PERFORMING ARCHITECTURE: A THESIS ON PLAYFUL DESIGN

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Performing Architecture: A Thesis On Playful Design
Alex Taylor

There is an element of play within all of us. It is imagination and interaction that makes us human. In this digital age, it is evident that we are losing touch with our own ability to remain imaginative and explore new and different ways to physically interact with our environment. In this thesis, it is my goal to design in a way that does not limit human abilities, but instead promotes the idea of play between our wants and needs as well as re-sparking our imagination.

In this thesis exploration, I experimented with multiple scales of playful design. I will show you how I implemented the idea of “play” for the design of a kite, a toy, a furniture piece, and a building. All of these projects are examples of designs that could have been static elements, but instead were designed to be dynamic to complement our everyday dynamic lives.

Enjoy!
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The idea of preforming architecture and playful design originated from the heightened interest of efficient design that we see today. We see new furniture pieces have the ability to change to meet different needs and uses while consuming the least amount of space possible. Also, there is always a “wow-factor” that is embedded into these new products because it is fascinating to physically transform something to make it suitable for a different use. Therefore, the thesis became the exploration of play at different scales. How can an object still possess the same personal interaction in the magnitude of a building? This exploration starts with small products such as a chair, a toy, and a kite. The biggest challenge is to design a large scale building with this design philosophy in mind.

EARLY RESEARCH: WALL SECTION

In the wall section to the right, the goal was to inhabit, interact, and transform the wall in as many ways as possible. The wall separates three different types of program: A kitchen and restaurant seating on the bottom level, and a gallery area on the level above. The inhabitant may walk through the wall as well as looking up and down into it. The bottom section of the wall also folds down to a table, and a cooking surface is revealed. In this same area on the opposite side of the wall is a cooking surface for the chef to prepare food. Below, drawers may slide in and out of the wall for the cook to use as well.

"Nude Descending the Stairs" by Marcel Duchamp
- In this painting, the body is portrayed as the movement.

Sketch of a New Interpretation
- Here, the floor may change to stairs. So both the body and the architecture are portrayed as the movement.
- ink on paper
All buildings change in many ways but usually at a small scale. These small scale changes may be called “switches” because they possess on/off qualities. The word “switch” is both a noun and verb that means “to make a change from one thing to another: to start doing or using something that is different”. Therefore, doors, windows, as well as blinds are few examples of switches that are part of every building’s design.

On the right are sketches of typical transformations. It is important to understand the many ways objects can be manipulated in a micro scale before exploring a transformation at a macro scale. This is the first step to decide which transformation is best suitable for a large scale building.

This is an example of how folding may change the use of a space. A floor may transform into stairs in three steps as shown on the left. - paper and pencil
PRECEDENT STUDY:
PRODUCTS

Carry Home
**Designer:** Students and Designers at Korea Sejong University
- Marketed as a “home away from home”, these furniture pieces transform into boxes, suitcases and trunks for easy carriage when they are collapsed. All of the furniture pieces are constructed of corrugated plastic sheets and red polypropylene webbing.

Loop Chair
**Designer:** Boaz Mendel
- This product is a multi-functional loop that is comprised of boards and metal hinges. It can change its geometry into various furniture items. When a certain configuration is desired, small connection pieces are put into place to make the structure stable.

Land Peel
**Designer:** Shin Yamashita
- This floor mat can be folded up to form tables and chairs. When the furniture is not needed, they can be folded back onto the floor and take up no space. The mat is made up of plastics and high density foam materials.
Milwaukee Art Museum, 2001
Architect: Santiago Calatrava
Location: Milwaukee, Wisconsin
Material: Steel
- In this example, the transformation has more of an aesthetic quality rather than a useful one. Large mechanized steel louvers fan out to look like bird wings. The opening of these louvers also allow for maximum sunlight into the gallery spaces below.

Wyly Theatre, 2009
Architect: REX and OMA
Location: Dallas Texas
Materials: Concrete and Steel
- The inside walls and floors of the this building are suspended from the ceiling above. The suspension system allows for transformations of spaces below and make the program flexible for any type of performance. This is a close example of the end building design of this thesis.

