Ribbon: Exploring Contemporary Form

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Keywords: design theory, form typology, ribbon, architectural form type

The history of theorizing over typology in architecture is centuries old. Quartremere de Quincy begins to discuss the idea of typology in the 18th century by classification – tent, cave and hut *1*. Contemporary Jean-Nicolas-Louis Durand codifies architecture within type *2*. The postmodernists weigh in with Adolf Rossi's reclassification of typologies regarding geometric form and historical archetypes *3*. These theories put into context the contemporary design ideas of their day. However, there are new versions of form currently infiltrating design that have not been classified. These latest sculptural gestures are buildings whose singular idea of form directs every decision.

These form-driven edifices by "stararchitects" and their protégé have left an indelible mark on contemporary design. The author has dubbed five form types: tubular, ribbon, peeling, shed and fractal. Each adhere to a geometric construct that is embedded in every major design decision. Within these designs the question is not whether the form fits the building type – a home, a church, a museum. The question is, does the building hold clearly and well to the formal strategy?

In Tubular Form Type | understanding design complexity *4*, the tubular form type was dissected. Building on this work, this paper introduces the ribbon form type. Within this ribbon form type designers must still answer the pragmatic questions of opening/light, architectural program, touching the ground, and termination of form that architecture has always grappled with. However, in this new form type the answers to these questions are built around the sculptural motivation of ribbon.

Inspired by the work of Anthony di Mari, which uses simple diagrams to discuss complex ideas *5*, this paper explains the ribbon through diagramming. This work endeavors to reveal basic principles of contemporary form and develop a critical study to help the next generation of designers understand geometric complexity.

INTRODUCTION

This research is attempting to define new contemporary formal typologies. These complex formal expressions of architecture involve a different vocabulary than traditional architecture. The language that they represent requires a holistic approach to design where all essential decisions are beholden to the overarching form type. The author has defined the contemporary form types as tubular, ribbon, peeling, fractal and shed. Each of these address the architectural design process with a singular mission of describing spatial sequences and contextual conditions through specific geometric constructs.

Why this study? What is its importance? Aren't these projects anomalies practiced by very few "stararchitects" and not relevant to practice? All of these are good questions worth answering. The simple answer to the first… borrowing a phrase from the explorer George Mallory when asked why he continued to attempt to scale Mt. Everest, "Because it's there." This may seem a flippant response and yet these edifices exist in the world. They *6* get the press and by that mechanism they have entered the public consciousness defining today's architecture and inspiring young designers. These buildings represent a vision of what can be done and what is possible. Like it or not they must be explored and understood.

The implications of this study are that given these more formal variants of architectural styles there is some key base knowledge to be discovered and defined. This is not to create a formulaic approach to design or to create a pattern language. The research is based purely on looking at essential building design needs and sythesizing these needs with case studies of the form type. How the architect creates these amazing designs built on such a complex morphology answers the crucial questions of connecting to the ground, delivering opening, light and visual connections. The designs must also answer the program function and determine out how to terminate the formal idea successfully. These issues must be resolved while still holding on to pure geometric intent.

The motivation for this study is the understanding of how to better communicate design language in a continually complex world. It is not the thesis that every building should equate to these form types, but to acknowledge that these formal styles

are part of our contemporary milieu better prepares the next generation of architects. It is useful to give them guidance and basic tenets from which to make decisions. In order to do that, these form types must be defined and then studied.

