INFRASTRUCTURES
The definition of **infrastructure**:

“the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.”

Throughout my education, I have always been interested in the idea and hidden realities of “infrastructures” and how this word can be expanded upon, not just in the physical sense, but in the **metaphysical**.

Infrastructures of **civic, commodity, community, resources, sanctuary, energy, ecosystems, conflicts**, and more.

My portfolio questions the notion of what it means to consider something an **infrastructure** and how we can **manifest** hidden and more important infrastructures within **existing frameworks**.
In the heart of Midtown Manhattan, this design proposal aims at bringing back health and wellness to the subway by integrating public goods services, such as libraries, local markets, and small health clinics for everyday users and allowing for better light and air quality to permeate each level.
Urban Map: Midtown Manhattan

Public vs Private Space Density

Axonometric Abstract Drawing
Analyzing Subway Systems

Section Abstract Drawing
Analyzing Subway Systems

Urban Map: Midtown Manhattan
Public vs Private Space Density
Amazon Fulfillment Center in Staten Island filled the needs of many safely and efficiently during the rise of the pandemic. Amazon fulfills over 1.6 million packages a day all around the world. Due to this volume of high numbers, the systems behind the operations are thoughtfully designed and well managed to ensure speedy delivery to every happy customer. In this drawing and representation class, the project aims to analyze the inner mechanisms of the process inside an Amazon Center, from the moment it gets purchased to when it is on its way for delivery.

Class Description
Architectural Drawing + Representation will investigate the current concepts, techniques, and working methods of computer-aided drawings in architecture. The focus of the course will be the construction of architectural representations. However, rather than just experimenting in technique, the course will encourage one to define how these new operative techniques are changing the role of drawing in architecture. To this end, we will study the operative relationship between 2d and 3d data, exploring the reaches of their analytic and representational potential. While the class is a foundational course in architectural computing, it will build on the student’s advanced ability to question, shape, and interrogate space and time. In doing so, the goal will be to reassert the speculative nature of representation in the creation of conceptual, provocative, and data-filled drawings.
The Triple C School is an advocate for allowing children to form a sense of belonging within the education system by stripping the idea of the square classroom and creating both collective and private spaces for students to inhabit. The school aims to fuel the child’s imagination through a series of curved partitions that invite students to learn, play, rest, retreat, collaborate, and engage with their academic surroundings while also teaching students about the historical importance of the East Village through active community engagement. Maintaining the history of old P.S. 64 was important to the project, so The Triple C School proposes to repurpose the historic demolished brick as a new porous brick façade that will connect the inner life of the school with the existing community.
East Village Proximity Map
This map locates the proximity of existing public schools and local community gardens.
Overall, the class focused on data visualization and how to efficiently and effectively convey data sets within architecture. The beginning of the semester began with a spatial analysis of our work set up during Covid-19. We then paired up in teams to find overlaps in our working spaces to create a data set of activities and objects in common. Lastly, we then paired into teams, each team coming up with their own manifestos of data visualization, to create our own idea of what it means to represent data visually.

Class Description
The ultimate goal of ADR2 is to incubate our relationship with drawing, representation, and architecture by considering drawing as a collective practice of worldbuilding. You are invited to develop your own style, to collaborate with others, and to explore and invent drawing tools and representational processes that shape how we design together.
An unfortunate issue for some residents in this community is Food Insecurity. We researched the relationship between household income and its effects on poor diet and nutrition. Because about 25% of residents in the South Bronx are living below the poverty line, they cannot always afford weekly groceries or daily meals and their diets and health suffer as a result. There are programs like SNAP and emergency food providers that help confront this issue but the idea to provide better housing with improved access to food became a guiding aspect in our project’s design. We wanted to build off of inherent pathways in the neighborhood, especially connections that promote a sense of community and encourage togetherness. The overall focus of our project plans to target the food economy of the Bronx by creating a workforce and labor agency through the amenity of shared kitchens and food production to be used by the residents and local community members. We wanted to understand the activity of cooking between the units and shared balconies. In addition, we imagine an exhaust system throughout units that can utilize embodied heat energy to heat units during the winter along with recycled water systems and composting facilities. We are hoping to use the lifecycle of food, planting, growing, harvesting, eating, sharing, and composting as a metaphor to multigenerational housing and the connection that food can bring to residents of the Bronx across all scales, while also supporting the local restaurant workforce and labor economy.
Aspirational Housing Collage
South Bronx Community

