

The Space and Form of Sustainability:

the Explorations of an Architecture of the City from the Ground Up, Down and Upon.

Instructor: Jyanzi Kong

Studio Objectives: from the Abstract to reveal the Real.

These explorations in essence are sense-driven wanderings, keeping us on track from the preconceptions which might have blinded us and the distractions which our whims might have chosen. What if the things that we assume we understood are more than what they seem to be? What if we ignore paths and follow arbitrary routes?

Open our senses and mind, redefine what we see and we would be surprised by what the City can offer. The City provides us with a rich text of layers that offers varied spatial experiences. These could be the urbanism in the city, domestic realm, commercial and social activities, weathering, historical and cultural aspects, materiality, built forms, patterns in a particular imagery, community and human/nature interrelationships.

By sheer receptivity, your collective unconscious begins to attract the fragments of the city, which in this particular exercise is about space-ness. Like iron filings, the images of a place will begin to etch onto a pattern in your mind. Whether these images will have a positive or negative influence upon your intrinsic attitude about a particular place is essentially the operations we are about to proceed, bearing in mind Subjectivity deprives people of the freedom to create, but objective creativity, born of consciousness, liberates design that did not exist before.

This brief seeks the ethereal dimensions and sustainability of nature and architecture in generating Space, Scale and Matters in our designs. We will construct the physical to excavate the metaphysical, understand the profane in order to attain the sacred and feel the mortal in order to contemplate on the immortal.

Also bearing in mind, permanence is an illusive imagination in nature. Nature tears and destroys, nurtures and grow, rejecting and accepting through a complex system of sustainabilities. Likewise, to live with nature, human's presence has to be amorphous to accommodate the functions of nature. Assimilating the current and swells of nature. The additional 'growth' of the Architecture is dictated by the future needs of its users. It is a project mutating with the times, exploiting creativity within its pristine environment.

Briefing and choice of Artifacts for Geometric Explorations

This part of the exploration is to expose you to the process of image forming about space which includes interactions between subjective and objective factors and is derived from a multi perceptivities-receptivities experience involving tactile and visual faculties.

Using your geometric construction of a choosen natural element, create the plans and elevations of a " temple of points, lines and planes" whose functions serve to enlighten and delight our perceptual senses.

Pin-up of findings and start Geometric Construction of Artifact.

The 2D geometric constructions, made up of a collage of juxtaposed geometric planes and shapes, calls for an order onto itself. Collage Developed from the assemblage of the illustrated points, lines and planes. Different areas begin to manifest into complexity.

Deformation towards multiplicity hence becomes the empirical phenomenon here. Through constantly evolving forms, the designer shapes his spaces in a state of unconsciousness through a series of deformation to achieve multiplicity. Thus making the unforeseen into intangible realities.

Pin up of Geometric construction in 2D. Starts 3D Model.

Using the forces of imagination and perception, the fragmented planes from the collage are assembled, creating open planes that clash and yet harmonise with one another. The flux of inconsistency in the assemblage unexpectedly gives rise to unintentional enclosed space that is beyond the facade. From this space, an extended element will be stretched out to give birth to another space.

The form of a four-wall, cube-like structure, each plane at 90 degrees with one another, is a dogmatic attempt at capturing space. The idea of constructivism through cubic form. It is merely thought of constructivist forms but not of the constructive space where the essence of constructivism, is truly about. Instead of discarding the cube, it would be a first step of the journey into space, constant reminder of the obsession and oppression of forms and the dictatorship of the 90 degrees.

Super deformation refers to a state where in the context of fast-paced experiential forms and spaces, different levels and scales of deformation are at once sequentially and simultaneously experienced. Every shadow (space) of every previous object (form) takes on an unpredictable characteristic and rapidly deforms into a complex collage of undefined multiplicity. Each shadow hints of the one before but is one stage more distorted, resulting in a state which appears to 'pseudo-multiply' from a beginning to an infinity.

Metamorphosis of 3D Model.

A characteristic section of the space model that displayed a unique feature of interest was chosen as the initiating element of the final model. Its idiosyncrasy immediately became the beginning of the subsequent 'bud', through which a budding process that distorted and elevated the current spatial quality to a higher level.

The manner of construction expands and contracts simultaneously. Each constructed component became the impetus for the next idea. Nothing was subtracted. These intertwining layers added to the next.