Villa Girasole, 1935
Architect: Angelo Invernizzi
Location: Marcellise, Italy
Materials: Concrete and Steel
- This building moves with the sun, much like a sunflower rotates its head to capture the maximum amount of sunlight. A large pivot is located in the center, which allows the building to move in a circular motion.
2. PRODUCT DESIGN
This is another study of transformation which is named "Swap" because it is suggestive that the kite can be "swapped" from one configuration to another. In this case, the kite can be swapped from a single-line kite to a duel-line kite. Single-line kites are nice for anyone to own because they may stay in the air without needing to control and having only one string for flight. Stunt kites are especially fun because you can control the way the kite flies with the use of two strings.

In this exploration, the goal was to design a kite that can both be a single-line kite, and a duel-line kite. With the use of a triangular structure, the kite frame becomes easy to manipulate which creates different shapes for flying.

The kite's construction is similar to a typical camping tent. Hollow rods are joined together with the use of strings that pass through them. Because of this design, the frame of the kite may be easily manipulated to other shapes since the joints are not in a fixed position.

The materials used for the construction of the kite consist of thin polyester fabric for the sails, light gauge hollow aluminum rods for the frame, and kite string to connect the rods together.
On February 17th, 2014, the SWAP kite takes its first flight on the National Mall in Washington, DC.

For the day of flight, the duel-line configuration was chosen because it was easier to control the kite and maneuver it while in the air. The kite proved to sail in the air for less than an hour, but the wind became too strong and the kite’s structure started to bend. Eventually the rods bend to the point of breaking so the test flight soon ended.

With more study and research, a different lighter and sturdier material can be used to replace the hollow aluminum rods. The SWAP kite will take flight once more with an improved structure in the future.
Trika provides a new and creative way to play with blocks. Unlike ordinary block toys, a ribbon connects the shapes together to form a chain. With the use of equilateral triangles, many formations of stacking are possible. Some formations can even look as if they defy gravity because all of the blocks are tied together.

Trika is both simple and complex. A child may play with Trika on the floor or table and discover a new way to create shapes with their imagination. Also a grown adult may place Trika on their office desk and move it into different formations when they have a few seconds to spare from their busy day.

Trika is comprised of simple materials. The equilateral triangle blocks are made of a cherry hardwood so the edges of the blocks do not become easily damaged. The blocks are connected by a thin non-stretchable polyester ribbon, and are simply applied to each block with super glue. The blocks may be painted or lacquered depending on the wanted aesthetic.
1. Static Position of Blocks

2. Lift and Transfer of Weight

3. Third Block Starts to Settle

4. New Static Position of Blocks
To the right are three final products of this study. All three products are made similar in size and construction, but possess different finishes. The finish of each toy may be of any color or look that the customer desires.

Future applications of material for the blocks may be plastic, metal, glass, different species of wood, or even a mixture of composite material. The connecting strip may also be made of other fabrics or synthetic materials as long as they cannot stretch.

Three Color Schemes: From Back to Front - Cherry Wood with Clear Finish, Painted In Monochrome, and Painted In Primary Colors
Trika can be placed in many forms, but the initial pyramid form is the most condensed configuration. This pyramid form easily slips into a triangular box that is provided for storage or ease of transport. The three corners of the triangular box lid are cut out, which reveal the three distinct colors of the toy. In this example on the left, the three primary colors of blue, yellow, and red are revealed. With the toy inside the box, having the lid closed also makes for a good display.
**PATAPATA: THE LADDER CHAIR**

PaTaPaTa is a furniture piece that can be fixed into multiple arrangements which allow the handler to use it as a chair, lounge, table, and even a flat package for carrying. This piece can be used in any application, indoors and out, and has the potential to become the new everyday portable chair.