Median Household Income

$ 28,038
South Bronx

$ 55,191
New York City

Food Accessibility

Walking Distance to Fresh Fruits and Vegetables

Only 4% of South Bronx is receiving the daily recommended amounts of fruits + vegetables servings

Income Research + Food Accessibility
South Bronx Community
Building Section
N/S Direction

Cross Ventilation Diagram
Tilt Turn Window
The site of the project is situated in the East Village of New York City. The project’s topic focused on the East Village’s historical presence of community gardens as a place for agency and connection, especially their relationship to education within the community. The main idea of the project is to use the classroom as a space for internal reflection about growing food and community engagement of food as a tool for education. In order to emphasize this point, we wanted to incorporate a few key aspects to highlight these topics. The building, a courtyard building, faces the central community garden. Classrooms facing the interior courtyard and establish connection between learning and community garden. Curved glass facade sits at the ground floor as visual means of access to see through the courtyard and invite the community in. Arched roof creates an open wintergarden to make the courtyard a covered area for playing and learning all year round. At the street level, the school opens up with a brick facade that cuts short at the ground level to reveal a storefront curtain wall that is segmented at repeating angles and gives off a curving language that is then reflected in the whole building’s interior where the interior courtyard is enclosed by curving glass walls and roof. Masonry window wall and segmented unitized curtain wall create two different levels of opacity and were placed in areas of the building that invite activity through transparency or encourage privacy through solid forms.
Airports started as military bases in Hudson Valley, due to its proximity to New York City and were seen as a prime location to implement this type of need from Cold War nuclear fears. The radius from Manhattan in case of bombing, and how Hudson Valley became a sanctuary during this time. Besides the airport and flights, in the air of Hudson Valley hides another type of sanctuary space that’s invisible/intangible - the radio waves. With the first ever ham radio broadcasting from Union College in Albany 100 years ago, those airwaves served as sanctuary of the minority voice. The two parallel research on airwaves and airports lead to our site at New York Stewart International Airport, which is located in the sanctuary city of Newburgh. It was called SAGE as an abbreviation of Semi-Automatic Ground Environment, or the first and ultimate line of defense from a Soviet nuclear attack, a harbinger from an act of war that seemed inevitable in the 1950s. The SAGE directed and organized the North American Aerospace Defense Command’s (NORAD) response to a potential Soviet air strike by coordinating radio waves collected from numerous radar sites into a single, comprehensible image. The SAGE Building will be reclaimed as a new form of media incubator that welcomes the agency and promotion of small businesses, local journalism, language justice, and grassroots organizations. In between, the terminal of the airport and the SAGE building is connected by a jet bridge.
This research focuses on resources and sanctuary spaces in Hudson Valley related to airports and radio.
Site Analysis Drawing
Newburgh Airport in Hudson Valley and
The historic SAGE Building

Axonometric
The SAGE Building

Floor Plan
Sanctuary Spaces

Floor Plan
The SAGE Building
Sanctuary Collage
Approaching the Living Space

Sanctuary Collage
Approaching the SAGE Building

Sanctuary Collage
Living Space

Sanctuary Collage
Approaching the Newburgh Airport

Sanctuary Collage
Radio Show in The SAGE Building

Sanctuary Collage
Community in The SAGE Building

Design Intervention Collage
Ecological change has made wood scarce, petroproducts unviable, and a revolution in cheap energy has made concrete and cementitious products extremely in-demand across the globe. As a result, SAND has become the earth’s most precious resource. For specific chemical reasons, only sand that naturally occurs in deserts, beaches, and otherwise naturally geologically. Daily life for citizens of the earth revolves around the collection, storage, and trade of sand—where having sand is seen as status and wealth. Others resist and work for a sand-free environment.

Class Description
In this course we engage the skills, ideas, and technologies shared between the practices of production design (for film) and architecture. Consider three topics around which this overlap occurs: the methodological, the conceptual, and the technical.

