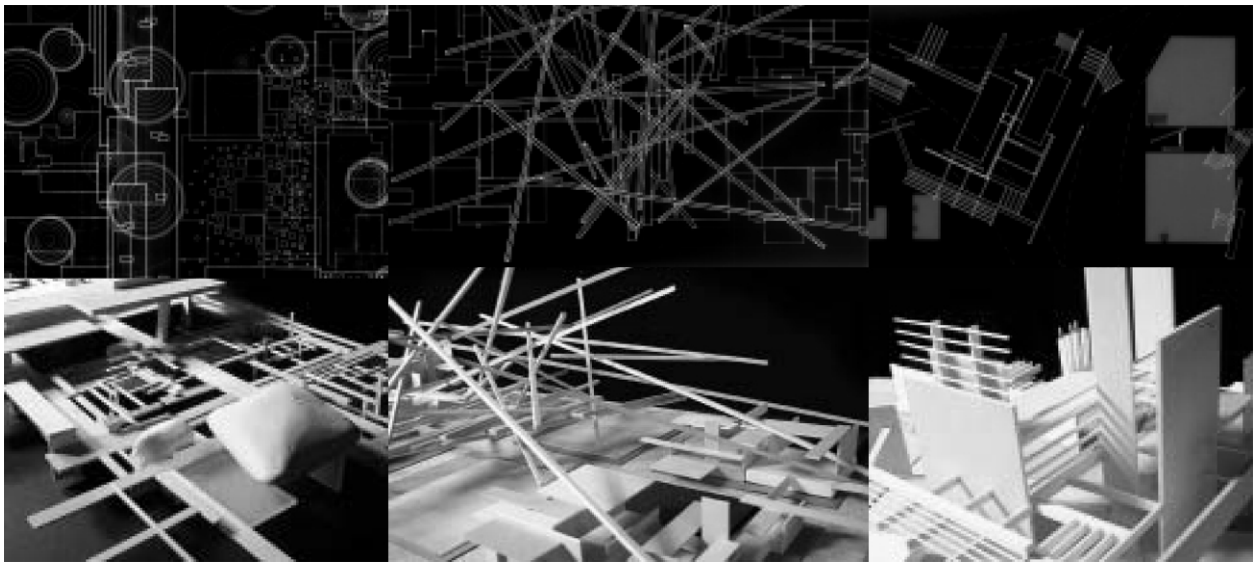
individual needs of the spaces. These forces instigated the creation of a translucent mediating skin of polycarbonate over metal frames that welcomed clients, showcased the artists' aesthetic and filtered light and dust respectively.

To increase my intuitive knowledge of the spaces created through this process, I have been sculpting temporary installations of empathic stick vectors at an occupiable human scale. This has allowed me to experiment with how the body may engage space and how such speculative spaces will be perceived in real life. In the Summer of 2005, the Shade Catcher was erected to challenge the preconceptions of how we interact with known spaces in our environment. It was created upon the tabula rasa of the desert and focused upon how acts of cooking, resting, gazing and storing of materials may respectfully engage each other. Each discrete space was formed upon the minimal dimensions and kinematic requirements of the bodies that would inhabit it for just over one week. Filters between public extroversion and privacy were enhanced through a series of diffusing elements and gestural forms. The space was not only greatly appreciated by hundreds, but also demonstrated that great structural strength is possible through redundancy of low-tech slender elements.