PaTaPaTa is comprised of 7 flat panels that are woven together in succession with flexible webbing material. The weave of the material around the panels is similar to that of the “Jacob’s Ladder” toy. Because of this weave, the panels can fold onto one another and be positioned into any configuration. Additionally, there are a number of slots cut out of the face of each panel that allow a second webbing material to snake through the panels and secure a preferred configuration. In order to secure the desired position, a “key” is used to tighten down the structure. The key is comprised of two different steel buckles, one that secures itself in a slot of the chair, and the other which assists to tighten down the structure to make the chair stable.
1) Chair
This configuration allows the user to sit upright with the feet flat to the floor. This configuration may also be adjusted to angle back or move forward depending on which slots were used to secure the structure.

2) Lounge
This configuration allows the user to lay back and stay elevated above the ground. This configuration may also be adjusted to angle the user's view forward and lower the legs, or to angle the user's view upwards and elevate the legs. Again, these different variations depend on the slots used to secure the structure.

3) Table
This configuration is used for objects to be placed upon. The user may sit on the floor at either end of the table to be used for dining and conversation.

4) Flat Pack
This configuration is used for transportation and storage. The piece is capable of folding into a flat package that can be easily toted around and stowed. The two "keys" lock the panels together by passing through the slots of each panel, and also form a handle for carrying.
DETAIL PHOTOS

Enlarged Rear Elevation Showing Webbing Connection

Overall Front Elevation

Detail of Rivet Connection

Detail of Buckle Connection

Detail of Webbing Connection
PataPata’s First Appearance at Design Within Reach in Georgetown Washington, DC, 2013

Design Within Reach Showroom, Georgetown Washington, DC, 2013

2013 AIA National Convention in Richmond, VA.
3. **BUILDING DESIGN**
The site selection process began by attempting to find a compelling place in DC that has the potential to be reactivated using the idea of play. The ultimate goal was to enhance that potential activity and express it in a building form.

After researching a few sites in DC, one site in particular proved to have much potential to become reinvented. The site selected for this thesis exploration is on a small peninsula near the Georgetown waterfront where Rock Creek flows into the Potomac River, which is commonly referred as “The Mole”. This area already has existing site changes mainly due to the waterfront edge because of the rise and lowering of the tides.

The site is currently situated between two other performance areas: the Kennedy Center to the south on the waterfront, and the Washington Harbour just East of the site in Georgetown. The Thompson Boat Center is the only building that currently occupies the site, which is positioned in the middle of the small peninsula. It was the program of this boat center that gave direction to the proposed program as well as the name of the new building design...

The Performance Boat Center.
The Performance Boat Center is more than an ordinary boat storage building. It is a multi-use public facility that is mainly comprised of performance areas both indoors and outdoor. Although the Thomson Boat Center would be removed, the program remains intact with the introduction of a larger and more innovative boat storage, an improved fitness area, a new docking area for all varieties of boats, and the holding of crew races that take place on the river.

The project may be considered an “inverse” to the Kennedy Center. All the Kennedy Center’s performance areas are indoors and the halls and rooms of these performance areas are fixed. But in the new Performance Boat Center, all of the activity happens both indoors and outdoors. Also, the center moves and transforms to accommodate different uses. The building can accommodate uses such as a festivals, farmer’s markets, performances on the river, and indoor/outdoor lecture halls that could be used for TED talks or other discussion series.
The Parti on the right came from looking back at all the previous studies and projects during the thesis development. A common attribute in all previous works was a “ribbon”, which is the static element that ties everything together and allows for transformations to exist. For the kite, the string served as the “ribbon” that held the transforming frame together. In the toy, an actual ribbon held the triangular blocks together in a chain. And in the chair, “ribbons” linked the panels together to form a furniture piece.

For a building design, a roof system was envisioned that architectural elements may suspend from. This would allow for transformations of program using gravity with up and down motions. Therefore, the roof system will serve as the “ribbon” in the building design.

This second Parti illustrates the conceptual relationship of the building’s program. The seating suspends from the roof structure above, which also allows for space for multiple performance possibilities below. Gravity serves as the key influence to allow for transformations because all of the objects are tied together at the roof level, and move in equilibrium.
The transverse section to the left illustrates 5 different types of program spaces as well as the building’s ability to transfer structural loads from the roof to the ground. The weight of the roof and the five levels of residential are transferred at the truss level, where weight is distributed to six points along the length of the building. These six points transfer the weight at angles at the indoor public space area, acting as a large triangular truss system. Once the weight reaches the floor of the indoor public space, the weight is transferred to the two dominate legs through the use of large transfer girders. With this structural system, it is possible to span 260 feet of open space below with no interruption and no need of additional structural supports.