RIBBON DEFINED

It should be rather obvious why the word ribbon is the title for this form type once you see an example project. However, for the sake of clarity it is important to make a clear distinction of what is assumed by the title ribbon. What does it mean to be a ribbon? A ribbon, just as all the other form types, including tubular, peeling, shed and fractal, gets its name from a word the most closely resembles its form. Therefore, any architectural building which defines a surface that smoothly transitions between floor to wall to ceiling/roof with all other possible adjacent orthographic projections being transparent is using a ribbon strategy. Breaking it down more basically, start with a ribbon for decorating a present. Take that ribbon and wrap three sides of a hypothetical transparent box. What is left is a ribbon that at the very least defines the bottom, side and top of the box. Now, if one continued to wrap the fourth side and attached one end to the other that would make a tube. Where ribbon gets more interesting is when it starts to wrap several transparent boxes adjacent to one another. As this ribbon moves from one box to another it never collides with itself. This becomes a very complex idea of wrapping space. It also begins to feel distinctly architectural. Refer to Figure 1 and *SpringtectureB* for an example of rather straight forward ribbon project.

Now scale this idea up. How can these complex geometrics within architecture be achieved? To delve into this, the case studies answer the questions of the morphological complexity, how the project deals with grounding and context, how the project deals with light, opening and views, how the pattern terminates and finally how the program is distributed, specifically the service spaces that are not to be celebrated but must exist.

THE APPROACH

This paper will use three projects to define the Ribbon form type and create an initial taxonomy of its use. These three projects were chosen to explore various program types and scale. The examples will form the foundation of how the ribbon form type is exploited to resolve key architectural issues in pragmatic, programmatic and poetic expression. The projects explored are *SpringtectureB*, *Villa T* and *Vagelos Educational Center* by noted architects Shuhei Endo, Architrend Architecture and Diller Scofidio + Renfro.

This approach is not based on what the architect was thinking but rather a reverse engineering on what they did. Each of these buildings introduce a formal bias of how architectural moves, both literal and figural, create an expression of space that goes beyond a traditional model. Each project attempts through
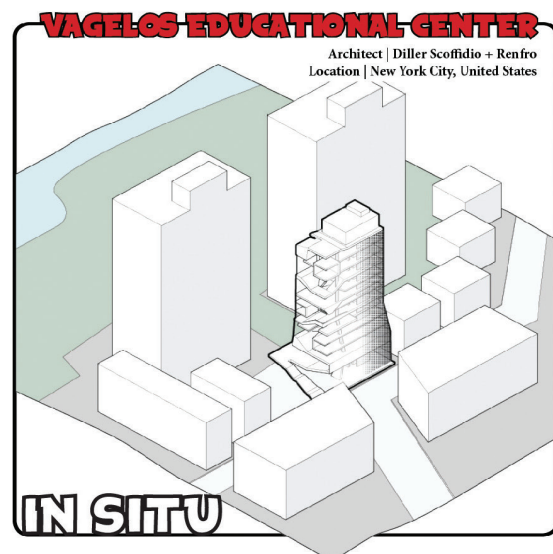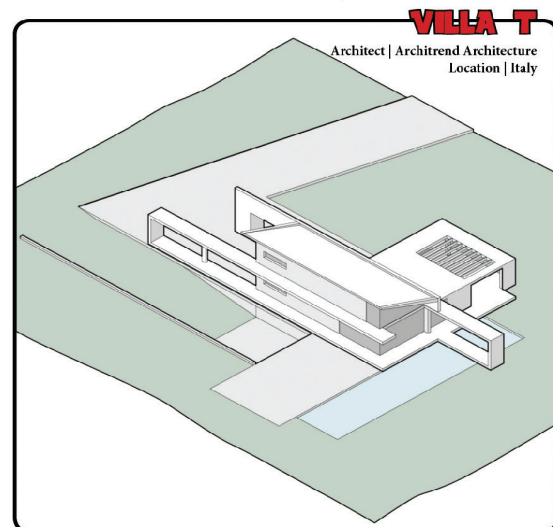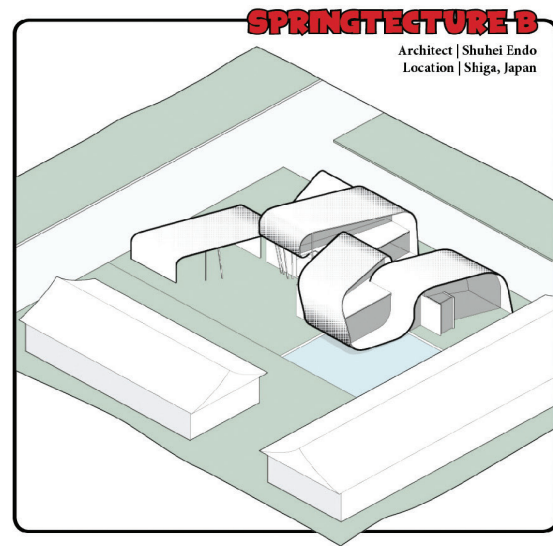