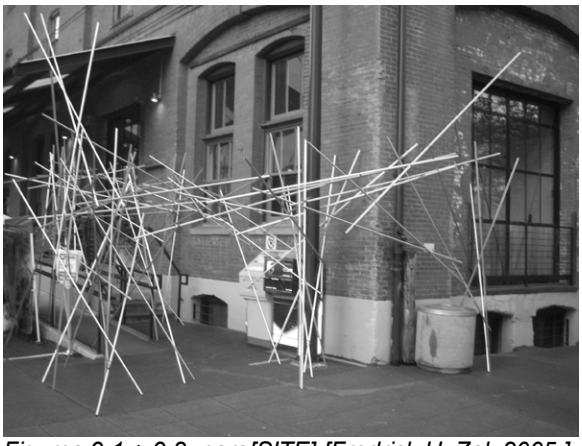
Design Intent: Translating

To engage our understanding of personal body space into the larger context of urban or rural scale, it is instructive to create drawings that interpret them into a visual language we can discuss. The process begins with looking at the external conditions of a site to be able to map, translate and derive contextual form from the physical and phenomenological nature of the context into a shared language. The site is considered a hybrid landscape, where both formal and phenomenological elements of the past, present and future are merged, putting forth a character that is simultaneously, both familiar and unfamiliar, vague and specific, qualitative and quantitative, etc. By harnessing the physical and metaphysical power of these forces we can design space that resonates with the pure conditions of the human psyche, and therefore design with a language inherent to architectural space, which will enhance and maintain the psychological and cultural nature of our society.

This is a part of the process which is much more familiar to design pedagogies, since contrary to all other arts, the field of architecture has been primarily developing from the outside inwards for the last four hundred years in both academia and the



*Figures 8.1, 8.2 + 8.3: Analytiques [*Leben, Elliott, and Medina*, 2003.]*



Figures 9.1 + 9.2: para[SITE] [Fredrick H. Zal, 2005.]

profession. These external pressures are certainly quintessential to the forces exerted upon a design, but they need to act symbiotically with those, which are coming from the internal experience and the sense of movement in, amongst and between the two.

Process: Integrating

An interwoven composite of the analytiques are then used as the impetus for the construction of a three-dimensional site investigation at varying scales of engagement with morphological layers that mediate between exterior and interior conditions. It is important to balance the two vantage points of inside – outside with outside – inside into a symbiotic whole. The figure / ground of context and design must work together harmoniously! This physical speculation is hence constructed from the pure phenomena and formalistic qualities that compose the nature of the site itself.

A method that we have been employing is the creation of plan and section psychographic analytiques. These figure-ground ink drawings represent metaphysical conditions perceived by the mind, much like the dark ferrous shavings accumulated on Faraday's clear sheets of glass. The analysis looks beyond simply the formal aspects of the site, and questions how other elements can be explored to construct and communicate the totality of our cerebral perception of the place. The series of analytical plan gestures are inspired from a multitude of potential elements, such as: public / private layers, fear / tranquility, thresholds, transformations, day / night, sound, enclosure, textures, natural / artificial light, use, solid / void, historic relativity, etc. The medium of ink drawings was selected due to the inherent freedom that ink has in application by brush, pen, hand or air. Plus, as ink has the potential of rendering very specific language, it is possible for a designer to experiment with effectively translating qualitative phenomena into quantitative terms. To communicate the third and fourth dimensional relationships within the experience of place, the gestures incorporate varying lineweights, tones and figure-ground hierarchies. Their intention is to capture emotions, history or other sensations in as pure and gestural of a state as possible. Representation and analysis of an existing context in this form develops an awareness and understanding of the various elements that define the experience of a specific environment for both the designer and inhabitants.

Design Intent: Intervening

The city or countryside has rhythms and patterns that will beg to be followed. Areas of entry, transition, occupation and egress will naturally occur. Each space's need for volume and direction will demand to be heard. Linkages between the spaces will flow dependent upon their sequence. The natural elements, topography and movement will advise orientations and

weaving of layers. Just as Faraday's metal shaving moved along the magnetic lines of force, architectural elements should naturally find a place along the phenomenological fields of force.

Another installation in 2005, entitled para[SITE], was commissioned by the Urban Art Network to specifically engage how fire code defines movement from the interior space of their headquarters to the exterior City along a path of egress. Without any threat to public safety, empathic stick vectors hovered and flowed with the directional forces of tenants' movements along the path and out to the surrounding context. The forgotten nature of their movement along this path of travel was reinterpreted to allow users to take pause and reflect upon their daily movements through time and space.