The longitudinal section to the left illustrates how the main truss structure acts as the “ribbon” of the building, holding everything together. Both the moving amphitheater and the moving platform are tied together in equilibrium at the main truss level. Therefore, when the amphitheater is down and used for seating, the platform is up creating a bridge from the residential to the seating area at the truss level. When the amphitheater is up and creating a roof to shade outdoor program below, the platform is lowered on top of the boat loading area, spanning over Rock Creek and creating a bridge from the outdoor public space to the area below the elevated amphitheater.
ROOF DESIGN:

The roof was the first architectural element that was addressed, focusing on collecting and shedding water. The truss system becomes an architectural performance that collects water while also becoming a set of stairs. This truss system is placed in the center of the drawing and slightly tilted, so the main architectural element became a way to divide the paper into three sections that allow three different views: a plan of the roof in the rain, a plan of the stairs below that is sheltered from the rain, and a section of the rain itself. Each truss section collects rainwater and regulates it to escape when there is enough weight of the runoff. This will make the rainwater escape in spurts, therefore allowing for another kind of performance for the audience. My hand this is evident in the drawing represents that the roof has the ability to move, which will make smaller or larger the spaces below.
The second architectural element is on the reverse side of the original drawing. The same truss system from the roof is transcribed onto this side of the paper, but now serves as a stairs for moving upwards fast. In order to draw a stairs for moving upwards fast, I thought of myself and how I use stairs when I want to go up quickly. I realized that I always want to skip every other step. This realization made me want to treat every other step with a different material: a hard, warm, concrete surface for the landings and the treads to be stepped upon, and a “material-less” wire mesh for the steps to be skipped. This “void” step also allows for light to penetrate through the stairs and be warm up the habitable spaces below.
This is a detail section of the stairs “threshold” which is connecting a boat storage above and creek water below. To develop a diagram, lines were constructed that extended from major divisions of my body while I am walking, standing, sitting, and lying back on the stairs. In addition, lines were constructed to represent ripples of water from a stone being thrown in. The combination of these lines allowed the stairs to take form. The horizontal rhythm derived from the ripples of water, which turned into the width of the stair treads. And the vertical rhythm derived from the proportions of my body relating to all the actions of walking, standing, sitting and lying down. This vertical rhythm became the height of the stair risers. As illustrated in the drawing, there are multiple different levels of these stair risers, which allow the user to inhabit the stairs in all modes of rest and movement.
This drawing expands to a larger scale of the previous drawing. The repetition of horizontal lines were extended as well as the lines that represented the ripples of water. To begin this drawing, a familiar sound was used to help design the threshold. In this case, the familiar sound of water hitting the shoreline was selected, which is represented by the lines of the water ripples. As the inhabitant ascends up the stairs, the sound of the water starts to dissipate, and a new and unfamiliar sound is heard. This unfamiliar sound is the creaking of a pulley system that assists boats into a suspended storage above. This takes place where the stairs end, and a new space begins, which is boat storage and prep area for crew meets. The sound of the ascending and descending boats will echo within this space and accent the feeling of movement. This feeling of movement will be demonstrated in the whole project.
This drawing illustrates a partial section of the building with smell in mind. With a broader scope of context, there are other smells that can’t be ignored. The smell of car exhaust that comes from the nearby highway needs to be blocked, so the planting of pine trees which last all year provide a filter for the smell and noise pollution. The smell of the pine trees will also pour into the building given that they are close to the structural wall. In this section you can also see that the wall ventilates all the way to the roof. These shafts allow for air to escape from the above dwelling units. Overall, the sections on both drawings are illustrated using gold. This relates to the shimmer of the aggregates in the concrete that become brilliant when the sun shines upon it. For this drawing, cologne was also added to the gold paint, which signifies that the concrete also serves to provide a better smell for the entire program through time.
This is a detail section and plan view of a typical locker room and rest room. The toilet and sink are nestled into the thick structural wall of the building, which allows for smells and air to pass through easily from the exterior. This also allows for the toilet room to become more sacred because it provides a great view outside and views down the Potomac River. The ventilation of air also occurs through the structural floor. Underneath this floor is a large area formed by 15ft transfer girders and beams, which becomes an area to store boats. Beneath the suspended boat storage is fresh air that blows inward from the river. This air is “harvested” by using the structural wall again, which acts using the “chimney effect”. Fresh air can now be brought into the indoor spaces and also allowing air to ventilate out. The smell of the bathroom is illustrated using soy sauce, and the fresh air is illustrated using pine sol. The smell of pine also comes from the pine wood floors that can be seen in the plan view of the locker room.
For this exercise, the construction of the building structure is comparable to a plate of spaghetti and meatballs. Just like spaghetti and meatballs, the structure of the building is comprised of different parts that make up a whole while still revealing all the elements that make it. The parts and components of the building structure also resemble the shape of the ingredients for spaghetti and meatballs as well. The spaghetti noodles are similar in form to the building’s tension cables, which are illustrated as thin red lines in the drawing. The cables are being fastened to other components that connect the tension cables to the truss system. These components are round in shape, much like the meatballs are on a dinner plate. In actuality, the round components are pulleys that allow the tension cables to move two platforms up and down in equilibrium. These elements are also illustrated in red, which highlights the “off-the-shelf” parts that formulate the structural system.
This drawing shows the final product of the building much like the finished ready-to-eat plate of spaghetti and meatballs. Like the meal, the building’s structure all works together to fulfill the needs of the occupants. The roof and the opposing truss structure move in equilibrium together, which allow for two different uses of occupancy. When the roof is up and the truss is down, occupants may stand and face the river to watch events on the water. On another occasion, the roof may go down and the truss will go up. This condition forms a large space where people can gather for outdoor events such as festivals, food markets, or any other public events. These acts are similar to digestion where the occupants react to their surroundings and start giving instead of just receiving. The acts of digestion in this environment are giving and touching items, producing conversation and laughter, and showing others the parts and components that created the space that they are currently experiencing.
The seating design started with a shadow study and evolved into a plan that revealed the use of materials.