Moving along the axes of the geometrized wayang kulit, one begins to think in the opposite direction, beyond the conventional, towards the creative. One started inclining the pieces acutely and obtusely, forcefully tearing oneself away from familiar 90 degrees. Instead of capturing space, one thought of liberating space. Imagine the spaces and construct the conceptual, psychological and perceptual effect they would create before constructing the solid form. The model is intended to be dynamic as it can be viewed from any directions in any way, thus articulating the freedom of movement as in wayang kulit when the puppet is flipped, twirled, spun with great dexterity against the interplay of light and shadow.

Thus the model can be experienced at 360 degrees in XYZ coordinates. The maker sees not just one view of the model but the many other opposing views from all other directions. Thus not just the visible is visible, the invisible can become visible at the same time. The interplay of light and shadow may also enhanced the exploration and the interpretation of spatial reality and spatial illusion.

Metaphysics of Space and Form: Revealing new ideas of Space and Form

Each process and progression is however checked and appropriated by spatial consideration from spatial experience to real functions, including sustainability. Thus some members may be identical in form, but never repetitive in space. The process ensures a well-connected yet open-ended system of spaces where the first 'bud' is subliminally related to the ultimate super-deformation through a relationship of multiplicity.

From Perceptual to Conceptual Design: the Project in Sustainability

The assemblage of planes and spaces has created an isolated machine that echoes statement far beyond its surroundings. It is reminiscent of the solitary Kelong in Bintan, out in the sea, yet commanding respect from all around. The Kelong is an architectural type that wants to break free from land. The spaces would extend circulation in resistance to the island, where intricate space develops will be as if pulled back slightly by the wave to the island. The resulting form, resembling a ripple, trying to move away, and yet always emphasizing its origin.

The concept of sustainable structures would be used to describe the relationship between the activity within a space and its shape. The rule base for this structure emerged from an appreciation of complex hierarchical systems and dynamic structure; every structure is made up of a number of component parts in shifting relationship with one another. Coherence occurs when all elements work together.

Hence the immaterial invisibility of spaces came first before the material manifestation of forms. Simultaneously, space becomes the being instead of the nothingness while form dissolves into nothingness. Therefore, it is an evolution of the acute and obtuse and a democracy of spaces. In this project, one seeks to redefine concept of form from space and space from form, from its familiar yet restrictive classical definitions to more revolutionary yet creative sustainable definitions. In doing so, the process, the method gives one a whole new city of spatial exploration and awareness. For the final model is a means to refining one's sense and sensibility towards sustainability and spirituality of space leading to forms, from being to nothingness, from nothingness to being, from ordered to chaotic and from chaos to order.

The context of the ground and its gravitational forces integrated with the essence of the model will generate projects ad infinitum, i.e. By placing the model in different formations with the different levels of the ground, it can produce a multiverse of projects. T

Studio Expectations:

a Project of Sustainability with the Notions of Floatations, Incisions and Levitations.

Floatations

Singapore, known for its limited land area, is actively exploring innovative solutions to address its housing needs. One promising approach gaining traction is floating housing, utilizing the vast expanse of water surrounding the island nation.

The Rise of Floating Housing in Singapore

Several initiatives and concepts are emerging, demonstrating the potential of floating structures to address Singapore's land scarcity:

Floating Homes, Parks, and Facilities: Experts predict that large-scale floating platforms could become a reality within a decade. This vision encompasses not only homes but also parks, storage facilities, and even entire settlements. The cost-effectiveness of floating structures, compared to land reclamation, is a significant advantage.

FloatingOn: This startup aims to provide affordable, modular, and sustainable floating accommodations by 2023. They envision a reduction in construction time by 60% and cost by 20% compared to traditional housing. These accommodations can be rented or purchased and are designed to be deployed quickly using shipping containers³.

The Reef: This project, a joint development by [MapleTree](#) and Keppel Land, is Singapore's first sustainable residential waterfront property with a floating deck . It showcases the integration of floating elements into existing waterfront developments.

