Louis Antonio Suarez
Selected Works, 2018 - 2022

Table of Contents

By Bathysphere or by Spaceship 2
Architecture as Material Flows 4
Mapping the Zauberberg 6
Hut on Fowl's Legs in the Shape of a House 10
A Hermetic Tale 14
Studies in Algal Motion 18
Alone Together 21
Truss Stomach 24
Against Theory 27
Gleisereick Station 29
Granada, Spain 30
Other Curious Objects 31
Biography 34
“I feel air from another planet.
I faintly through the darkness see faces
Friendly even now, turning toward me..”
- Stefan George, *Rapture*

Ever since I first read Sean Lally’s *Air From Other Planets*, I became convinced that those foreboding words sung in the final movement of Arnold Schoenberg’s second string quartet marked a deep connection between symbolist poetry and environmental architecture, though I knew not how this would be so.

If I were asked, “Would you rather explore the deep sea or deep space?” I would answer: whichever allows me to see Earth best. Thus another question is raised: in which way is Earth best contemplated; as an inaccessible whole by telescope or an incomplete part by microscope? This question, which has no exhaustive solution, is both ontological and geometric in nature, and motivates me to pursue a career in architectural academia. The complex geometries I began exploring in Professor Dana Cupkova’s Advanced Option Studio are multivariate, as their appearance, behavior, and aesthetics transform across scales, revealing an approach to the natural sciences founded in scalar examination of physical forms. I aim to act at the intersection of computational, sustainable technology and environmental humanities, exploring and theorizing about perception and representation of nature via crossing the fields of architecture, poetry, and fractal geometry.

My interests in poetry have invariably led me to the scholarship of Dante. The Florentine philosopher-poet’s ordering of the liberal arts in the *Divine Comedy* is in-itself geometrically striking, as he dispatches metaphors geographically within an early 14th century understanding of Earth’s geology, inspiring scientists and artists alike, ranging from Galileo to Botticelli. Even more potently, Dante’s poetry records the replacement of the neoplatonist ideal of a principle-monism through prime immutable concepts with an acceptance of ambiguity. A neoplatonic narrative would conclude when the Truth is revealed to the poet by the sunrise, the Truth. Dante rejects this narrative approach by implementing a poetic subjectivity which forgos utter clarity in favor of a reality constantly in motion.

Alberti’s treatise *De pictura*, which introduces a theory of perspective still taught at Carnegie Mellon, heralds a rearrangement of the Medieval representational mode in which appearance and reality are commensurate, toward a more modern of understanding the perception of reality being relative and based on one’s position in occupied space. A dialectic is created between these two respective modes of knowledge because of their inherent tensions, and its solution raises new tensions. Even though a cube’s foreshortening changes depending on from what vantage Alberti chooses to paint it, it always remains a platonic solid, disregarding modifications from weathering or from carbuncles observable only with magnification.

The epistemological structure presented by Dante, in which our cognizance of the world continuously updates and shifts based on factors such as position, lighting, or climate is not entirely new to architecture, but was present in Renaissance architecture of the following centuries. Alberti’s treatise *De pictura*, which introduces a theory of perspective still taught at Carnegie Mellon, heralds a rearrangement of the Medieval representational mode in which appearance and reality are commensurate, toward a more modern of understanding the perception of reality being relative and based on one’s position in occupied space. A dialectic is created between these two respective modes of knowledge because of their inherent tensions, and its solution raises new tensions. Even though a cube’s foreshortening changes depending on from what vantage Alberti chooses to paint it, it always remains a platonic solid, disregarding modifications from weathering or from carbuncles observable only with magnification.