The shadow study is illustrated in a way to show existing structure above, which will affect the design and placement of the stadium seats. Since the roof is divided into three bays from the overhead truss, the sections of the stadium is also divided into three elements. This is to allow the seating sections to rise and fit into the truss above when the stadium is elevated.

Each of the three sections has its own stairway and seating that branches to the left. The stairs are made of a combination of perforated structural metal and solid grooved aluminum treads. The aisles for the chairs are comprised of slip-resistant steel flooring. And the chairs are made of dense vinyl for warmth and comfort.
A section of the stair treads and risers became a significant study for the design of the stadium. The stadium platform needed to act as a seating area as well as a roof when the building transforms. Therefore, a balance needed to be established between the usefulness of being both stairs and seating as well as a roof shading device.

The design evolved into having solid treads for every-other step and the elimination of the solid stair risers. This makes the stair still usable and sturdy while retaining a transparent feel.

Once the stadium seating is lifted and the connected platform is lowered, the stairs and seating now acts as a large trellis above the multi-functional space below.
4. FINAL DESIGN
The site plan to the left is an aerial view of the final building design on the selected site. The Performance Boat Center stretches across Rock Creek and faces perpendicular to the Potomac River. The new center is nestled between Washington Harbour and the Watergate Residence; and the John F. Kennedy Center is about a five minute walk south on the waterfront.

With this new Performance Boat Center in place, the DC waterfront is tied together to form a more extensive waterfront dedicated to public use.
The site plan to the left illustrates the ground level of the Performance Boat Center as well as the surrounding context, access, and parking. It is in this plan where the vehicular and pedestrian circulation is visible.
This plan illustrates many outdoor public spaces and the circulation that connects them together.

The first architectural element that most visitors will experience upon arrival is the large open space formed by a long transfer girder system spanning between the two building stair and elevator cores. This area contains suspended boat storage and is above the main open-air prep hall.

