Systems of Space: From 2D to 3D and Back Again

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Architecture studio begins with varied muses. The studio brief brings a device to analyze — a site, precedent, artwork, ecology, or form-finding operation. Among them is a common moment, the leap from analysis to design, with a concept. It is a complex moment for the beginning design student, with intuition and iteration, with foundering and maybe some luck. Some students harbor preconceptions about form and space. Here are three form-finding pedagogies (4-8 week) for bridging the gap between prompt and concept, rapidly.

A. Through the Looking Glass and the "Still Life" — On Scaleable Spatial Geometries

B. Skins and Clouds — On Tectonic Enclosure

C. Chimeras and Animal Houses — On the Lives of Drawings and Narrative Program

Embedded in these approaches are:

> Time as a tool for working, a way of seeing, and a conversation with the canon.
> Design through making, with technology and digital fabrication tools close at hand.

A. Through the Looking Glass. The "Still Life" — On Scaleable Spatial Geometries

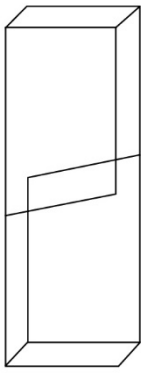

Figure 1 Geometry Arch Advanced, with Keith Plymale, 2016-17

This brief quickly produces a concept as a spatial geometry, or system. The geometry is a sequence of line segments that partially describes a three-dimensional space (or spaces) in a two-dimensional plane. Spatial geometries are scaleable. They are adaptable and translatable; they can imply ground, space, structure, and situational program.

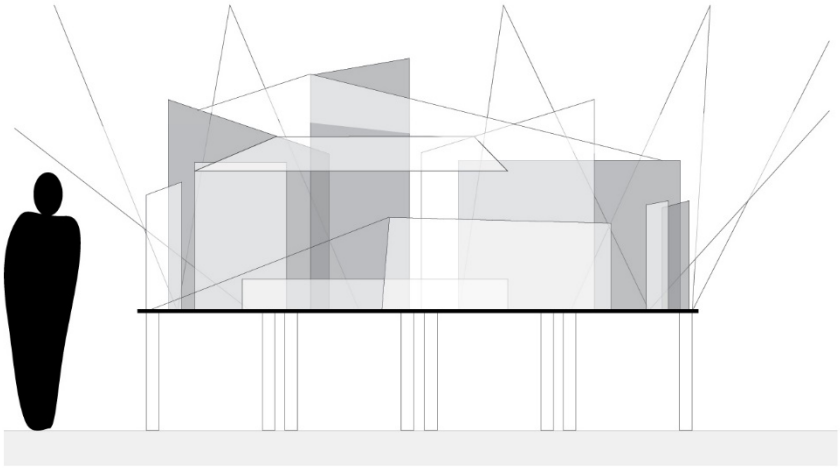

Figure 2 Still Life

1. Construct a “Still Life”. At least semi-transparent, of solids, planes and wires.
2. Timed Drawings of the Still Life: Flicker and Speed
    - Flicker the objects between opaque and transparent with your eye.
    - Study the edges and the contours, not the objects, but the space between.
    - Superimpose simple profiles onto other planes and spaces.
    - Extend and project lines beyond where they physically end.
    - Flatten and expand the objects and space between, with your eye.
    - Masses before you will dematerialize.
    - Contrivances create operative illusions.
    - Reveal a hidden geometry.

Change position, rotate paper, and quicken pace to produce 4-8 drawings, 18”x24”, with increasing abstraction and non-hierarchical orientation.