Figure 1. Here are each of the buildings in situ. James Reed Strawn, Jaasiel Duarte-Terrazas and Nathan Howe.
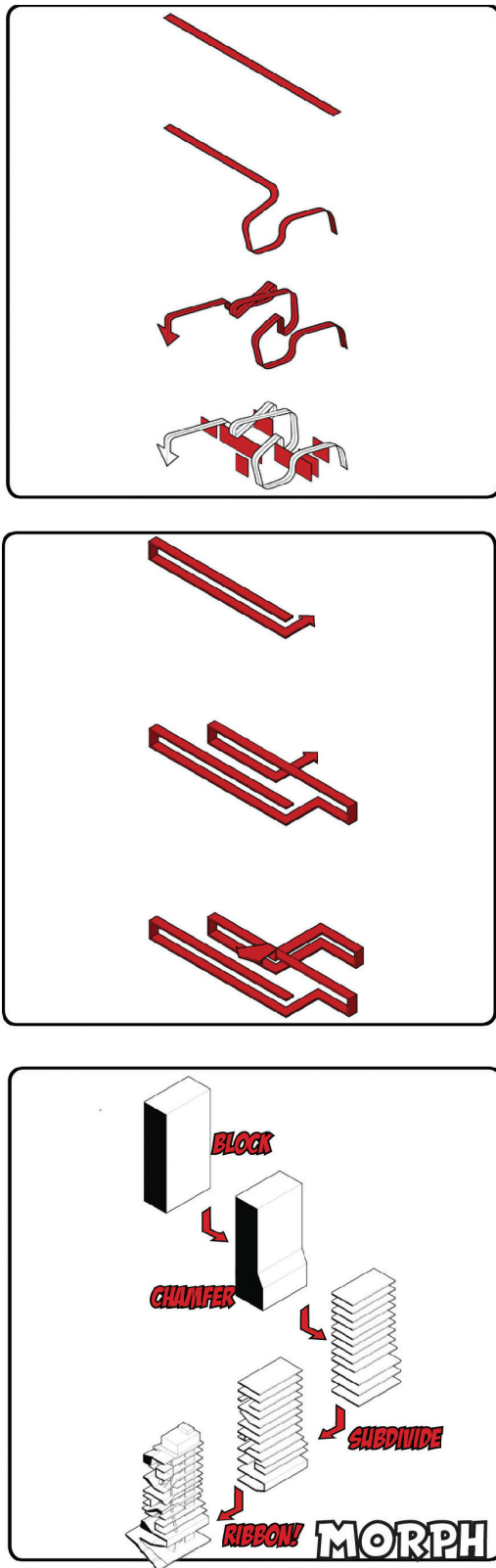
Figure 2. This shows the development of the ribbon in each project - from the wrapping at the top, to interweaving, to a more edge use of ribbon. James Reed Strawn, Jaasiel Duarte-Terrazas and Nathan Howe.

complex geometrical manipulation to make the architecture conform to a larger geometric agenda.