Rock Creek separates the prep hall and boat storage area from the public multi-functional patio. These two spaces may be connected by a moving elevated platform that is suspended above and is tied in equilibrium with the stadium seating at the truss level. This platform also connects the building to the top of the stadium seating, which is illustrated in the Truss Level Plan.

The public multi-functional patio is an area where many uses are present. The primary use for this space is for crew teams to camp and erect their tents. At all other times, seasonal events may occur such as food markets being present in the spring and fall, as well as festivals in the summer and an ice skating rink in the winter.
This enlarged plan reveals the method of arrival into the Performance Boat Center.

A visitor primarily arrives at the vehicular drop-off and then is welcomed by the large open space created by the long transfer girders above. The visitor may choose to use the stair ramp to descend into the prep hall, which has illustrations of boat types engraved onto the floor and the corresponding boats stored above by a suspension system. This area is adjacent to the waterfront of Rock Creek, which provides easy access to load the boats into the water.

The visitor may also enter in the center welcome lobby that contains a check-in counter and concierge office all surrounded by a two-story glass enclosure. This is where a visitor can collect their room key and take the elevator up to the residential floor above. These elevators also take you to the indoor public space of the building, the truss level, and also the rooftop terrace.
This plan shows the first full indoor public space that stretches across the open-air prep area beneath. This space is completely enclosed by transparent channel glass. The space is completely open by the use of structural “V” bracing columns.

The plan highlights four distinct public events, but most of these spaces are interchangeable and may be used for a different use. First, the lobby terrace to the north is the only outdoor space on the level. This terrace may be used for public or private events such as receptions or lounging. The terrace can be accessed by the provided elevators or stairway.

The space south of the outdoor terrace is a place where art exhibits may be held. Sculptures make up portions of this space, and the sculptures also form a grand hall on the north side of the interior which takes the visitor to the other end of the building.
The enlarged plan to the left shows the different possibilities of uses for the interior public space.

The sculpture hall forms the “spine” of the different uses and serves as the primary circulation space from one area to another. The stage and surrounding seating is the largest use on this level. This area is primarily used for lectures, bands, or other small performances.

The area south of the stage is a cafeteria, bar, and kitchen. This space is used for receptions, happy hours, and private parties, which complement the adjacent lecture area as previously mentioned.
The plan to the right illustrates the second level of the interior public space, which is also enclosed by clear channel glass and supported by “V” bracing columns. This level is considered the fitness floor of the building. A fitness machine area takes up the northern section of the plan, as well as free weights, large yoga mat, lockers, and treadmills. A lounge is also provided for access to quick relaxation. And the start of a sprint track takes you from this area to the other end of the building.
This enlarged plan shows in detail of the sprint track, locker rooms, and the large two story space that is open to the stage below.

The sprint track, much like the sculptures from the level below, serve as the “spine” again of the plan and is the primary circulation to move from one side of the building to the other. What makes this unique is that after a person is finished working out in the fitness machine area, they may make a final sprint down this track which takes you directly to the locker rooms.

The locker rooms have showers that are placed in the center of the space, while the toilets are moved to the exterior wall and look directly out of the building. This design was made because the toilets can easily ventilate, and it also allows the user to reflect and be in solitude with a good view down the Potomac River.
The truss level is the architectural element that ties the building together. It is the only elevated floor that spans the majority of the site, and makes the connection between the solid building mass and the stadium seating facing the river.

The trusses are supported by the large six columns seen on the previous floors, which include two unique columns that are hollow and encapsulate a spiral staircase inside.

The floor of the main building mid-section is open-air and serves as the entrance to and from the stadium seating and the outdoor bar / cafe. This floor is also where mechanical equipment is placed which supplies air conditioning to the public spaces below and the residential units above.

This plan also illustrates the floor of the moving elevated platform. This platform currently provides a connection between the main building mid-section and the stadium seating. But when this platform may also descend to connect the prep area and the public multi-functional patio on the ground level.
Here is an enlarged plan of the southern edge of the truss level. This area is all open-air and overlooks the Potomac River.