Process: Mediating

To create designs that are respectful of the pressures exerted by both interior / exterior conditions and needs or the transition from differing spaces along a path of travel, I have been working with the concept of a zone of zero-thickness that exists between the discrete conditions to form connective tissue. This connective tissue I have termed "zero-space" in my Land|Form an.Architecture dialectic.

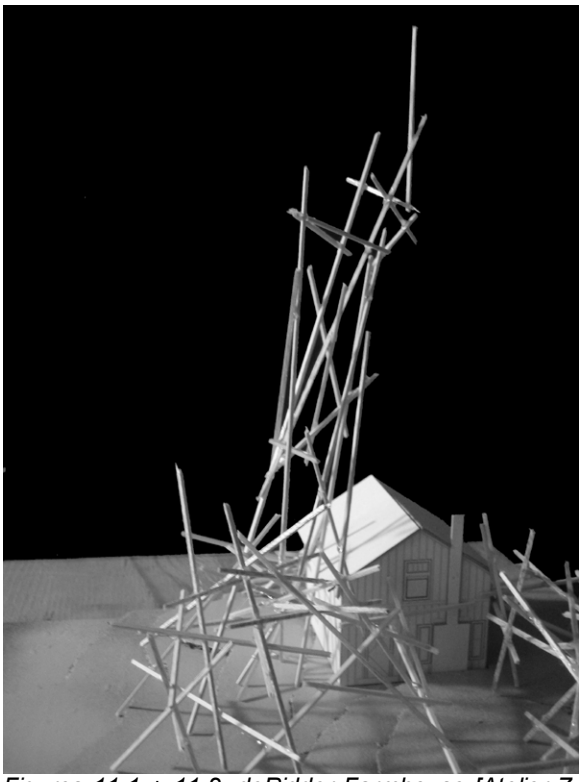
By applying forces upon the surface of the zero-space skins and folding them into new forms that are derivative of the empathic and phenomenological needs of space; we begin to form the artifice, which we call architecture. The geomorphic terrain of the zero-space folds around the body and thicken as required to create a place to sit, lie, or stand. The body's needs carve apertures from both within and without. The body reaches out to exert pressure and creates surfaces that enhance their emotional and physical needs for inhabitation of this new space. As the body moves through this evolving space, juxtapositions of positive and negative space are instigated that provide cadence for walking and climbing. It is a holistic space still visceral and exciting; full of the kinematics of pure empathy.

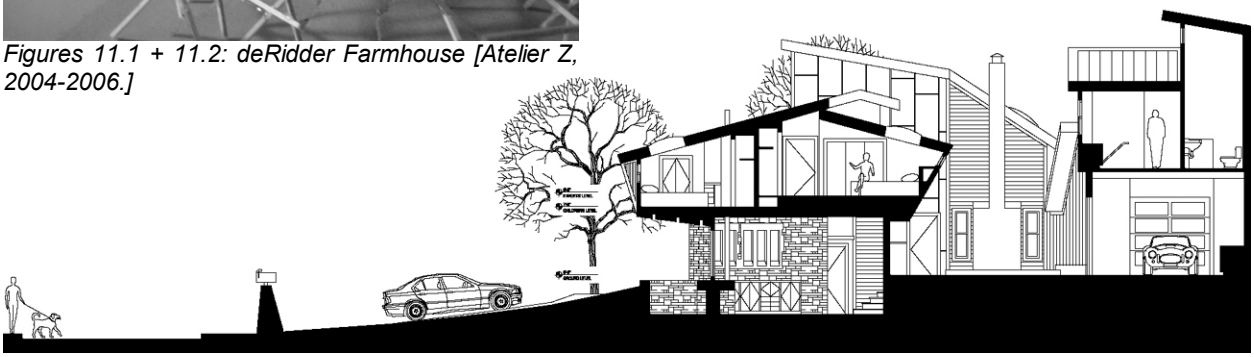
As multiple Land|Form spaces evolve around multiple bodies, complex dialogues interlock these mediating zero-space skins like a complex puzzle. The idea of these mediating Land|Form skins takes the concept of poché, structural mass between spaces, activates it to a higher level by interlocking not just the physical elements in plan and section, but also their narrative. This concept can be visualized as the acrobatic tension between two capoeira dancers or viscous fluids rolling across each other, but never quite touching. The sensuous nature of this interaction will become entwined in the final composition to enhance each unique space's sensorial state upon the body, echoing throughout the spaces to foreshadow spatial sequences.