The same geometric problem can be applied to examining Earth’s shape. If seen from space, its form would be ‘correctly’ observed as that of a sphere. Upon closer examination, one discovers that it is flattened at the poles and bulges at the equator, and the geometric model is updated, becoming an oblate spheroid. Looking closer still, Earth appears to change again. The spheroid has mountains and ocean trenches, each having its own set of ridges and divots. When magnified, the geometry becomes fragmented, rough, not straight, not clean, weird. It is anything but platonic.
The roughness inherent to geographic forms is a definable mathematical property, introduced to the field by Benoit Mandelbrot in his book *The Fractal Geometry of Nature*, where he observes that, "Clouds are not spheres, mountains are not cones, coastlines are not circles, and bark is not smooth, nor does lightning travel in a straight line (Mandelbrot 1982)." Colloquially, a fractal is often understood as a self-similar shape, but a more astute definition lies in the rethinking of the concept of dimension as a way of describing the bends and folds in complex geometries. The fractal dimension $D$ is computed by comparing a shape across varying scales, and is given by the equation: $N = S^{-D}$, where $S$ is the scaling factor and $N$ represents the number of subdivisions between scales. When $D$ is a non-integer number for some geometry, it indicates that the shape is a fractal, because it maintains a degree of roughness regardless of scale; this is the way in which natural forms are indeed fractals.

By updating the concept of dimension to include any positive real number denoting a geometry’s roughness, we discover a way to create and measure shapes that are fuzzy, though by way of gradient, but as simultaneously rigid and indefinite. Expanding the definition of dimension lends a much richer notion of fractal beyond the simply self-similar, because it marks a new way of understanding geometry that is directly related to architectural problems of porous geometries whose non-euclidean forms enable ecological growth. In this way, I also believe mathematics has now tapped into some of the same ontological and perceptual issues I had previously discussed regarding writing and drawing, because it connects across scales the concept of shifting perceptions of reality.

Returning once again to the study of geodesy, the question is not whether Earth is better observed by bathysphere or by spaceship, but rather to compare findings across varying degrees of closeness and depth. Now I realize that George’s “air from another planet” may refer to none other than Earth, as depending on how and at what scale one looks at the planet, it becomes a very different thing. Our growing empathy toward strangeness allows us to understand a plural notion of Earth, where the closer one gets to it the more it changes, and the more one learns about it the less clear it becomes. Arising from a world with this ecological outlook, my aspiration as a designer is to geometrize these concepts into architecture to address prevalent discussions in ecocriticism and environmental philosophy by forming a bridge between the mechanical and liberal arts.

Image Credits
All buildings are complex systems with life-cycles and material formations that span beyond the geometric boundaries of the envelope. For any particular building, its material logics and processes share common characteristics with all other buildings: the matter is extracted, transported, processed, assembled, and demolished. Each of these processes requires energy, which, in most cases, means burning fossil fuels and the release of greenhouse gasses into the atmosphere. Thus, it can be deduced, when building is defined as process and flow rather than merely geometry and form, architecture is a sufficient condition for climate change. Carbon is a necessary condition for building. This paper proposes a new form of drawing that engages building within its larger ecological context and tracks material flows directly to the design domain.

While all buildings require energy to construct, operate, and dispose, the specificities of different typologies’ environmental impacts may vary depending on manufacturing paradigms, cultural factors, and lifestyle. Pre-industrial and contemporary vernacular manufacturing practices emphasize bespoke construction with built-redundancy and resultant low carbon impact. The processes of standardization catalyzes manufacturing paradigm shifts, as new conventions and orthographies provide an effective means of establishing collective agreement for some common purpose. Industrial practices of mass manufacturing uses standardization to streamline assembly processes by eliminating redundancies and treats each element identically in every instance regardless of geography, climate, or ecosystem, leading to unintended and often harmful environmental consequences.

Architecture as Material Flows in Systems of Energy and Extraction

Spring 2020 | Advised by Dana Cupkova, Azadeh Sawyer, Matthew Huber, and Robert Heard

A node is given by the ordered pair: \( (\text{Name}, \text{Position}) \)

The set of all nodes \( N \) is determined by taking the union of the sets of ordered pairs \( (\text{source}, t_0) \) and \( (\text{target}, t_1) \) is given by the equation:

\[
N = [(x_{\text{source}}, x_{t_0}) \text{ for } x \in \text{Flows}] \cup [(x_{\text{target}}, x_{t_1}) \text{ for } x \in \text{Flows}]
\]

Duplicates are removed, yielding set \( N' \) for unique nodes:

\[
N' = \emptyset \\
N' = [\text{append}(N', x) \text{ for } x \in N \text{ if } \neg (x \in N')]
\]

Flow mass calculation:

Base case, where \( t_0 = 0 \):

\[
x_{\text{mass}} = \text{Fratio} \times \text{maxFlow}
\]