SpingtectureB is the quintessential project most closely resembling the ribbon as the architectural scale object whimsically wraps the building from ground to building and back to ground. This is achieved through a corrugated skin that is fastened together to make an industrial yet elegant home. The *Villa T* project has a less fluid technique. It has clear seams while it transitions from floor to wall to roof/ceiling. Even with the seam it has a continuity of materiality and has transparency in all other possible orthographic adjacencies. Its approach to ribbon is different as it is a more rigid application, yet the notion of wrapping space and allowing for the opening to define and frame is prevalent. The final project *Vagelos Educational Center* is the most complex of examples. Its use of ribbon is not necessarily continuous, yet the major public spaces have a continuous floor to wall to ceiling/roof strategy that harmonizes the entire building and engage the spatial strategy. These three projects will form a series of possible theoretical answers to creating architecture through a lens of formal strategy.

MORPHOLOGY

The morphology of a building at its base root is its formal organization. As a formal exercise, the notion of morphology in architecture is concerned with the diagram of its basic organization. This essence is related to the program, the context and the user. Within the morphology, the project reveals how the ribbon will be used to answer the primary functions of the building.

Ribbon by its nature is about wrapping, but it is also about leading and connecting something together. In the three projects, their evolution of how the building was created is potent. It is in the nature of the ribbon form that the building's kinetic energy is visually palatable. In *SpringtectureB* the playfulness of the corrugated skin continually meandering around the main circulation is a constant element that provides delight and creates space that is contemplative and restful. What its evolution reveals is how to consider the ribbon form type as a continuous surface. Using shifts in direction both vertically, laterally and horizontally the ribbon maintains its integrity and yet fulfills various spatial conditions on multiple levels. One thing to note is that the ribbon does not overlap itself. It might come close in proximity, but it remains continuous and unbroken.

In *Villa T* the evolution is more reserved in its manifestation yet just as strong in its execution. The evolution of the ribbon is driven as a continuous surface that creates the main circulation paths for both the interior and exterior to the home. This connects the spaces in elegance and extends the nature of exterior to interior. It becomes a powerful tool to blur these two spatial extremes. It Is also continuous. It does manage to overlap itself but note that it slips past by changing the height and slips underneath to then dramatically ascend to contain the main living space.

Within *Vagelos Educational Center* the ribbon gets its most complex problem – a mid-rise tower. Its evolution is much different from its smaller counterparts. It is informed mostly by a conventional understanding of structural and service core near its center with floorplates then extending from its core. What is unique and qualifies this building for ribbon is how it uses ribbon ideas to connect the building vertically. Continually through the building as one climbs each floor there is a richness to the idea of ribbon, and the fluid connection of floor to wall to ceiling becomes a poetic gesture of movement, public access and aesthetic delight. *Vagelos Educational Center* also reveals that it is not always necessary to have a continuous surface wrapping the entire structure. However, there still needs to be a consistency of intent and philosophical rigor to achieve the harmony being sought in the overall formal gesture.

LIGHT + OPENINGS

Within some form types lighting and opening must be strategized because by their nature they may be more closed systems. In tubular and peeling this is the case. Both systems do not necessarily create natural opportunities for large amounts of openings and natural light sources. With ribbon because of need to have transparency immediately adjacent the system is rather open. Therefore, opening is not the issue however controlling the amount of light entering the building is.

With *SpringtectureB* the transparent openings are purposely facing north and south. This optimizes using the ribbon as a solar shield with its broad overhangs. This shield not only keeps the building from overheating, but it protects the building from glaring direct sun light making a more comfortable interior environment. Also, because the overall ribbon wraps deeper into the site this allows for multiple courtyards to be developed through this layering. This use of the ribbon allows for various microclimates and cross ventilation to be used to allow for passive cooling. These design implementations are not because of the ribbon but are supported by the ribbon concept and are allowed to gracefully flow as an implemented concept. The lesson here is to use the form type to always do multiple jobs. It not only creates a formal unification but also supports a passive system for smart environmental design.