As the applied forces continue to evolve, the skin itself becomes not just a mediator of inside / outside, but actual form, distinct from its previous non-dimensional relation. The mediating zone is neither inside nor outside, neither solid nor void; it is the zero-space. The empathic and phenomenological qualities, which derived the forms, call out for specific material properties. Differentiation between opacity and translucence, the sound of hard against soft, tactility of smooth in relation to rough; these are the properties which allow us to define material constructions and detail their intersections.

Figure 10.1: Land|Form [Fredrick H. Zal, 2003.]

The deRidder Farmhouse has allowed this methodology to engage a project that is scheduled for construction in 2006. Looking at the contextual tensions between occupant needs, zoning code, topography, vague programmatic volumes and solar orientation; a sculptural composition of vectors solidified into an appropriate form. The design was further developed through exerting the internal forces from places to sleep, converse, create and circulate within the overall form. Areas with gravitational concentration were solidified into masonry mass. Gestures towards or to protect from the sun evolved into cantilevers of zinc. Juxtapositions of internal divisions allow for a balance between open communication and the needs for private personal space in a growing family.





Figures 11.1 + 11.2: deRidder Farmhouse [Atelier Z, 2004-2006.]

Design Intent: Rationalizing

Building with lines is much like watching a spider construct a web. The first lines are parasitic, as they latch onto the surrounding context for structural support. But, as the design grows and begins to find a balance between the interior and exterior forces shaping it, non-essential elements may be removed or clipped so that only the essential connections with the context remain. This redundancy of elements allows for no single element to bear the structural weight of the entire composition. There are no given load paths, primary members or material definitions; so the design remains pure, informal and open to interpretation. The important focus is actually not even the vectors themselves, but the nodes of intersection that like a hologram may work together to describe an infinite number of design options.

Cecil Balmond has been working with the concepts of: scatter, cloud, and zone in contrast to grid, axis, or line as a new language for design rationalization. The belief is that each design, no matter how seemingly chaotic, has its own internal rhythms and patterns, much like the politics of a complex urban culture. Working with this intrinsic pattern allows the design intentions to flourish into a rationalized beauty that is pure. This is the new form of architecture that leCorbusier had called for with "Vers une architecture" in 1923. Structure, skin and space integrated to form a beautiful and logical whole.