For \( t_1 > 0 \):

\[
\text{Flow}_{\text{in}} = \begin{cases} \text{y}_{\text{max}} \text{ for } y \in \text{Flows} & \text{if } y_{\text{target}} = x_{\text{source}} \text{ and } y_{\max} = x_{\max} \\ \sum \text{Flow}_{\text{in}} & \text{otherwise} \end{cases}
\]

\[
\text{max}_{\text{in}} = \sum \text{Flow}_{\text{in}}
\]

\[
x_{\text{max}} = \text{Fratio} \times \text{max}_{\text{in}}
\]


[4.] A drawing can be mathematically defined, as in this generic flows schema.
With a diminishing need to represent architectural form, what kinds of images should architects make, if at all? Perhaps we must now shift away from conceiving of buildings as discrete, countable entities that hold still in three dimensions. Due to architecture's historical and contemporary embeddedness in systems of energy and extraction, buildings must be conceived of as systems of networks and flows in a landscape. In this sense, architectural image making draws more from data visualization than from descriptive geometry, where spatialized flow diagrams represent buildings as inects and processes in a world, the only world we have.

Only rarely will an architect participate directly in manufacturing, as architects do not make buildings; they make drawings of buildings. Architectural drawing contains its own orthography in the form of graphical marks on paper or screens. These conventions allow construction professionals to translate architectural imagining (drawing) into physical form (building). The rise, however, in additive manufacturing diminishes the necessity for constructible drawings which are readable by human agents, as technologies such as Binder Jetting can produce physical form directly from computer models and numeric data.

This paper explores drawing of a building no longer as discrete form, but any possible building; repeatable, ever-changing systems, networks, and flows. The computational approach is not just a practical methodological solution for problems involving mathematically describable systems in the world, but it speaks more deeply to an epistemological and ontological conception of computation in architecture.

[5, 6] Current-state material flows alongside impact value benefits of circularity.
Mapping the Zauberberg

Spring 2021 | Advised by Matthew Huber and Francesca Torello

Mapping the Zauberberg is a project about diagramming a perceived sense of time. By perceived-time, I mean how long a given duration of time appears to last, regardless of its actual duration. Since the coronavirus pandemic, many people have experienced new(er) phenomena (e.g., Zoom fatigue, self-isolation, etc.). These have caused people to report feelings of “days blurring together” and “losing one’s sense of time.” The experience of pandemic life is different for everyone, but we can nearly be certain that we spend a lot of time in our rooms.

In this particular room (my room), stands a bookshelf, and on that bookshelf sits Thomas Mann’s 1924 novel The Magic Mountain. This thesis is about perceived-time and it is about The Magic Mountain. The Magic Mountain is a decidedly rich book with no single interpretation. This project does not aim to substitute or replace Mann’s magnum opus, but to consider perceived-time (which is a pertinent theme in the novel) through diagraming the novel’s structure and the characters’ experiences within.

The Magic Mountain is set in a tuberculosis sanatorium in Davos, Switzerland in the early twentieth century, in the years prior to World War I. In this Bildungsroman, the protagonist, young Hans Castrop ascends to the International Sanatorium Berghof to visit his Tubercular cousin, Joachim Ziemssen, for three weeks. However, when diagnosed with a moist spot in his lung (and motivated by his infatuation with the careless Clavdia Chauchat), Hans Castrop becomes a full time patient. And there he stays for seven years, contemplating and philosophizing thoughts he never would have had down in the flatlands, until the Great War breaks the Mountain’s spell and releases Hans Castorp back into the world.

Time is an important theme in The Magic Mountain. The characters frequently discuss and philosophize time, noting how the peculiar mountain atmosphere distorts one’s perception of time. Consider the following quotation:

“What people call boredom is actually an abnormal compression of time of time caused by monotony-uninterrupted uniformity can shrink large spaces of time until the heart falters, terrified to death (Zbg., p. 102).”

And:

“I’ve always found it odd, still do, how time seems to go slowly in a strange pace at first.” (Zbg., p. 108).