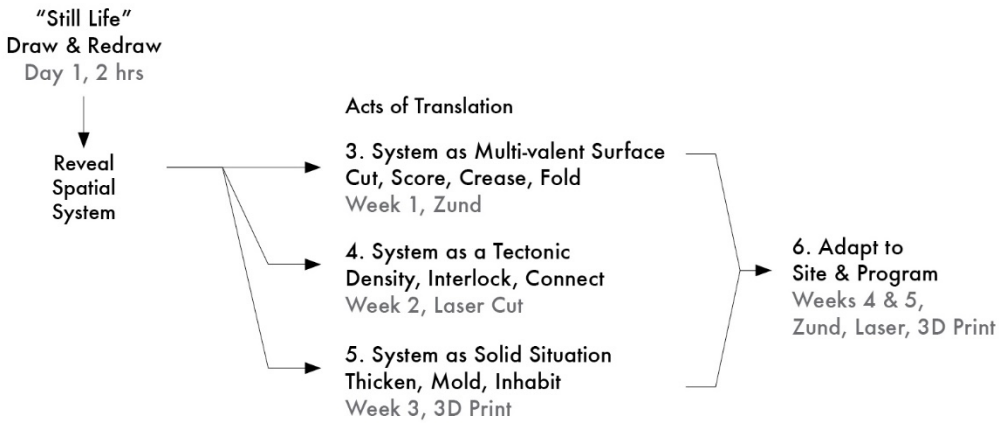

Figure 3 Process

Systems allow for adaptation. Looking at the studies and drawings of Etienne-Jules Marey, geometries can have a malleable anatomy which allows for deformation within a familial range. Geometries shape space in plan, in section, and in time. Systems move beyond abstract geometries to suggest ways of making and immersive atmospheres.

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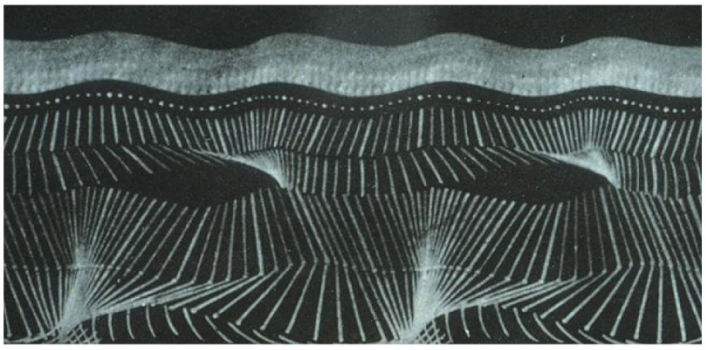

Chronophotography, Etienne-Jules Marey, 1886

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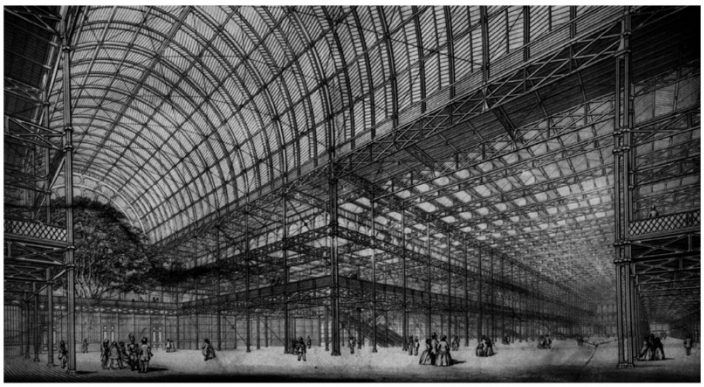


Crystal Palace, Sir Joseph Paxton, 1851

Figure 4 Dialogue

The formal concept is a geometric premise for structuring space and offers creative resistance, like a rule. Geometry positions the beginning students to imagine possibility, to see a lineament become: articulated ground and enclosure, interlocking structure, and thickened solids.