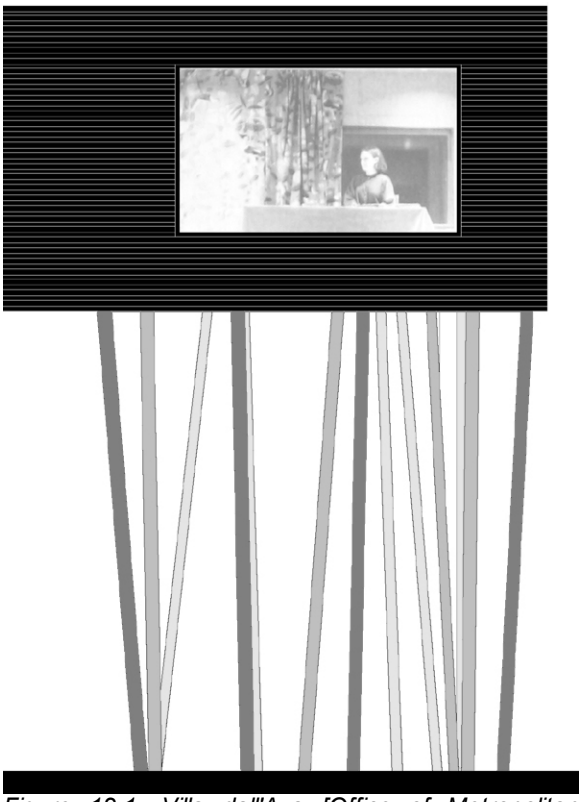


Figure 12.1: Villa dall'Ava [Office of Metropolitan Architecture, Rem Koolhaas, 1991.]

Process: Constructing

This informal language can be seen in many contemporary projects. Of particular note, and illustrative of this informal structural language are Villa dall'Ava [1991] by Rem Koolhaas in St Cloud, Paris, France and the Olympic Archery Training Range [1990] by Enric Miralles and Carme Pinós in Barcelona, Spain. Both projects endeavor to create a sense of lightness and hovering by having a redundancy of slender members that support their physical and psychological loads in tandem. No single member is predominant and could easily be removed or translated through space to have a different orientation for a greater perceptual impact. The mind is forced to accept the composition of space in its totality, and cannot parse it down into predetermined static systems.

The Villa dall'Ava makes use of a series of slender columns to hold-up the second apartment on the southwest corner of its composition. Making use of perspectival parallax, Rem Koolhaas purposely obscured the ability for the mind to define the structural system in 'civilized' terms. Albeit a simple trick of Gestalt psychology that abuses the left-brain's logic center, this allows the mind to enjoy the composition in a more organic manner, like a grove of bamboo holding up a massive canopy of leaves or as the legs of a giraffe that lend to its grace. By freeing the effects of structural preconception to create a seeming perception of anti-gravity, the project effectively employs the concepts within leCorbusier's "five points".

The Olympic Archery Training Range designed for the Barcelona Olympics employ a similar strategy. The inspiration for the design was the trajectories created by the raw force of an archer's arrows interacting with the turbulent flow of air through space. The roof, a series of opposing planes, creates a sense of fluid undulation skewered by apertures of light to the locker rooms below. Then an assortment of simple shafts are cast into the sand as dropped from an archer's sheath, and gracefully support the flow of the roof above. Again it is this seemingly 'random' nature of the supportive columns that obfuscate their structural nature and allow the roof above to maintain its sense of airborne freedom. But in reality, it is precisely the seemingly random angles of the columns that allows for a most efficient transfer of loads in a relatively perpendicular direction from the ever-changing roof geometry down to the ground.

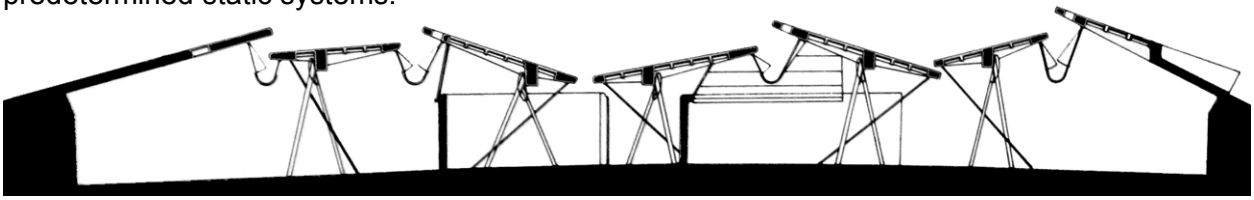


Figure 12.2: Olympic Archery Training Range [Enric Miralles + Carme Pinós, 1990.]

In both examples, the array of elements conjures empathic fields of force vectors that we can feel with our mind and body. Through photographic representation, the array can be input as vectors along two-force elements into a digital model, or analyzed using graphic statics and free-body diagrams. These methods of analysis take a form, which is pure in its design intent, determines the direction and quantity of load paths so that one can assign structural properties to them. Tensile elements can be replaced with cables to create tensegral clouds, planar nodes can be consolidated into shear panel skins, and consolidated compressive elements can be molded to create a minimal section modulus or allow for the transfer of moment.