The novel’s structure and pacing are indicative of this temporal compression. The Magic Mountain is divided into four roughly equal sections lasting three weeks, six months, just over two years, and approximately four years. By peeling this undistorted timeline apart and reshaping the branches based on story’s pacing for each section we can better visualize time’s compression and acceleration. This happens both over the course of the entire novel, and within individual scenes and subchapters. Take Hans Castorps’s first three weeks for example: the first day moves by considerably slowly, but as weeks pass, so does the pace increase.

Another perceptual feature of time in The Magic Mountain is its circularity. Consider the following remarks by the narrator at the beginning of Chapter 6:

“Since we measure time by a circular motion closed in on itself, we could just as easily say that its motion and change are rest and stagnation-for the then is constantly repeated in the now, the there in the here (Zbg., p. 339).”

Rather than representing the timelines as linear as we have done so far, the timeline could just as easily be drawn curled in on itself in a spiral. By combining the notion of circularity with compression, we can generate a new timeline that more acutely translates Hans Castorps’s time experience, where each turn in the spiral represents a day of the week and the distance between turns is scaled according to the story’s pacing.
Now that we have a timeline that accounts for both time's compression and expansion and it's circular uniformity, how does one go about representing how such circularity is experienced? To do this, I set about diagramming what is referred to in the novel as “the rest cure.” This is when, for four times every day, sanatorium patients lie out on their private balconies, as it was thought at the time that mountain air helped cure tuberculosis. Here, Hans Castrop experiences the cycles of time through the changes in seasons, often described in the novel by the quality of light and color of the sky. And not just sky color but also weather (e.g., rain, snow) and flora (e.g., meadows, mountain flowers). Take for example, October:

“Several days later, somewhere between the beginning and the middle of the month, things turned around again, and a belated summer burst upon them with absolutely astonishing splendor. Not without good reason, then, had Hans Castorp heard people praise October in these regions. For a good two and a half weeks a splendid sky reigned above the mountains and valley, each day outdoing the last for sheer blue purity (Zbg., p. 223).”

But the following month…

“Clouds pushed in from the northeast across Piz Michel and Tinzenhorn, and the valley turned dark. Heavy rains followed. Then it wasn’t just rain, but a whitish-gray mixture of snow and rain, finally just snow that came down in squalls that filled the whole valley (p. 264)… Then the sky turned clear. A bright, pure frost reigned, winter’s splendor settled over mid-November and the panorama beyond the balcony was magnificent - snow-powdered forests, ravines filled with soft white, a glistening sunlit valley under a radiant blue sky (Zbg., pp. 266-267).”
And some months later…

“Hans Castorp found the slopes full of flowers, the same ones that had just been ending their bloom when Joachim had gathered a few to put in his room as a friendly greeting - yarrow and blue bells. It was a sign that the year was coming full circle (Zbg., p. 363).”

So far we have looked at how one anchors one’s sense of time with year’s passage, but what happens when this is no longer possible? During Hans Castorp’s second winter up here, he bought a pair of skis to seek the solitude of the mountains. During one such outing, his path represented here with varying thickness to show the changes in narrative pace, Hans Castorp was caught in a snowstorm and began to wander in circles through the white nothingness. When it became clear he could not make it back to the Berghof until the storm blew over, Hans Castorp decided to rest by a solitary shed. It was at this moment, when Hans Castorp had no sense of space in the snowy wasteland, that the narrative pace slowed to terrifying depths, and he began to dream. He dreamt of an Arcadian landscape by the sea and a Grecian temple, but within the paradise there was also horror: witches devouring a baby. Ripped from his dream, though still asleep, Hans Castrop thought this thought:

“For the sake of goodness and love, man shall grant death no dominion over his thoughts (Zbg., p. 487).”

And when young Hans Castorp awoke, Mann wrote:

“Gentle dusk was falling. No wind, no snow. The whole mountain face opposite, including its ridge of rough firs, was visible now, lay peaceful before him. Shadows now reached halfway up it; but the upper portion was bathed in softest pink. What was happening, what was the world up to? Was it morning? Had he laid there in the snow all night without freezing to death, despite what the books said?… He managed to pull out his watch. It was ticking… It wasn’t five yet - not by a long shot. Not for another twelve, thirteen minutes… Could it be that he had laid there in the snow for only ten minute or a little longer, had fantasized all those daredevil thoughts, those images of happiness and horror, while the hexagonal monster moved on as quickly as it had come? Well, then, he had been remarkably lucky in terms of getting home… An hour later… his dream was already beginning to fade. And by bedtime he was no longer exactly sure what his thoughts had been (Zbg., pp. 488-489).”