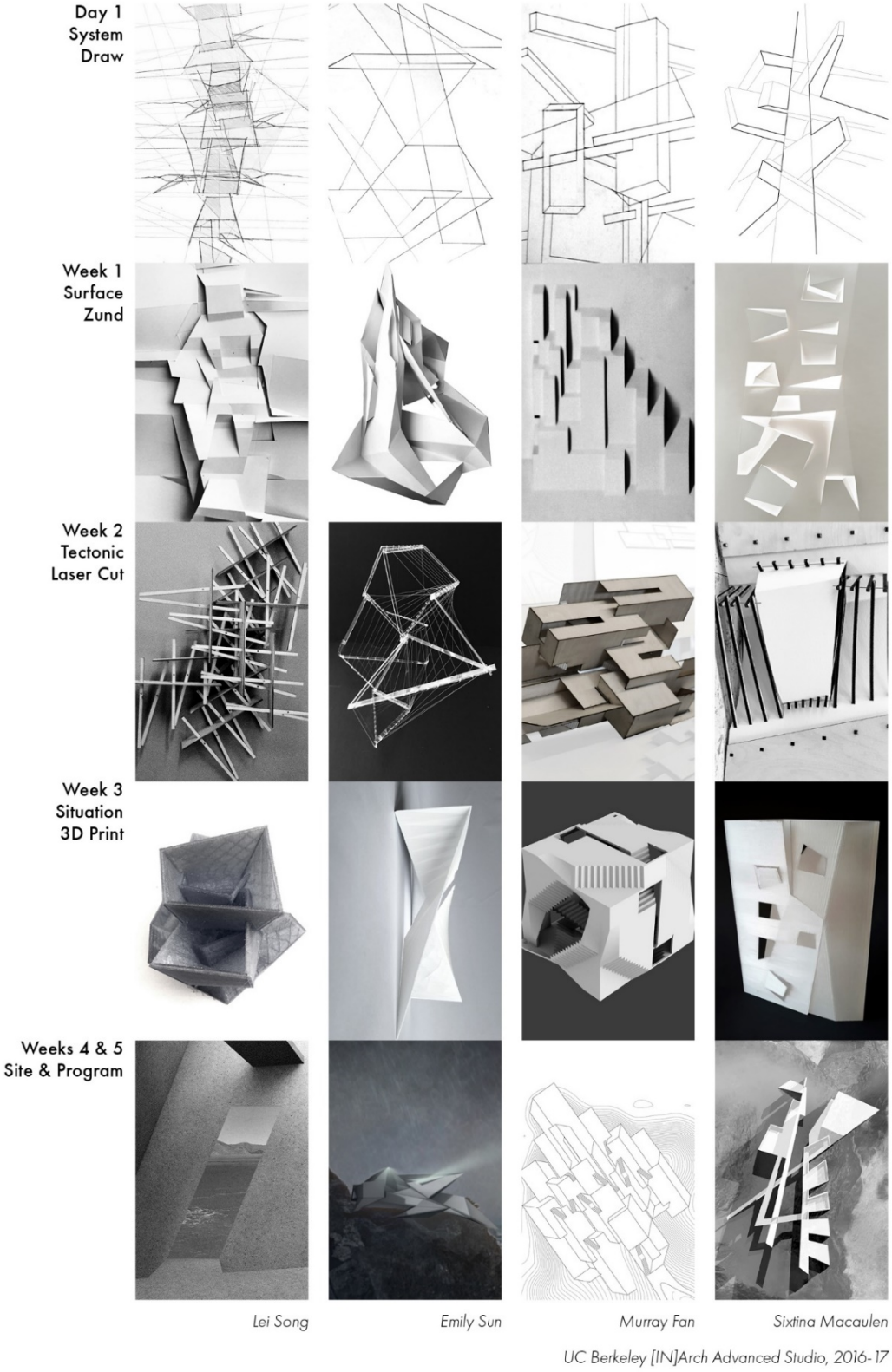


Figure 5 Lei Song, Emily Sun, Murray Fan, Sixtina Macaulen, UC Berkeley [IN]Arch Advanced Studio, 2016-17

B. Skins and Clouds — On Tectonic Enclosure
200A Fundamentals of Architecture Design, with Ron Rael and Kyle Steinfeld, 2017