Villa T creates a similar strategy with an additional layer. The ribbon here creates an overhang much like *SpringtectureB* to help with direct light reaching the interior. The ribbon then also has the added bonus of creating a light shelf to bounce natural light into the home indirectly. This creates more ambient and even light inside without the heat gain. The ribbon then wraps the exterior rooms of the home defining exterior courtyards. Additionally, given the pastoral setting where *Villa T* resides these ribbon wraps create scenic frames of landscape beyond. This framing uses the vista as a composed moment by gathering it figuratively by the framing.

Within *Vagelos Educational Center* the strategy, discussed previously, of center core with open floorplate to let light in
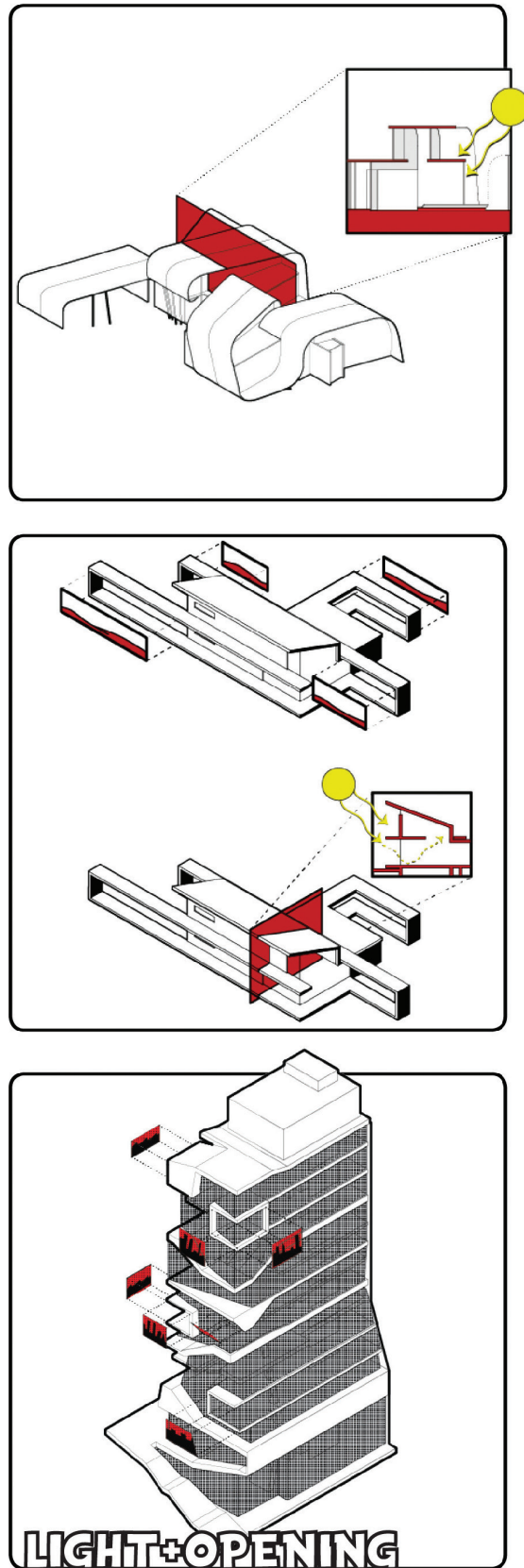

Figure 3. Lighting and views become a major part of strategies of the ribbon flowing through the buildings. James Reed Strawn, Jaasiel Duarte-Terrazas and Nathan Howe.

at the edge is in play. The ribbon is used less as a light control and more to create public openings cascading down the tower. With each ribbon there becomes opportunities for the users to have a connection to the exterior normally not facilitated in a traditional format. This exposes the public space to the sun and uses outdoor terraces to shield the interior from direct heat gain.

PROGRAM (SERVICE VS. SERVED)

Within such pure morphological constraints that exist in form types, one of the essential questions is how to distribute the program? This should be rather simple for the desirable and major public spaces; however, every project has service and undesirable but needed spaces. 7 How does one deal with the storage, the restrooms, mechanical rooms, etc.? All these spaces must have a place to allow the building to function.