We will accomplish this by starting with a story, building models, and filming them. Small groups of students will be given premises for fictional future scenarios, and they will develop and articulate the worlds in which these stories occur by making working, detailed, scenographic scale models. These models will be then filmed in a series of scenes developed in consultation with your peers and instructor. The ultimate deliverable for the course is a short test film (or series of clips) of these highly developed models.
Story Board
Compilation of Scenes

Mood Board
Inspiration from Dune, Blade Runner 2049, Mad Max: Fury Road, etc.
FIRST PERSON PERSPECTIVE PROBE SHOT

CAMERA ON TRACK FOR AERIAL SHOT

LIGHTING
Our goal for our drawing was to unpack the way pieces come together to form the four-way intersection. We chose to explode the two views shown here in order to reveal all the small details of the fasteners and connections. Objects are represented in color to establish a link between materials and the relationship between the objects. Some are called out as well to emphasize how they fit into the large scheme. By drawing the curtain wall in this way, we were able to understand how the pieces stack. Starting on the left column, this front view captures the details of the mullions and fin. If we zoom in, we can see that the male and female mullions come together to form the connection and are joined together by anti-buckling clips. The components of the mullions are shop assembled. Pieces of the vertical mullions are attached to each other through a unit lift/alignment lug that is bolted through. The stack joint meets the vertical around 2’ off the floor. The fin is shop assembled as well. A fin cover is attached to the blade receiver and covered with a stainless steel panel. Silicone sealant is placed in between the fin cover and the panel. This is all attached to the vertical fin blade with fin hanger pins, and the connected to the vertical mullion in field with anti-lift pins. Starting with the slab, the metal deck is bolted to the beam and the rebar and pour stop are prepared for the concrete pour. The floor slab is then poured, leaving a C Channel, which is fabricated off site, for the anchor, and once dried is installed. The pin carrier attaches to the hook anchor and fits into the anchor fist which then receives the vertical mullion and is bolted three times on each side. Before firesafing, the extent of the slab leaves out is filled in and the smoke seal and steel angle floor enclosure are installed on top to prep for the finished flooring.
Commercial Curtain Wall Assembly

Commercial Curtain Wall Assembly
Since its inauguration in 1775, the United States Postal Service has seen an immense evolution in the mail delivery service. However, recently we have seen a massive push in a large-scale shift toward the use of electric and renewable resources. The Bipartisan Infrastructure Law recently passed by President Biden plans to invest $7.5 Billion to build a national network of energy, and the USPS has committed to make 40% of its new trucks electric by late 2023. However, the progression of electrification means a larger production of lithium ion batteries which brings up issues regarding long-term sustainability and mass production of the battery. Energy storage is becoming a necessity for cities, however, space for these systems is becoming scarce. In times of emergency, how can the USPS leverage its upcoming infrastructure of electric vehicles to become a key role in this system? Can the USPS become a space for energy storage and emergency preparedness planning to react during times of energy emergency? Relay boxes will serve as a battery recycling drop off box that USPS drivers can pick up during their routes. The new USPS Electric Vehicle can be rented by locals when vehicles are not in use and can be repurposed as generators to power small food trucks, construction sites, and more. In an emergency situation, the USPS Electric Vehicles can act as a roaming generator around the city, deploying energy at the ready. In order to support these newly implemented services, the building must become a working machine to support the mission and incoming infrastructure of the USPS, generating and storing energy for its day to day activities. However, in situations of emergency, the building's stored energy can act as a microgrid to deploy readily available energy, planning for unplanned times of emergency response.
Battery Energy Storage System: 2-3 Mwh

Building Material Axonometric
Motorgate Parking Garage
Photovoltaic Glass + Fin / Solar Panels
We are interested in examining the ways in which locality of material and construction methods influenced the development and expression of modernist housing in Latin America between the 1940's and 1980's. The scope of our focus will include: the interplay between architectural ambition and the limitations imposed on them by material particularities of the region and technological constraints; ways in which local materials informed style and form; and the evolution of construction and material use through time. The focus of our investigation will be on the work of two architects: Mexican architect Luis Barragán and Brazilian architect João Filgueiras Lima (Lele).

This book is thematically organized. Different sections will approach the architectural comparison through different lenses.
This is a personal residence designed and built by Barragán (1948) at 14 Calle Fernández Ramírez in Mexico City. Originally designed for Herta M. H. Fromm, Barragán ended up moving in himself, and there he lived and worked until his death.