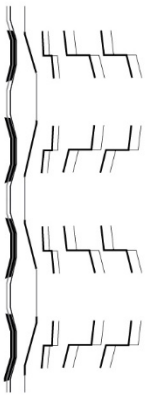


Figure 6 Thick Skin

The essence of this brief is enclosure. For new students, enclosure is sometimes ambiguous, a single line, maybe a double line, of dubious floating material. The premise here is a Thick Skin — a coherent, deep, and non-uniform enclosure system made of multiple porous and differentiated layers. There are two simultaneous tracks: enclosure as a skin (surface) and enclosure as a cloud (density). Through processes of perforation and assembly, subdivision and aggregation, uniformity and customization, the skin and the cloud coalesce into Thick Skin Enclosure.

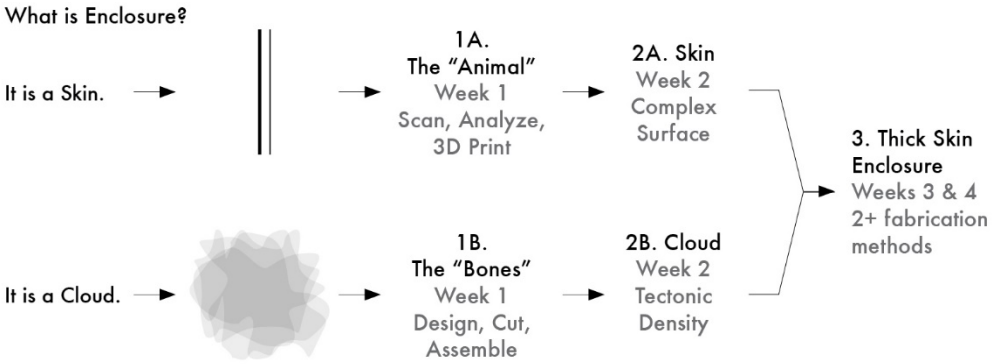


Figure 7 Process

Enclosure has layers of opportunity: communication between inside and outside; the passage of light, air, heat, cool, people, sight, sound; and tectonic and material quality. The phenomena that make buildings both liveable and experientially multiplicitous.

Thickness is depth and density. Thick skin has an outside, an inside, and a space, or structure, in between. It is integral and it is an assembly. Surfaces of thick skins are articulated and calibrated to the spaces that they define. Inside surfaces and outside surfaces are related, but different. Thickness has "richness": complexity, differentiation, and a "grain" or unit of material.

Subdivision and Aggregation are fundamental mutual processes in architecture. Enclosure has holes, joints, thresholds, texture, compartments and connections. Systems of enclosure and their structure must be subdivided, in order to be aggregated again in construction.

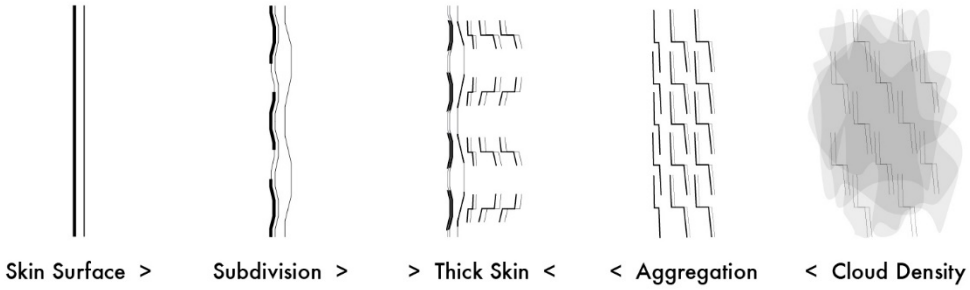


Figure 8 Thick Skin 2

Animal Track

Inspire the skin with an "Animal". Suitable "animals" can be found in many places. What is important is that they fit in the 3D scanner and that they are not predominantly smooth. Their texture inspires 2D and 3D interpretation with perforation, subdivision, and articulation.