In *SpringtectureB* the ribbon is used to fold from one space to another playfully separating major spaces within the home. The strategy for the service spaces are to

place a series of flat walls parallel to the circulation spine in the center which the ribbon continually engages. These flat walls are minimal and allow for simple division of space and needed practical functions such as a bathroom, a flat wall for the head of the bed, a surface for kitchen cabinets, etc. The important lesson is the ribbon remains a pure sculptural element, uncompromised with the minimal walls juxtaposed.

Within *Villa T* the program is more systematic and conventional. The ribbon is used to highlight circulation between major served spaces. The service areas of storage, bathroom, etc. are pushed to the mass interior of the served spaces. The lesson here is to use the thickness of poche to swallow the service spaces and allow the served to have the most freedom.

The *Vagelos Educational Center* takes on another conventional strategy of pushing the service to the inner core of the building. This provides the outer edge of the building to have the most freedom. The building however also uses a strategy of using two sides of the building as premium sides for public versus private. Thus, the labs, administrative suites, and classrooms are held to the northern side of the building, and the public auditoriums, cafes, and outdoor seating are located on the southern side. The major formal gesture is given to the main public served spaces.
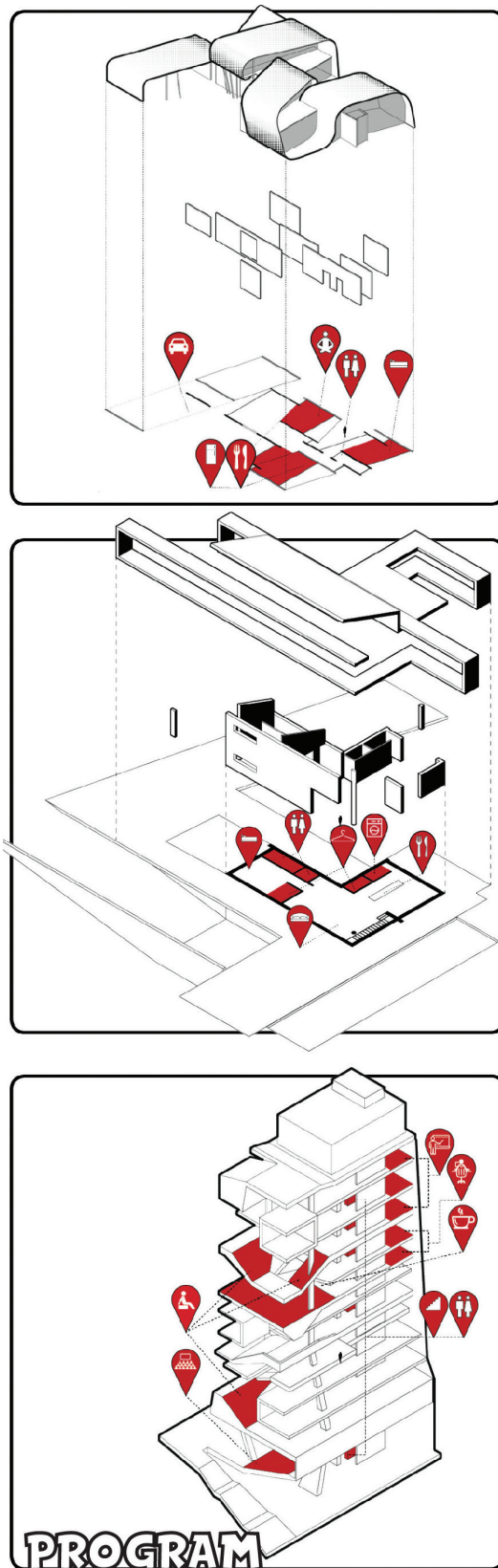

Figure 4. These diagrams describe how the program is distributed. James Reed Strawn, Jaasiel Duarte-Terrazas and Nathan Howe.