I hope this project accomplishes two goals: first, that it raises interest in The Magic Mountain and reading in general; and second, that it demonstrates how drawing and diagramming can serve as exploratory tools in elucidating, making clear, certain aspects of the human condition, and contribute to a well-considered life.

FINIS OPERIS
Hut on Fowl’s Legs in the Shape of a House

Spring 2020 | In collaboration with Longney Luk, Advised by Dana Cupkova and Robert Heard

On approach, the Chicken House appears against the horizon of a forest. When one turns around, the town is revealed. Hazelwood neighborhood in Pittsburgh’s picturesque landscape is grounded in a hilly topography and contaminated post-industrial soils. Nurturing a collective self-sustaining system and biodiversity, this New Pastoral design calls for a vernacular sensibility and deindustrialization of agriculture while immaculating pollution through upcycling of contaminated soil for new construction.

The house evolves from the Pennsylvania bank barn embedded in a hill with the entrance at the top. The lower level becomes a garden for chickens and the upper a house for human dwellers. The house is centered around a hearth and chimney, providing warmth and acting as a thermal mass. This strategy transforms lot vacancy into

[3.] Approach from the South West; [4.] Journey of the house (top-down): PA bank barn, House situated in the landscape, Picturesque, Integration of thermal systems, Neighborhood context; [5.] Overall and close up site plans; [6.] Site groundwater runoff.
productive landscapes, for the inhabitants that belong to a racially diverse, underserved, economically and socially vulnerable demographic. The Chicken House seeks to examine a new form of pastoral urban life, incorporating a human/non-human co-sharing dialectic, as a contemporary ecological thought moves to include other species. The clients are a farmer-gardener, her family, and a family of chickens. Here, the co-operative farmhouse for pan-species dwellers lies between Hazelwood Greenway and suburban neighborhood.

Rooted in a research studio “Lithopic (Living Stone) House: Ecologies of Earthen Matter”, that was led in conjunction with a material science seminar, our design approach is underpinned by a potential of construction waste recycling through direct 3d binder-

[7.] Sectional axo embedded in site; [8.] Floorplans: Loft (top), Ground (bottom); [9.] Structural Form Study: Increasing ecological impact by reducing material volume; [10.] Design Process Workflow: Using AI to identify ecological patterns that would support plant growth integrated into material form of the thin shell construction.
jet printing. This cradle-to-cradle method would reduce CO2 levels by reducing the volume of new architectural materials, as well as offsetting waste streams heading to industrial landfills. Shaping printable components for minimal material use aligned with structural and ecological potential is coupled with a desire to integrate new landscape and biomass directly into the architectural form, function and experience.

At the peak of Industrial Pittsburgh, early 20th century steel mills and coke factories provided optimistic job opportunities while employees conveniently lived in proximity to the plant. One of these notorious coke plants resides approximately 4 miles south of Downtown Pittsburgh. From the economic meltdown, the majority of those residents abandoned their neighborhood, leaving a repercussion in the early lot vacancy phenomenon. Arrives the 21st century 178-acre transformation plan along with secondary intentions of neighborhood revitalization through Mill 19. Still, the development disregards the historical local values by its large scaled infrastructure and dwelling complexes. Expectations of domesticity and family operations are lost within the massive single unit blocks. As continual commercial development inevitably leads to a loss of culture and climb of consumerism, we venture to discover a new pastoral life.