In terms of the plan, Barragán avoided the prescribed rules of a rational layout. His plans emerge from a sequence of rooms that are neither linked to an area one feels comfortably onto, but rather can be better described as a sequence of carefully staged areas, orchestrated with extreme economy and spatial economy. (The planner 214) For example, walls subdivide the interior space in such a way as to obscure the views of other surrounding rooms while inside any given space, generating an effect of discovery, and losing lost within the rooms. The organization may be interpreted as a relation to the life of the Modernist free plan, aimed at maximizing the spatial economy of each room.

Casa Dos Arcos: Nivaldo Borges Residence

In 1973, Lelé was commissioned to design a residence for Nivaldo Borges. During the commissioning of the project, Nivaldo Borges expressed to Lelé that he desired his house to be quite large, a place where he could gather his family on the weekends. Additionally, Borges asked Lelé to design the home to accommodate certain eccentricities, such as a space to contemplate his passion for cars and cinema, a mechanical workshop, and a theater room that could seat up to 50 people, where all programs would face the central reflecting pool.

Nivaldo Borges’ home, known as Casa Dos Arcos, resides on a beautiful, vast landscape in an exclusive residential neighborhood in the city of Brasilia. The home is spread out on a smooth topography, enticing one to approach its arched entrance. However, the absence of a gated boundary continues the way on how they should enter the home. Lelé intentionally wanted the arrival of the home to feel unknown, allowing the user to be invited to a complete promenade and provoke curiosity. Upon entering the home, you are approached by a grand yet discrete lobby with nearly eight-meter-tall ceilings where the space is reinforced by its simplicity. Paying close attention to this, we can begin to understand the result of Lelé’s intention which is to focus the core values of the family on the central living space of the resident.
This project dissects the tessellation of a rigid form, the square, to create many organic tiles which can be combined into a nonrepeatable pattern. The tessellation is derived from the overlaps of circles, which create heart-shape forms and dictate what becomes void versus what becomes solid.

This specific process of tile-making is strategic, taking into account additions and subtractions of the form. Subtraction elements are placed in the mold before pouring to act as a filler for the liquid. Once the rockite is poured and cured, the tile is released and the implanted element is broken off to reveal its final form. Tiles are then combined together to create an endless nonconforming organic pattern, transitioning seamlessly between solids and voids.
Mold Making Process
Silicone / Hot Glue / Foam Board / Mold Release Spray

Tile Pouring
Silicone Mold + Rockite

Tile Making Process
The project focuses on the controversy of the Geothermal Power Plants in Olkaria, Kenya and a design that hacks the geothermal energy to give back to the community and promote environmental justice. The geothermal steam is the major agent of the Olkaria development. Noise, air pollution and habitat fragmentation are decreasing or completely wiping out a number of important animal species at the park, including migratory birds and animals that are extremely sensitive to noise and vibration. To target these challenges, our intervention takes in two different parts: one at the wellhead, and then the other four along the pipe. The permanent wellhead silencer and water filter will mitigate the noise created by the wellheads and will filter / condense steam to potable water. Individual train carts can provide a space of safe cohabitation for the agents affected by the development. To combat habitat fragmentation and promote environmental justice, our design is strategically devised to live and move upon the existing and future expansions of the geothermal pipes, harnessing the energy that will be used to benefit the local ecosystems of Hell’s Gate National Park.

# Geothermal Steam / Energy / Waste
# Hacking
# Habitat Fragmentation
# Environmental Justice
# Extraction
# Reinjection
# Exploitation
# Pollution
Cosmogram
Research Analysis Drawing
of Geothermal Energy in
Olkaria, Kenya

Theater of Operations
Brainstorming of potential interventions for Geothermal Energy in Olkaria, Kenya

Noise Reduction Facility
Air Filter
New Habitat For Maasai
Bird Sanctuary
H2S Abatement System
Global Archive Of Geothermal Power Plant
New UN Building For Geothermal Power System
Brine Capturing System
Brine Filtration Center
Build A Big Mountain For Geothermal Pipes
National Network Of H2S Monitoring System
Hot Balloons For Transportation/Transmission Tower
Social Media Product Of 3D Virtual Platform
Narrative Section Drawing
Section of geothermal energy in Olkaria and ecosystems residing nearby.
Svalbard is a Norwegian archipelago in the Arctic Ocean, situated between the northern coast of Norway and the North Pole. It is the most northern inhabited place on the planet, with the largest settlement being in Longyearbyen, located in Spitsbergen, and is home to around 1,800 people. In the Arctic, there is a war over resources. As the ice melts more and more, many countries surrounding the Arctic want to stake a claim in Svalbard and utilize its resources for their own purposes. Many people see this as a looming disaster, but for the Arctic Nations, this change means an opportunity, access to a brand-new ocean. The Svalbard Treaty, signed on February 9, 1920, established Svalbard as a free economic and demilitarized zone. The treaty says that any country who has signed the treaty “shall have equal liberty of access and entry for any reason or object whatever to the waters, fjords and ports of the territories”, otherwise saying that any country contracted in this treaty can have its people on Svalbard and can exploit the land for commercial or economic purposes. The land legally belongs to Norway, however, forty-five countries have signed this treaty, allowing these countries to have an economic claim to the land, whether that be “maritime, industrial, mining, or commercial enterprises”. One exception to this rule is that no nation, including Norway, may have military assets on Svalbard.