GROUNDING

One aspect of buildings which can often get overlooked as a banal moment is how the building connects to the ground. This should be anything but banal. This moment is where the designer makes a clear departure from earth and begins to defy the natural elements and gravity. Architects must have a philosophy as to how to approach this pivotal moment. With form types normally this moment is anything but pedestrian. The beauty of the form types is that the formal idea must be championed throughout the design. Therefore, the grounding must be resolved and is where most form types excel.

Starting with *SpringtectureB*, it reveals two different alternatives to how it approaches grounding. The first is when it connects perpendicularly to the ground. Here this connection might be read as rather abrupt, perhaps, not celebrated. However, when it loops back down to the ground later in its journey, the connection is more sophisticated by not connecting but having a reveal that allows it to visually float above the surface of the water. With this contrast of industrial connection on one end and then releasing to a poetic gesture, *SpringtectureB* creates a multifaceted dialogue with the ground plane. Please note that this gap between the water and the ribbon is important in order to hold to the integrity of the formal gesture.

In *Villa T* the grounding has a different approach. The ribbon first begins in the air as a beautiful cantilevered brow over the exterior and then wraps down to the ground maintaining its materiality and depth *8* to clearly separate it from the ground. This is further enhanced by a small reveal on the other side of the pool. Giving just the hint of a gap creates a clear definition of the idea and the earth connecting yet being separate by a simple detail, the technical and poetics weaving together holistically.

With *Vagelos Educational Center* the grounding adds another level to this idea of connection. The ribbon comes down from the heavens with a grand stair providing an invitation to the street. This touching of the ground is rather impressive but given the scale of the edifice is also delicate. This stair then wraps to create the main public auditorium above the ground floor. Below the auditorium is a liberal expanse of glass. This reveal of releasing the ribbon from the ground is taken to a much larger scale than the other projects but can also be a clear strategy. A clear philosophical, deterministic idea must surface in order to consider a successful grounding of the idea.
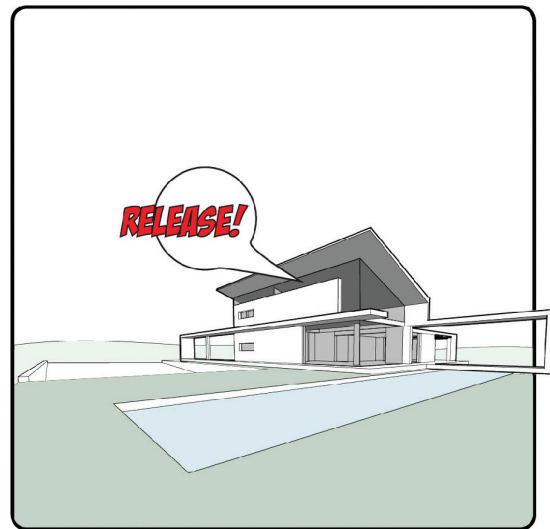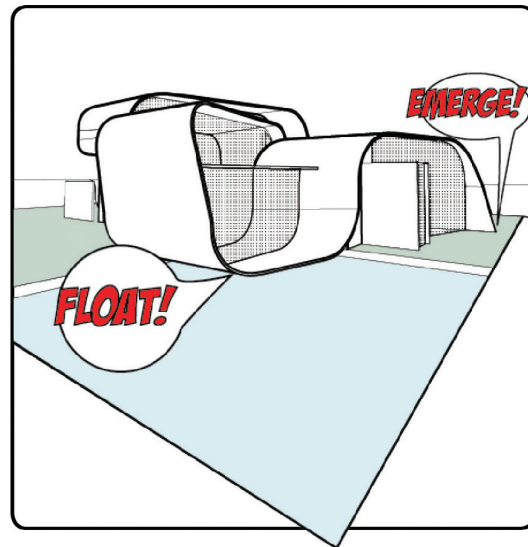

Figure 5. In termini one can see how each design begins and ends the ribbon giving making clear the continuity of the formal idea. James Reed Strawn, Jaasiel Duarte-Terrazas and Nathan Howe.