One special section of the outlook has a mesh floor which allows the visitor to see through the floor down onto the dock below. And the other section angles downwards and provides additional stadium seating which may be used by VIP visitors or judges for the crew races.

This floor is the top level of the spiral staircase column, which leads down to the ground level for easy access.

A. River Outlook and Stadium Seating
This floor plan is typical for five levels of residential floors, which are all above the truss level.

The residential floor serves many different modes of living, ranging from dormitory style rooms for crew races, hotel rooms for nightly stays, and short-term monthly living. All of these modes of residence can be achieved because the unit’s interior walls may move to create different spaces and living conditions. Four different unit floor plans are provided: a corner large 1 or 2 bedroom unit, a corner studio or 1 bedroom unit, a typical large 1 or 2 bedroom unit, and a typical studio or 1 bedroom unit.

The central corridor is positioned on the north side of the centrally lined columns. This shift of the corridor provides two different sized units, with large units facing the south, and smaller units facing north.

Each residential floor has public space on either ends of the building. The northern end supports a Wi-Fi lounge for studying or business purposes. And the southern end of the building supports a game room with a pool table, a ping-pong table, and a large television with sofas.
A. Typical Large 1 or 2 Bedroom Unit

B. Typical Studio or 1 Bedroom Unit

The plans to the left serve as diagrams for potential lay-outs of the residential units. Each unit has sliding walls that create different spaces which provide various uses. The first pair of unit plans illustrate the dorm room style layout. Here, all of the walls are stretched out, dividing each unit into 3 separate rooms.

The second pair of units illustrate a large and small one bed hotel room or rented room. Here, one of the walls is slid into the adjacent pocket wall, which opens up the room and forms a common kitchen, dining, and living room.

In the third pair of unit plans, a different large and small hotel room or rented room is illustrated. In these plans, all of the walls are sliding walls are hidden away. This creates a completely open space that may be inhabited however the occupant chooses.

Each unit comes with a balcony and small sun-room. The sun-room’s French style doors may open completely which provides more interior space for the unit.
The plan to the right illustrates the public spaces of the building’s roof terrace. This is the tallest occupiable space in the project, which is the same height of the neighboring Watergate Residence across the street.

Several social spaces are formed by the serpentine path that stretches from one end of the building to the other. The path also wraps around the light wells that protrude from the floor and penetrate in the residential level below.

Both of the cores that contain elevators and stairs have a complementing overhead trellis that visually encapsulates the open spaces and provides shelter from harsh sunlight.
Here is an enlarged plan of the social spaces formed by the serpentine pathway. Two of these social spaces are discussion circles that have the aesthetic and feel of an ancient outdoor amphitheater. Both discussion circles face out from the building, which allows the environment to serve as the background for the speaker.

Another unique social space is tucked between two of the building’s structural columns that form the southern elevator core. This space is designated as a story-telling area with a fireplace. At night, a person telling a story may stand behind the fireplace and shadows from the story-teller would be projected on the opposing wall.
The longitudinal building section to the right illustrates how the original section part became a final building design. Here, all of the architectural elements are refined and the habitable spaces are defined.

Structure is the primary driver for the design of the whole building, especially in this section. The main truss structure is still the primary structural component that ties everything together. The shape of the truss is derived from the ways tension and compression exist within the structure. Therefore, the cantilevering ends of the truss come to a point while the depth of the truss increasing when spanning between two columns.

The columns are in the shape of a cone, which creates a sturdy connection between the base of the column and the ground below. This enables the use of pin joints, which is the connection between the top of the columns and the truss system above.
Here is an enlarged selection of the previous longitudinal building section. This section reveals the specific uses for the areas formed by the building’s structure.

The most evident use of structure for usable spaces are the transfer girders which support the whole building as well as containing the suspended boat storage.

There are other spaces such as patios and mechanical areas that are formed from the intersecting truss system. Since the truss system is completely open to outside air, mechanical and other various building systems are placed within the truss interstitial space rather than usable space on the building’s roof.
The transverse building section to the right is also an elevation which reveals the use of material throughout the project.