Validating and Reiteration

Before 'finalizing' the design, one should review the original design requirements of site, program, emotions, budget, etc. Are the physical, psychological and capital requirements met? May the design solution have a refined palette of systems that eloquently address the problem efficiently and effectively? The term 'efficiency' is complex and should not be defined only by the economic use of members or sheets of required calculation, but by ease of meeting design intentions. If done intelligently, this not only efficiently responds to the flow of forces through it, but also communicates an intuitive structural language of materials and space that has life-cycle benefits.

Through reiteration of the process, one may ensure that all of the qualitative stimuli now embodied in a quantifiable form are still adhering to the originally intended design sensations. It can be painful to scrap a design, start over, or feel like one is going 'backwards' in the process. But, to repeat the process after working through it one or more times, the designer has a greater understanding of the pathways. They can avoid pitfalls, preconceptions, or other earlier errors to create something stronger. As no problem has an unique solution, reiteration will remove the egotistical fetishization of a singular solution, style or artifact and place it amongst the multitude of possibilities from a diversity of cultural and sociological perspectives.

Conclusion

This drawing, modeling and calculation process has infused my academic and professional career with a raw energy that I highly recommend. Collaborations with students, performance artists, and consulting engineers remain fluid while simultaneously focused upon both 'reality' and the true empathic intent of professional design work.

I look forward to continuing a dialogue about this process as you experiment with ways to apply it within your established or evolving curricula and professional practices.

Fredrick H. Zal, NCARB, is a sculptor and the principal architect of Atelier Z: an.architecture and industrial design studio, which advocates dialogue in the fine + applied arts. By striking a balance between praxis and theoros, Atelier Z passionately engages works with a focus upon theoretical morphology, materiality and empathy theory. As a professor of design and active practitioner, Fredrick's work is published, exhibited and lectured upon nationally.
Website:http://www.fhzal.com E-mail: fzal@fhzal.com Phone: 503.236.4855

Figures:

Figure 1.1: Empathy [Fredrick H. Zal, 2006.] These images show a base series of spatial conditions: void, plane, concavity, and enclosure. Imagine yourself there and vicariously experience what it would feel like in each of these spaces.

Figure 2.1: Magnetic Phenomena [Michael Faraday, 1831.] Reference: Friedel, Robert D. "Lines and Waves Exhibition", Institute of Electrical and Electronics Engineers History Center, 1981.

Figure 3.1: Honme Dwelling [Atelier Z, 2004.] The unfolding form of this dwelling is based upon a series of incredible discussions between the client and architect about space, form, sociology, aesthetics, the delicate warm light found in the film "La Double Vie de Véronique" by Krzysztof Kieslowski, the morphological systems of 1850's crystallography by Struver, concepts of materiality as it pertains to both contemporary Japanese minimalism and also Ned Ludd's theories of a luddite society experienced in the films "Brazil", "12 Monkeys", "City of Lost Children", and "Matrix". The pre-fabricated shards are being constructed of Structural Insulated Panels [SIPs] and clad with riveted zinc by Blazer Industries inc.

Figure 4.1: Frame / Mass / Skin Language [Fredrick H. Zal, 2002.] The phonetics here are based upon the conceptual design work of Bernard Tschumi's "Decomposition of Cube" and "Recombination". His studies led to a matrix of the potential permutations of recombined platonic forms. These additive forms subsequently defined the constructed designs for the follies at the Parc de la Villette. The lineage of this work can also be seen in the Stockholm Exhibition [1930]. Original Publication: Zal, Fredrick H., ACSA West Proceedings: Imagined Realms | Remaking Worlds "Gestalt of deFamiliarized Urbanism", November 2002, p.257-262.