- **Advantages of Floating Housing**
- **Speed of Construction:** Floating homes can be built significantly faster than traditional land-based structures, reducing waiting times for new homes³ .
- **Flexibility:** Floating modules can be easily relocated to different locations as needed, offering greater flexibility in urban planning¹ .
- **Sustainability:** Floating housing can be designed with sustainable features, including solar energy and efficient water management systems³ .
- **Challenges and Considerations**
- **Space Allocation:** Identifying suitable locations for floating structures while ensuring safe navigation for ships and other maritime activities is crucial¹ .
- **Societal Acceptance:** Public perception and acceptance of living on water are key factors in the successful implementation of floating housing.

The Future of Floating Housing in Singapore

The development of [southeast Asia](#)'s largest deepwater ocean basin by the Technology Centre for Offshore and Marine, Singapore (TCOMS) is a significant step towards testing and validating floating structures . This facility will allow researchers to simulate real-world oceanic conditions and advance the development of these innovative solutions.

While some challenges remain, the potential of floating housing to address Singapore's land scarcity is undeniable. As technology advances and societal acceptance grows, floating homes could become a viable and sustainable part of Singapore's urban landscape.

Incisions

"incisions onto the ground" can be interpreted in the context of sustainable architecture.

The term "incisions onto the ground" in architecture likely refers to "cuts" or "excavations" made into the earth's surface, often as part of a building's design or to create subterranean spaces. While not a common architectural term, it's an interesting concept that can be explored in relation to sustainability.

Reducing Energy Consumption: Cutting into the ground to create partially or fully underground structures provides natural insulation, reducing the need for heating and cooling, and thus lowering energy consumption.

Harnessing Geothermal Energy: **Earth**-sheltered homes can utilize geothermal energy systems, which use the stable temperature of the earth to provide heating and cooling, further enhancing energy efficiency.

Geotechnical Engineering:

Minimizing Site Disturbance: Careful planning and execution of ground incisions can minimize disturbance to existing ecosystems and reduce the need for extensive land clearing, promoting ecological preservation.

Stabilizing Slopes: Strategic cuts can be used to create retaining walls or terraces, stabilizing slopes and reducing erosion, particularly in areas prone to landslides or erosion.

Underground Gardens:

Incisions can create underground gardens, bringing natural light and greenery into subterranean spaces, improving the aesthetics and well-being of occupants.

Rooftop Gardens: Cuts can be made to create terraces or platforms for rooftop gardens, maximizing green space in urban areas.

Integrating with Natural Systems:

Water Management: Incisions can be used to create swales, bioretention ponds, or other water harvesting features, promoting sustainable water management and reducing stormwater runoff.

Waste Management: Cuts can provide space for underground waste storage and treatment systems, minimizing the environmental impact of waste disposal.

Challenges and Considerations:

Earth-sheltered construction can be more expensive than traditional above-ground construction due to the specialized techniques and engineering required.

Accessibility: Underground spaces can present challenges for accessibility and natural light.

Regulation: Local regulations may restrict or require specific permits for ground incisions, depending on the size and nature of the project.

Future Directions:

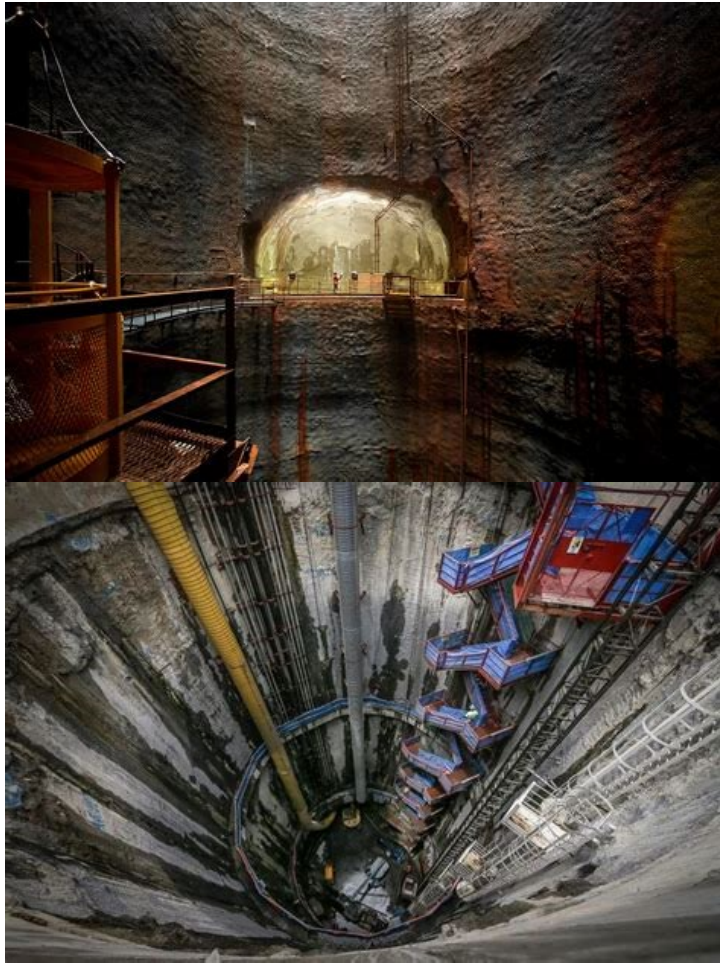
Bioclimatic Architecture: Integrating "incisions onto the ground" with bioclimatic design principles can further enhance the sustainability of buildings.