[11.] Transverse section looking south; [12.] Mass Reduction: Chimney (left), Chimney casing for hearth (right); [13.] Longitudinal section looking east; [14.] In the Grotto, after Jean-François Millet; [15.] Maison poulet; [16.] In the Kitchen, after Ander Zorn; [17.] Departure from the South East, after Camille Pissarro.
A Hermetic Tale

Fall 2020 | Advised by Gerard Damiani

A Dark, Satanic Century: So Reyner Banham entitled the third chapter of the Architecture of the Well-Tempered Environment. A Dark, Satanic Century. And what a name indeed. Banham refrains from his customary ramblings, in that waggish tone, on mid-century gadgetry as if they were the most interesting contrivances since Archimedes’ screw. No, not at all. Banham, writes about something very dark indeed: cholera, tuberculosis, silky odors, and those invisible fiends all too well known in the nineteenth century. It is a chapter about the unseen. It is an ironic chapter, for what else do you call it when every attempt to bar the uninvited mephitis of industry from entry into your home only augments toxins from respiration and gas lamps? It is a cautionary chapter, as we are exhortated chiefly away from the dangers of a hermetic architecture. Yet that very hermetic-bubble remains a pervasive insignia of the well-tempered architecture, and even Banham’s Un-house: Transportable Standard-Living Package possesses the same modus operandi; the only difference being the absence of gas lamps and the presence of awesome, energy-intensive contraptions.

What you are now about to witness is a story, told in the memory of that bewhiskered Englishman, about the unconscious dream of a bubble-architecture; about the dark culprits of air pollution; a tale about the unseen.

But first, some lines of Goethe:

“The devils all began to cough, to utter
Much belching back and front, to sneeze and splutter;
Hell filled with sulphurous acid fumes, expelling
Its brimstone stench, like a great gasbag swelling!
Until such monstrous force, as soon it must,
Shattered the dry lands of the earth’s thick crust.
Now, things are upside down: the great abyss
Of former times, too, their orthodoxy’s based,
With nethermost by uppermost replaced;
For when we fled the hot pit’s servitude,
Our lordship of the upper air ensued.
An open secret, kept till now with care;
Lately revealed to the nations everywhere.”

Let us turn our attention to six little scenes. Listen carefully, for I will describe each one only briefly, and what is said shall not be repeated.

The first scene depicts the onslaught of air pollution as the evil atmospheric spirits as mentioned in Goethe’s verse. They creep down the walls of a tall romanesque chamber and descend upon a weary man, disrupting his sleep and damaging his psyche. That our protagonist is this particular man, or a man at all, really, is quite inconsequential, for it was only by chance that this particular story happened to this particular man, and it was an even greater improbability that we chose him from amongst all the souls who could boast a similar plight.

Let us now follow our hero in his somnambulation. He has a very special guest waiting for him in the library, the name whom, though omnipresent, its slightest utterance arouses fear and trembling, like the macabre gaze of the cockatrice. As we wander, take notice of our man’s furnishings and adornments.

These paintings and artifacts do not unveil any real adventures, but are the shadows of images of the world.

Our hero and his guest will now embark on a brief excursion through time, in which the latter edifies our man regarding the origins of architecture. Not in the sense of the primitive hut as its genesis, but a pedigree from the cosmic to the well-tempered bubble. When the guest asks our hero what he would give to see a well-tempered architecture? the man replies, in effect, “I would give Versailles, Paris, St-Denis, the towers of Babylon, and the bell of my parish church,” and the pact is sealed.

Qu'il fait bon dormir. How good it is to sleep.

Let us now end our hero’s dream. Was it all a dream? Of course not! Such an ending would be terribly contrived and ultimately fallacious, for that standard-living package of his is quite real, though not at all of its cosmic gestalt. No, his home is but one out of many in the columbarium, each having the same unchanging function, continuing in the same unchanging form, because they are all the same. And before we leave him to return to live as they do, let it be said that he, yes he, our inconsequential hero, if just for a moment, in a dream, he too was in Arcadia.

If ecological awareness is nonviolent coexistence with non-human others, then ecological architecture isn't simply synonymous with sustainable architecture which aims to reduce negative impact of human built structures on the environment. Ecological architecture is more like an architecture mediating the space between humans and others, in which the building envelope is understood as something that also shelters others and program is the mode in which others operate in, each in completely unique ways. In a sense then, all architecture is ecological even when it's unintentional.

Imagine a house on Pittsburgh's Allegheny river. It is a house for people, where they sleep, dine, play, etc. A compositional mashup of Friedrich's *Woman at a Window* and *The Wreck of Hope*. What at first glance appears to be scene of strict verticals and horizontals is actually an irregular lens distorting the echoing forms in the distance. Romantic art is surprisingly relevant access mode for interrogating the world because shows how when you actually try to get at objects how weird and manifold they really are. [25] Siteplan; [26] Building cores; [27] Plans and section (clockwise from top left): Ground floor, upper floor, longitudinal section, transverse section.