Bones Track

The Cloud begins with a uniform component. The component has a system of standardized notches for attachment. The Fox plugin for Grasshopper is one method for testing their aggregation. Iteratively cut and assemble uniform, and then bespoke, bone components.

Jenna Frowein, Sam Gebb, Susie Yan, Tara Shi, Sarah Vermeer, Sandy Curth, Nathan Nguyen, Tom Devore, Michael Johnson

UC Berkeley 200A Fundamentals of Architecture Design

Figure 9 Jenna Frowein, Samantha Gebb, Susie Yan, Tara Shi, Sarah Vermeer, Sandy Curth, Nathan Nguyen, Tom Devore, Michael Johnson UC Berkeley 200A Fundamentals of Architecture Design 2017

C. Chimeras and Animal Houses — On the Lives of Drawings and Narrative Program 200A Fundamentals of Architecture Design, with Ron Rael and Kyle Steinfeld, 2017

This is a project for a dwelling for an invented client. The brief involves three latent ideas:

1. Abiogenesis: Drawings have continued lives. They are fodder for interpretation. The 2D drawing of a project, reinterpreted, is the DNA of a new project. What the student needs for their next project is sitting at their desk.
2. Dialogue: Typically precedents serve formal purposes. Beyond aesthetics, the dialogue we have with the architecture of the past relates to method, ways of working. A precedent of process creates a conversation across time.
3. Narrative: The Client is the protagonist in a narrative about their work and way of life. The narrative becomes the brief and the program, it supplants the will of the student, though the student does also create the Client and their narrative.

Context (and Dialogue):

- In biology, a *Chimera* is an organism with a combination of genetically different tissues, formed by fusion or grafting.
- "Gate House, House of the Undertaker, House of the Suicide, Sea Captain's House, School House, House of the Quadruplets, Director's House, House of the Painter, The House of the Urologist, The House of the Crochet Woman, The Custom's House, The Botanist Complex..." In *Riga, Vladivostok, Lake Baikal*, John Hejduk conceived of 96 buildings, many of them dwellings, that arise from his poetic narrative of the occupation and identity of the inhabitant. The identity of the client is the identity of the dwelling.
- An Ideogram is a drawing that is a Chimera. It is a layered composite of drawings or images, which are a set, the Catalogue. Douglas Darden, in *Condemned Buildings,* conceived of 10 buildings, each derived from a superimposition of four found drawings, an Ideogram.

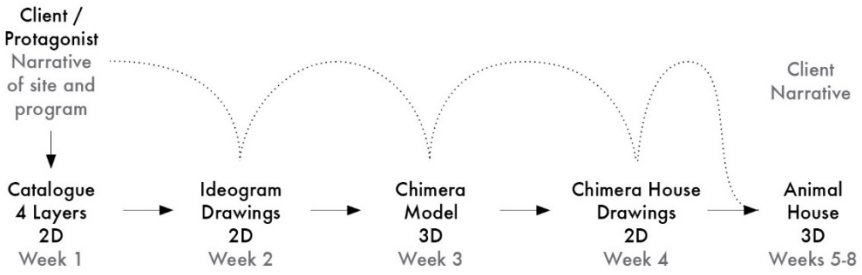


Figure 10 Process

The Catalogue for the Ideogram includes two found layers (patent drawing and illustration) and two layers from previous design projects (image and drawing). Through superimposition, fusion, and grafting, the four layers become an Ideogram. Interpreted literally as orthographic drawings, the Ideogram becomes plan and section of an inchoate project. Intertwined with the Narrative, the Animal

House develops, incrementally, by traveling from 2D to 3D and again to 2D. Students derive, find, and create information in the space between the drawings and the models.