Underground Cities:

Exploring the potential of creating large-scale underground cities or communities, utilizing the earth's natural resources and mitigating the impact of urban sprawl.

While "incisions onto the ground" may not be a widely used architectural term, it represents a promising approach to sustainable design. By carefully considering the environmental impacts and integrating these techniques with other sustainable strategies, architects can create buildings that are not only beautiful but also environmentally responsible.

under ground Singapore



Singapore, facing land scarcity, is actively exploring the use of underground space to create more room for housing, amenities, and green spaces. This strategy is part of a larger plan to rejuvenate the central business district (CBD) and make it a more vibrant place to live and play.

Moving Facilities Underground

The government plans to move utilities, transport, storage, and industrial facilities underground to free up surface land for people-centric uses. This includes creating more homes and amenities in areas like Downtown, [Marina South](#), and Rochor, enabling more people to live near their workplaces.

Three Zones for Subterranean Development

The [Urban Redevelopment Authority](#) (URA) has identified three zones for initial subterranean development: [Marina Bay](#), Jurong Innovation District, and Punggol Digital District. These areas are strategically chosen for their potential to accommodate underground infrastructure while minimizing disruption to existing surface activities.

Benefits of Going Underground

- **Freeing Up Surface Land:** Moving infrastructure underground allows for the creation of more parks, housing, and public spaces on the surface.
- **Creating "One-Stop Hubs":** The plan envisions developing "one-stop hubs" underground, offering shopping, dining, and family bonding activities under one roof, making it easier for residents to access amenities.
- **Improved Transport Connectivity:** The plan also includes improving transport connectivity at major hubs in Singapore's north, west, and east.

Technological Advancements

The URA plans to use 3D technology to create detailed maps of the underground, ensuring efficient use of space and minimizing potential conflicts between various underground facilities. Existing caverns, such as those at Tanjong Kling, are also being considered for storage, utility, and industrial uses.

Challenges and Considerations

Environmental Impact: Construction activities can disrupt existing ecosystems and potentially affect groundwater quality.

Public Perception: Public acceptance of living and working in underground spaces is crucial for the success of this initiative.

The Future of Underground Singapore

While challenges exist, the potential of underground development to address Singapore's land scarcity is significant. As technology advances and public acceptance grows, underground spaces could become an integral part of Singapore's urban landscape, offering a unique and sustainable solution for a densely populated city-state.

Levitation

How do you think the concept of "above the green cover housing" aligns with Singapore's vision for sustainable urban development?

The concept of "above the green cover housing" aligns very well with Singapore's vision for sustainable urban development. Here's why:

City in Nature: Singapore's "[Singapore Green Plan 2030](#)" emphasizes creating a "City in Nature". This vision promotes integrating greenery into the urban environment, and "above the green cover housing" embodies this by incorporating green roofs and potentially vertical green walls.

Reducing Energy Consumption: They provide insulation, reducing the need for air conditioning and heating, saving energy and lowering carbon emissions.

Managing Stormwater Runoff: Green roofs absorb rainwater, reducing the strain on drainage systems and mitigating flood risks.

Enhancing Biodiversity: They create habitats for pollinators and other wildlife, contributing to a healthier urban ecosystem.

Promoting Green Building Technologies: Implementing green roofs requires specialized knowledge and technologies, fostering innovation and development in the construction sector.