The project maps three main factors in Svalbard related to time and producing a projective overlay that interrogates how these factors interact in the future, through the lens of a climatic timescale: climate change, industries and resources, and oddities and border anomalies.
Theater of Operations

This collage shows the relationship Russia has in Svalbard through a tourist city, Barentsburg.
Located on the South Lawn of Avery Hall, The HUG is an inflatable, lightweight pavilion that welcomes all members of the Columbia community to rest and recharge, literally. Our pavilion thrives off three photovoltaic panels connected to internal and external systems that allow the pavilion to become a hub of energy. Internally, The HUG is strategically designed to hold up to 1,300 lbs of sand for weight counting, a large PV battery which stores energy from the solar panels and runs the LED light strips and device charging stations. Externally, The HUG acts as a space of reprieve, allowing users to control their environment and unwind from the chaos of school.

In addition to the functional elements of The HUG, our pavilion also centers around comfort. Worm-like legs meet the ground to become “huggable” pieces for the students, faculty, and families. These legs are filled with recycled foam and donated clothing which will be taken to a local shelter to continue our positivity within our community.

The HUG pavilion has been extremely well-received by the Columbia community and will participate as a gathering space for the graduate class of 2023. Thank you to all of those who have made this pavilion a success. We cannot thank you enough!

Instagram: @gsappxhug
Laying out Tarp
Inserting + Connecting Lights
Clamping Wire
Unloading Sand Bags
LED Light Detail
Connecting PV Battery
Unloading The HUG
Inflating The HUG
PV Connection Detail
Laying out The HUG
Filling The HUG with foam
Phone Charging Detail
Blower Detail + Connection
Foam Disassembling
Laying Down Runway
LED Light Detail
Electrical Wire Detail
Disco Ball Detail
The HUG

Instagram: @gsappxhug

Photo Credit: Angela Allou Keke

Photo Credit: Carley Pasqualotto
A “LITTLE” DREAM

Animation Synopsis:
“A person is bored at work and in their everyday mundane life. On an ordinary day at the office, they fall asleep and embark on a vivid dream, a reflection of their search for excitement in life.”

The main focus of the class was to question what could be possible in architecture if there were no limits, using the power of video game renderers as a lens to focus this on. The project questioned the reality of architecture and experiment with the fantasy of new spaces through film sets and cinematography. Certain references were key to our animation, such as Severance on Apple TV+ and Loki on Disney+, where we found inspiration for our film experience to collide two opposite worlds to tell a story.

The entire animation was completed through the Unreal Engine 5. We 3D modeled the entirety of the space, set up our scene in Unreal Engine, and created animations through the use of blueprint and construction event scripts within the software.
1-The office
- Set: Office space. Simple, Dull, familiar.
- Mechanics: Changing screens on overlap; changing lighting colors.
- Feeling: Starts to wonder if that is reality.

2-The Corridor
- Set: Hallway. Sterile, mundane, liminal
- Mechanics: Glitching effect, changing lighting colors.
- Feeling: Starts to feel trapped in this maze and there is no way out.

3-The Space corridor
- Set: Space-like corridor, futuristic.
- Mechanics: Moving walls on overlap; Moving lights up and down on a loop.
- Feeling: Realizes they are in another dimension/confusion

4-Out of space
- Set: galactic, unfamiliar, space.
- Mechanics: Niagara particles; Morphing material on sphere.
- Feeling: Fear and curiosity. What it is behind the sphere?

5-Back to reality
- Set: Office space.
- Feeling: wake up scared.