**Studies in Algal Motion**

Fall 2018 | Advised by Dana Cupkova and Matthew Plecity

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procreate, entertain, or what-you-will. And it’s a house for algae which swims about for (at first glance) no apparent reason partaking in what we call Brownian motion. The algae photo-synthesizes sugars from carbon dioxide and water. It releases oxygen that the family cat breathes. It swims about, and not in a completely random way, because algae, just like the cat, is more likely to do some things than others. More specifically, algae is reacts to sunlight in a particular way that can modeled with what is known as a Markov chain, or stochastic model describing the total possible sequence of events. By computing this we discover that the algae’s position in relationship to an aperture in a container can be determined probabilistically based on how long it has been exposed to sunlight. Because algae must be periodically shift between states of intense light and darkness in order to survive, its presence in the house isn’t constantly present. The algae partakes in a fluctuating dance of survival that in turn, mediates our experience of opacity and light, thus effecting how we live in a real-time way. Solidarity is achieved between us and them.

[28.] Computational modeling is employed to evaluating the algal motion at varying container shapes for three different sun positions; [29.] Algae is employed within the wall poche to create a dynamic shading device based on its proximity to sunlight. This generates an experience of varying opacities. Depending on the time of day, spaces in the housing units undergo differing levels of privacy of daylight, encouraging a more fluid way of life; [30.] Building envelopes are never single lines. They are manifold with stuff existing between each surface; [31.] (following page) The lives of others.
What do monasteries, libraries, and swimming pools all have in common? Each are typologies with roots in ancient civilizations. They form a contemporary variation of the trifunctional hypothesis. Praying men, fighting men, and working men become modern clergy, athletes, and students. And they all also exist as communal spaces in which the occupants remain in solitude. Swimming pools are divided into lap lanes. Libraries contain vaulted reading rooms with wooden reading desks with green reading lamps. The monastery has the courtyard. The Buoys partition swimmers and green reading lamps fashion striations of light and shadow engendering symbolic boundaries between studious individuals. While the courtyard is similar in respects that

Architecture is the masterly, correct and magnificent play of masses brought together in light (Le Corbusier 1927); [33.] Sight-lines across a courtyard; [34.] In the tepidarium; [35.] Ceci n’est pas un plan d’étage, but that of a forum. An introverted building contains its own urbanity. Perhaps even, all buildings do; [36.] In the frigidarium.
provides barrier, it forgoes the need to block all sensory access between agents, namely the sense of vision. The courtyard thus, is a space in which occupants exist in sight of each other, though isolated from contact.

“To circumambulate” is the courtyard’s associated verb, only not quite. Circumambulation, which plays a role in Christianity, Islam, and Buddhism, among other religions, and deriving from Latin for “to walk around,” requires a sacred idol or object to act as the pivoting point for the motion. The courtyard, as in the monastic tradition and in the bathhouse design here, removes the center object and re-frames circumambulation as an action of introverted community. Closeness without contact, or in our case of contact without proximity.

Aggregated, the courtyard produces a simulated urbanism. Hackesche Höfe in Berlin is an example of this. A figure ground reading of the complex reveals the buildings as a single mass and the courtyards as streets. Ground contained in figure. Another example is Joseph Gandy’s painting of John Soane’s Bank of England as a ruin. It’s simultaneously an arrogant statement about architecture’s permanence and a floorplan. Not a building floorplan but that of a forum. An introverted building contains its own urbanity. Perhaps even, all buildings do.

[37.] A choisy; [38.] In the caldarium; [39.] (following page) How does one give form to an introverted building? The courtyard pools serve as nodes that push their programs.
On the south bank of the Allegheny River just north of the 40th Street Bridge stands an experimental boarding school. The fundamental pedagogy of this school is based in the ecological literacy of Orr and Capra, or “understanding the systems that make life on Earth possible.” To this end, this school aims to create a space in which the architecture becomes a teacher. The school has two massive “stomachs” which are programmed as bio-hacking labs where students learn a bio mechanical framework to growing and architecture, by immersion in principles of microclimates and thermal mass.