Figure 5.1: Wall of Amir [Atelier Z, 2002.] This remodel of a historic school house room at Portland State University sprang from the architectural theory taught by the faculty. It is a physical manifestation of the phenomenological rhetoric that guides the students' pedagogy. The single office was divided into two. The first being a solid mass of fractured darkness, and the other being transcendental and composed by a simple plane of light and text. The shared entry area allows for a student conference table with a light fixture cantilevering out as a fractured shard from the mass beyond.

Figures 6.1, 6.2, + 6.3: Viellet Loft [Atelier Z, 1999.] This S.E. Portland loft is designed to be both the home for two independent designers and as their office / shop. The WWII era poured-in-place concrete building currently houses an automotive racing engine shop, and overlooks the Brooklyn rail yards. The designed fractured translucent wall filters light from the uninsulated south-facing windows as it transitioned into the wood / metal shop. The entry space dramatically cascade into their office / living space. The design not only creates an incredible space for living, it also creates a venue to exhibit their skilled craftmenship and design. The images depicted show the evolution from an original gestural plan sketch, through empathic stick forming, to the rationalization into a framework of metal studs clad in 3/8-inch translucent double-wall Polygal polycarbonate sheet.

Figures 7.1: Shade Catcher [Fredrick H. Zal, 2005.] With temperatures pushing over 120ºF on the desert floor of Gerlach, Nevada, survival requires a place to catch shade and rest. Weaving around a series of static elements, this sculptural space was created using fifty bamboo stalks. To create the strength needed to withstand gusting winds and dust storms, they were lashed together and triangulated, with an element of redundancy. This redundancy not only provided stiffness, but it also allows for very small members to support great weight in a mysterious manner that the mind cannot easily track. At the end of the 8-day event, all elements were burnt; so as to allow the entropic nature of creation to come full-circle. The image shows the embodied construction of empathic forces for cooking, eating, storing, resting and gazing.

Figures 8.1, 8.2 + 8.3: Analytiques [Erin Leben, Allison Elliott and Carlos Medina, Portland State University, Architecture Design Studio 281: "Design Fundamentals Studio II, Place Response", 2003.] These student analytiques of 'isolation', 'fear', 'order', etc. became the impetus for construction of expressive three-dimensional designs inspired by the formal characteristics and less tangible phenomena experienced in an actual cultural context.

Figures 9.1 + 9.2: para[SITE] [Fredrick H. Zal, 2005.] This spatial installation is based upon a long and complex history of sculptural and architectural parasitic / symbiotic works that respond specifically to their environment. The intention of this piece was to work within the building and fire-safety allowance for contemporary architectural space, while allowing for a freedom of design often ameliorated by lethargic and standardized practices. By enveloping the spaces of this egress staircase and ADA ramp, while still allowing for legal clearance requirements, the occupants of this building were able to perceive a space, which they pass through daily, in a new manner. Many tenants appreciated the intervention, as it gave them pause to reflect upon the inherent possibilities in the everyday object and/or spaces around us. Pictured is local architect Richard Potestio after leaving a long day at the office. The installation was commissioned by Peyto Yellin and Jennifer Kapnek of the Urban Art Network and existing only momentarily; for three hours. The work was 43-feet by 22-feet by 16-feet tall and composed of 100 sticks

of 3/4-inch galvanized EMT conduit, typically used by electrical contractors. All of my empathic vector installation sculptures have always been 'recycled' to the full physical and theoretical extent of entropic design. I have been fascinated for years by found objects, detritus, spent elements of our post-industrial culture; as these objects have an embodied narrative in them. They were nibbled upon, hewn, welded, pounded, ridden, tossed about, or just left idle in a corner for decades. They have stories within their molecular structure that they long to share. Embodied wisdom in the potent material enters the sculptural dialogue to inform its future artistic incarnation. Then, going beyond the "post consumer waste" in dumpsters, salvage yards and rail lines, these sculptures embody the concept of "pre-consumer waste-not". This is when prior to an element being used in it's pre-conceived consumerist manner; be it clothes hanger rod, wood 2x2, electrical conduit, etc; it is given a subterfuge life. They are like a Goth diva having to pull herself into work at the crack of dawn to sit in a banal cubicle, but she can smile wryly knowing of the vampish secrets still whispering in her mind from the night prior.