The roof terrace is full of green space and is shielded by two trellis structures that overhang the extended elevator cores. Below the roof are the residential units, which all possess their own recessed balcony accompanied by different color glass. The color of the glass prevents the UV rays to enter the units, much like how sunglasses protect the eyes in harsh sun. The color also adds an element of play in the building's exterior face.

The public space level below uses clear channel glass instead. This allows the public spaces to look transparent and reveals the activity inside.
This enlarged selection of the previous transverse building section clearly shows the sequence of how the structure works to keep the building erect.

First, the residential levels are organized with concrete columns at the demising walls, which also support the roof terrace above. The weight is transferred through the intersecting truss system and down onto the peaks of the “V” bracing columns below.

The force from the weight of the columns above is then shifted at a 45 deg angle to the elevator core as well as the transfer girders below. The transfer girders are 15 feet deep, and transfer all the weight to the two opposing elevator cores and shear walls. All the weight of the building lands in the two “feet” of the structure and penetrate down into the earth onto the building’s foundation.
5. PHOTO GALLERY
PHYSICAL MODEL

Materials:
- basswood
- museum board
- chipboard
- acetate
- foam-core
- metal mesh

View Looking East from the Potomac River
Enlarged View of Stadium Underneath the Truss System
The first element that I constructed was the truss frame. I found it appropriate to make this element first because it was the single architectural that tied all of the pieces together and drove the project to its final form and program.

Once the truss was constructed, the main building was erected with the use of museum board to give a nice contrast between the two different materials.

Acetate was used for the water so the architectural elements may be reflected on the surface.
NORTH FACADE

The images to the right show the face of the building that is seen from the city of Washington, DC.

Many views before these have been views from the Potomac River since the Performing Boat Center’s primary focus is on water sports. But the building also needed to respond to the surrounding architecture of Washington. Therefore, the building’s north facade is more dense and flat, reacting to the urban surroundings.
I have demonstrated how the idea of “play” can be applied to the design of a kite, a toy, a furniture piece, and a building. All of these projects are examples of designs that could have been inactive elements, but instead were designed to transform for our wants, needs, and aspirations.

The act of transformation occurs in several modes and at different scales, but all achieve the same goal to re-spark human creativity and imagination. The kite has the ability to “swap” from one form to another, changing the use of the element. This same act holds true for the overall building design as well. The stadium has the ability to swap from an amphitheater seating to a roof-scrape that altered the use of the space. And the toy as well as the chair can transform their shape to accommodate many different uses. The same manner of transformation occurs within the units of the building project, where the walls can shift position to create various residence styles. All of the projects explored for this idea go hand-in-hand and accomplish a similar outcome of playfulness.

The relationship of all the changing elements rely on the system that is established. I have learned that in order to design with the idea of “play”, the design of the system is the most critical element. This system can be considered the rules of the playful and exciting game.

-Alex Taylor
Images:

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Carry Home, Pg.8
Designer: Students and Designers at Korea Sejong University
Images from “hometone.org”:

Loop Chair, Pg.8
Designer: Boaz Mendel
Images from “furniturefashion.com”:
<http://www.furniturefashion.com/the_loop_chair_takes_any_shape_or_size/>

Land Peel, Pg.8
Designer: Shin Yamashita
Images from “designboom.com”:
<http://www.designboom.com/design/shin-yamashita-land-peel/>

Milwaukee Art Museum, 2001, Pg.9
Architect: Santiago Calatrava
Location: Milwaukee, Wisconsin
Photo Image from “appstate.edu”:
<http://www.appstate.edu/~maleyrr/architecthtml/gallerypg.html>
Drawing Image from “imgarcade.com”:
<http://imgarcade.com/1/milwaukee-art-museum-floor-plan/>

Wyly Theatre, 2009, Pg.9
Architect: REX and OMA
Location: Dallas Texas
Images from “archdaily.com”:

Villa Girasole, 1935, Pg.9
Architect: Angelo Invernizzi
Location: Marcellise, Italy
Images from “obviousmag.org”:

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RESOURCES

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Autodesk Revit 2014
Adobe Photoshop CS6
Adobe InDesign CS6
Adobe Acrobat CS6
Octane Render 2.0
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