In mathematics, orientability is a property of surfaces in Euclidean space that allows for normal definitions of inside/outside or clockwise/counter-clockwise to be applied to a surface. For a surface to be non-orientable there must be a closed path around which a figure can be moved only to look like it’s mirror

[40.] Air circulation in the double curtain wall (left to right): Winter, spring / autumn, summer. [41.] Front elevation showing the two stomachs and overhead truss. [42.] Siteplan.
image when it gets back to the start. In the case of this project, the stomachs suggest non-orientability by surrendering the building’s interiority to the outside, extending its program to a concrete growing wall. The wall is constructed using robotically fabricated concrete panels. Deformations in the surface demarcate unique thermal zones, creating microclimates to facilitate plant growth.

Opposite of the growing wall, a double skin curtain wall will aid in natural ventilation and improve thermal performance by increasing glazing assembly R-values through the use of argon gas-filled IGUs and laminated 3/8” glass panels sealed with a silicon sealant. Adjustable mechanical louvers provide three different configurations for the curtain wall for the summer, spring/fall, and winter seasons. By exhausting hot air, pulling in fresh air, and circulating warm air in the cavity.
“I am a monument!” shouts the new office building.

“Ach, such hubris!” retorts the towering church,

“How can that be? You’re just an office building and I’m an immovable place of worship.”

“But that’s where you’re all mixed up. In four hundred years I probably won’t be an office building but I’ll still have my beautiful parabolic vaults.”

Still unsatisfied the church continues, “You’re just a formalistic mess. Architecture is about people and how they interact. Buildings exist to facilitate their lives.”

“People come and go; it’s absurd to think we will know the needs of our occupants long into the future. I doubt the Mezquita would ever have expected a Christmas mass to be held in side her walls. No, it’s not our uses that matter but our aesthetic principles.”

“Ha! I have caught you with your poor logic. By your reasoning, people’s tastes will also change. How can you be certain that your parabolic vaults will still please future generations?”

“No, but at least they will know who our makers were.”
Gleisdreieck Station

Summer 2018 | Advised by Douglas Cooper and Mareike Lee

It was Sunday that I arrived at the railway triangle, or wye, switching lines to find my lodgings.

Unfinished poem...

[50.] Google Earth satellite imagery of Gleisdrücke, Berlin; [51.] Unfolding of the book; [52.] Two levels of Gleisdruck Station and the street below.
Granada, Spain

Summer 2019 | Gindroz Travel Prize

[53.] Granada Cathedral, Dusk; [54.] Granada Cathedral, Dawn;
[55.] Campo del Príncipe; [56.] Casa Museo Manuel de Falla;
[57.] Alhambra, Entering; [58.] Alhambra, Departing.
Other Curious Objects

MMXVIII - Present

[59.] Inverted Casa Poli, Chile; [60.] Flowlines Over a Concrete Panel; [61.] (p. 26) Motion of a Freestyle Swimmer; [62 - 65.] (p. 27) “Jellyfish” Objects under the sea, Jellyfish sections, Stereographic projections of the Jellyfish Objects, Ecological growth on the projections.
Louis Suarez (born December 4, 1997) is a graduate from Carnegie Mellon University School of Architecture. He completed a Bachelor of Architecture with a minor in music (2021) and an Accelerated Master of Science in Sustainable Design (2022). His interests cover a broad spectrum from sustainable design and materials science to architectural history and theory. These interests are reflected both in his speculative architectural work integrating cradle-to-cradle and circular economy design frameworks into vernacular building traditions, and in his professional work as a researcher for the Carnegie Mellon University Manufacturing Futures Initiative where he studies material waste streams to find new ways of reducing carbon footprint in the building industry.

Aside from his architecture work, Louis is a classical guitarist of nine years. He has made solo and chamber appearances with the Pittsburgh Classical Guitar Society, the Carnegie Mellon Guitar Ensemble, and the Carnegie Mellon Contemporary Music Ensemble. Louis is also an avid road cyclist. He believes the world is best seen from the seat of a bicycle, and often takes long rides outside of Pittsburgh to explore industrial and agricultural infrastructure along the three rivers.

[65.] Photo of the artist by Longney Luk, 2018.