Figure 10.1: Land|Form [Fredrick H. Zal, 2003.] Imagine a line that mediates between the Earth and the Sky. As this is a dimensional situation, the line transforms into a zero-plane, a skin of no thickness that is draped between the undulations of the Earth/Sky, stretching out beyond the quantification of our perceived horizon. It is quintessential to my philosophy that anything we create is merely a modification of this relationship, and not a purely creative act; similar to the geotectonic forces that from time to time shall swell up and spew stone up towards the heavens; leaving chasms into its belly. We do not create space, we only transform relationships between matter and air for the purposes of our emotive intents. Original Publication: Zal, Fredrick H., NCBD 19 Proceedings: "Land|Form an.Architecture", April 2003.

Figures 11.1 + 11.2: deRidder Farmhouse [Atelier Z, 2004-2006.] The inspiration for this beautiful home comes from the original Peterkort barn, which is now the clients' home. The Peterkort farm has been divided up over the last few decades to become what is now known as Beaverton, Oregon. Over the years, the building has had a number of lives: barn, school house, labrador kennels, etc. With each segment of time, the structure has grown, shrunk, been sliced, adapted and tweaked to the specific needs of the owners. The deRidders have paid close attention to this historic narrative implicit to the Cedar Mills area, and are looking forward to finely crafting their new home with traditional labor and materials.

Figure 12.1: Villa dall'Ava [Office for Metropolitan Architecture, Rem Koolhaas, 1991.] Photography: Hans Werlemann.

Figure 12.2: Olympic Archery Training Range [Enric Miralles + Carme Pinós, 1990.]

Further Exploration:

Aalto, Alvar. RIBA Annual Discourse: "The Architects Struggle", vol.64, May 1957.
Balmond, Cecil. "Informal". Prestel Publishing, 2002.
Berliner, Anna. "Lectures on Visual Psychology", The Professional Press, 1948.
Friedel, Robert D. "Lines and Waves Exhibition", Institute of Electrical and Electronics Engineers, 1981.
Jarzombek, Mark. "De-Scribing the Language of Looking: Wölflin and the History of Aesthetic Experientialism", Assemblage. #23, v.28, 1994.
Koolhaas, Rem. "S,M,L, XL: Villa dall'Ava, St Cloud, Paris, France". Monacelli Press, 1995. p.132-193.
Mallgrave, Harry Francis + Ikonomou, Eleftherios. "Empathy, Form, and Space: Problems in German Aesthetics, 1873-1893". University of Chicago Press, 1994.
Mark, Robert. "Architectural Technology up to the Scientific Revolution", MIT Press, 1993.
Merleau-Ponty, Maurice. "Phenomenology of Perception". Routledge, 2002.
Miralles, Enric + Pinós, Carme. "The Architecture of Enric Miralles and Carme Pinós". Lumen Books, 1990. p.43-47.
Prix, Wolf + Swiczinsky, Helmut. "The Power of the City". Verlag Press, 1988.
Shelden, Dennis R. "Digital Surface Representation and the Constructibility of Gehry's Architecture", MIT, 2002.
Snelson, Kenneth. "Sculpture". Hirshhorn Museum, Smithsonian Institution, 1982.
Struver, Giovanni (1842-1915), mineralogist, University of Rome, Italy.
Williams, Blake. "Armadillo Zen", Seattle Case Study Homes: a plan book of modern home designs. 2002, p.10.
Woods, Lebbeus. "System Wien". Hatje Cantz Publishers, 2006.
Zalewski, Waclaw + Allen, Edward. "Shaping Structures : Statics". Wiley, 1997.