TERMINI

How to end a formal strategy? Each form type takes on different characteristics when it comes to how to end. Some end in a flourish, others just end. For each it is important to understand different approaches that apply.

With *SpringtectureB* the corrugated ribbon ends how it begins with a perpendicular moment touching the ground. This is probably the simplest and least celebrated of alternatives. The project is based around function as much as it is on celebrating how common materials can be used in poetic ways. The project terminates with the carport on one side and the main entrance to the home on the other. The major takeaway here is that sometimes simpler is best in order to celebrate the nature of the materiality and its use in creating space.

In the *Villa T* project, the home begins with a cantilevered moment and ends as the roof ascends to the sky. This creates a roof over the main living space and wraps around and hovers over the ribbon's overhang beginning. The beauty of this project is how the constant interplay of the ribbon from start to end provides surfaces that engage both interior and exterior spaces. *Villa T* considers how to incorporate both program and termini in how it uses the ribbon to create space. The first is how, in the back of the site, this framing defines the carport and then once again, in the front of the site, an exterior private courtyard is defined.

The *Vagelos Educational Center* provides the beautiful front steps discussed earlier which then ascend into the sky. The ribbon is a playful cascade of volumes giving back to the users of the building. It finally ends in a series of exterior spaces looking out upon the skyline. One lesson learned from this project is that the ribbon is used for the added benefit of public by layering the most public spaces near the base and more intimate public spaces near the top. Throughout there is acknowledgement of vertical and user connection to space. With a building that is so tall the continuity of the form type is essential while maintaining an understanding of restraint.

CONCLUSION

Developing a method to the preverbally madness is the essence of this research. How does one grapple with complexity? In a pantheon of clear design principles of proportion, rhythm, repetition and scale, what does one do when diverging from simple forms and diving headfirst into waters of geometric complexity? How are decisions made when the heart of the

design is a pure morphological system? The answer is if the system is pure then develop answers to each basic question. How do you ground the design? How do you create a philosophy for service verses served? How is light controlled and openings created? How does one begin and one end the building? These appear to be simple questions. They are not, but they are basic enough to allow for development of morphological logic in the design process.

If one can come to terms with how the geometric complexity of ribbon remains pure and still manage to answer these questions, then the designer has formed a thesis and a philosophical understanding of the building has been determined. From this point further the building has a voice of its own. This research serves to help a young designer deal with essential questions and provides case studies from which to learn possible answers.

ENDNOTES

1.   Quatremère de Quincy, *De l'architecture égyptienne: considérée dans son origine, ses principes et son goût, et comparée sous les mêmes rapports à l'architecture grecque,* (Paris: Chez l'Auteur, 1803), 239.

2.   J.N.L. Durand, *Précis des leçons d'architecture données à l'École polytechnique*, (Paris: Chez l'Auteur, a l'Ecole Polytechnique, 1802). 5-6.

3.   Aldo Rossi, *The Architecture of the City*, (Cambridge, Mass: MIT Press, 1982), 35-41.

4.   Nathan Howe and Jaasiel Duarte, "Tubular Form Type | understanding design complexity," in *Virtual + Actual : Process and Product of Design*, ed. M.Saleh Uddin, So-Yeon Yoon, Lora Kim, Christopher Welty, (Ithaca, NY: Design Communication Association, 2018), 300-307.

5.   Anthony di Mari. *Conditional Design: An introduction to elemental architecture*, (Amsterdam: BIS Publishers, 2014).

6.   By "they" it is meant to include all of the form-driven pieces of architecture.

7.   By desirable and undesirable what is meant is celebrated public space versus non celebrated but necessary spaces.

8.   The continuity of the depth of material is important here. It allows for the reading of simple plains as tied together formally.