Mitigating Climate Change Impacts: They help reduce heat island effects in cities, improve air quality, and contribute to a more comfortable urban environment.

Adapting to Changing Climate: Green roofs can help manage extreme weather events, such as heavy rainfall and heat waves.

"Livable Density": Singapore strives for "livable density", balancing high population density with a high quality of life. "Above the green cover housing" can contribute to this by:

Creating Green Spaces: Green roofs provide additional green spaces within densely populated urban areas, offering residents opportunities for recreation and relaxation.

Improving Aesthetics: Green roofs can enhance the visual appeal of buildings, creating a more pleasant and welcoming urban environment.

Challenges and Opportunities:

While "above the green cover housing" aligns with Singapore's sustainability goals, there are challenges to overcome.

Technical Expertise: Specialized knowledge and expertise are required for designing and implementing green roofs.

Regulation: Clear regulations and guidelines are needed to ensure the safety and effectiveness of green roofs.

Despite these challenges, the concept of "above the green cover housing" holds significant potential for Singapore. By investing in research, development, and public awareness, Singapore can successfully integrate this innovative housing concept into its urban landscape, further advancing its vision for a sustainable and livable city.

Underground Development Strategy

Vertical Hydroponic Integration

vertical housing with hydroponic gardens in Singapore



Singapore's quest for sustainable urban living is driving the exploration of innovative housing solutions. While the search results primarily focus on vertical gardening techniques for homes and apartments, they offer insights into the potential of integrating hydroponic gardens within vertical housing developments.

Vertical Housing: A Space-Saving Solution

Vertical housing, characterized by high-rise buildings with multiple levels, is a common approach in Singapore to maximize limited land space. This concept offers several advantages:

Increased Density: Vertical housing allows for a higher population density, accommodating a growing population within a smaller land footprint.

Reduced Sprawl: By building upwards, vertical housing minimizes the need for urban sprawl and preserves valuable green spaces.

Improved Accessibility: Vertical housing often features amenities and services within the building, reducing the need for travel and promoting a more walkable lifestyle.

Hydroponics: [A Sustainable Approach to Urban Farming](#)

Hydroponics, a method of growing plants without soil, offers several benefits for urban environments:

Space Efficiency: Hydroponic systems can be compact and adaptable to vertical spaces, making them ideal for limited urban areas.

Water Conservation: Hydroponics uses significantly less water than traditional soil-based agriculture, crucial in water-scarce Singapore.

Reduced Waste: Hydroponic systems minimize the need for fertilizers and pesticides, contributing to a cleaner environment.

Year-Round Production: Hydroponic gardens can be controlled for optimal growth conditions, allowing for year-round production of fresh produce.

Integrating Hydroponics into Vertical Housing

The search results showcase several examples of how hydroponics can be integrated into vertical housing:

Rooftop Gardens: Rooftop spaces can be transformed into hydroponic farms, providing residents with access to fresh produce and creating a green oasis in the city.

Vertical Walls: Hydroponic systems can be incorporated into vertical walls, maximizing space and creating a visually appealing green facade.

Shared Gardens: Vertical housing developments could feature communal hydroponic gardens, fostering a sense of community and promoting sustainable living.

The "Home Farm" Concept

Search result presents a compelling concept called "Home Farm," designed by Spark Architects. This concept envisions a high-density housing complex for seniors that integrates vertical aquaponic farming. This approach offers:

Food Security: Residents can contribute to their food supply through the on-site farm, promoting self-sufficiency and reducing reliance on imported food.

Social Engagement: The farm provides opportunities for residents to engage in meaningful activities and connect with their community.

Challenges and Future Directions

While the integration of hydroponic gardens into vertical housing holds significant promise, several challenges remain.

Technical Expertise: Managing hydroponic systems requires a certain level of knowledge and expertise, which may not be readily available to all residents.

Regulation: Clear regulations are needed to ensure the safe and sustainable operation of hydroponic systems within vertical housing developments.

Despite these challenges, Singapore's commitment to sustainable urban living and its innovative spirit suggest that vertical housing with integrated hydroponic gardens could become a reality in the future. Further research and development are needed to address the technical and economic challenges, and to promote public awareness and acceptance of this novel approach to urban living.

The Project may address one of these themes or combinations of the themes, whichever the student may want to pursue.

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