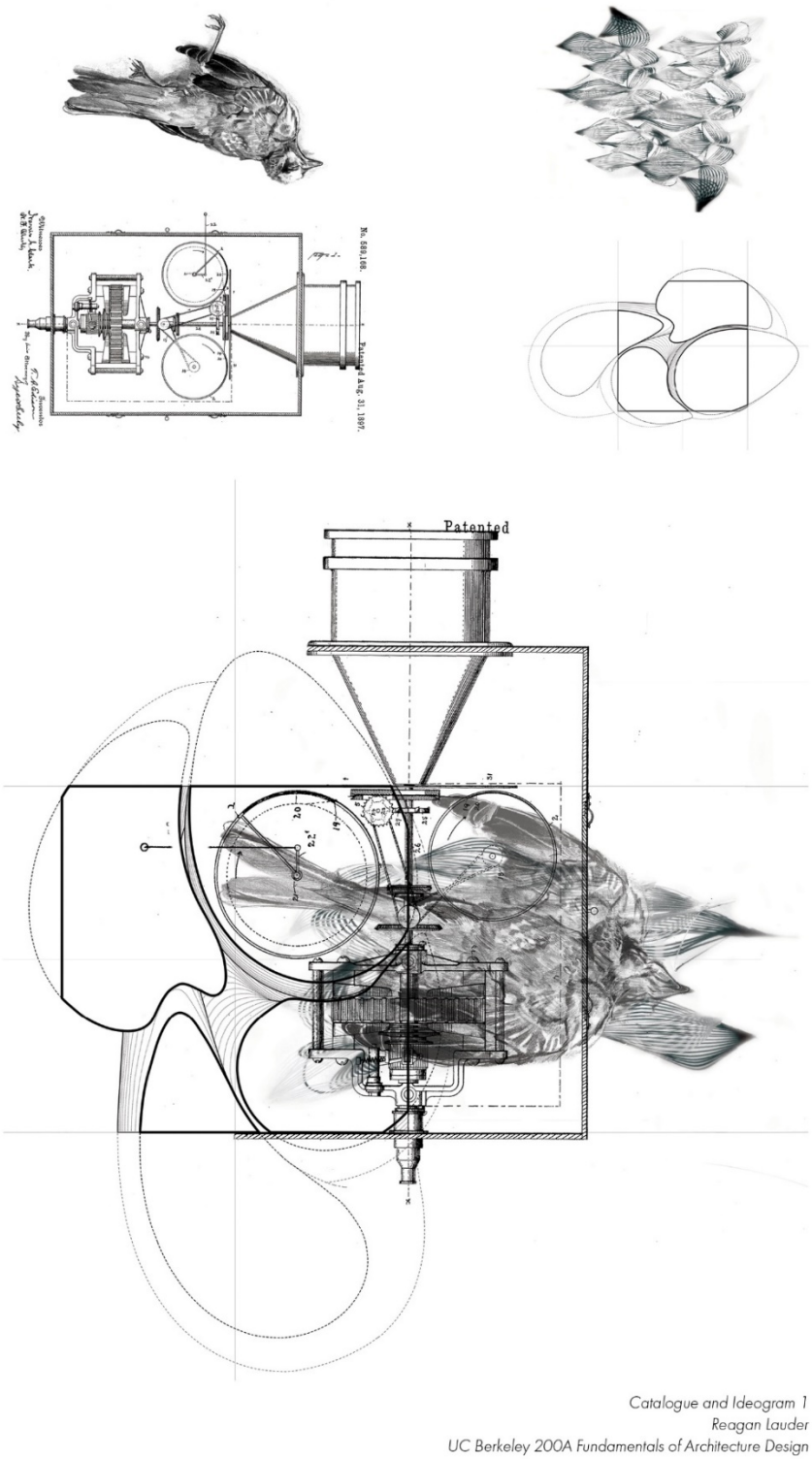


Figure 11 Catalogue and Ideogram 1, Reagan Lauder, UC Berkeley 200A Fundamentals of Architecture Design, 2017

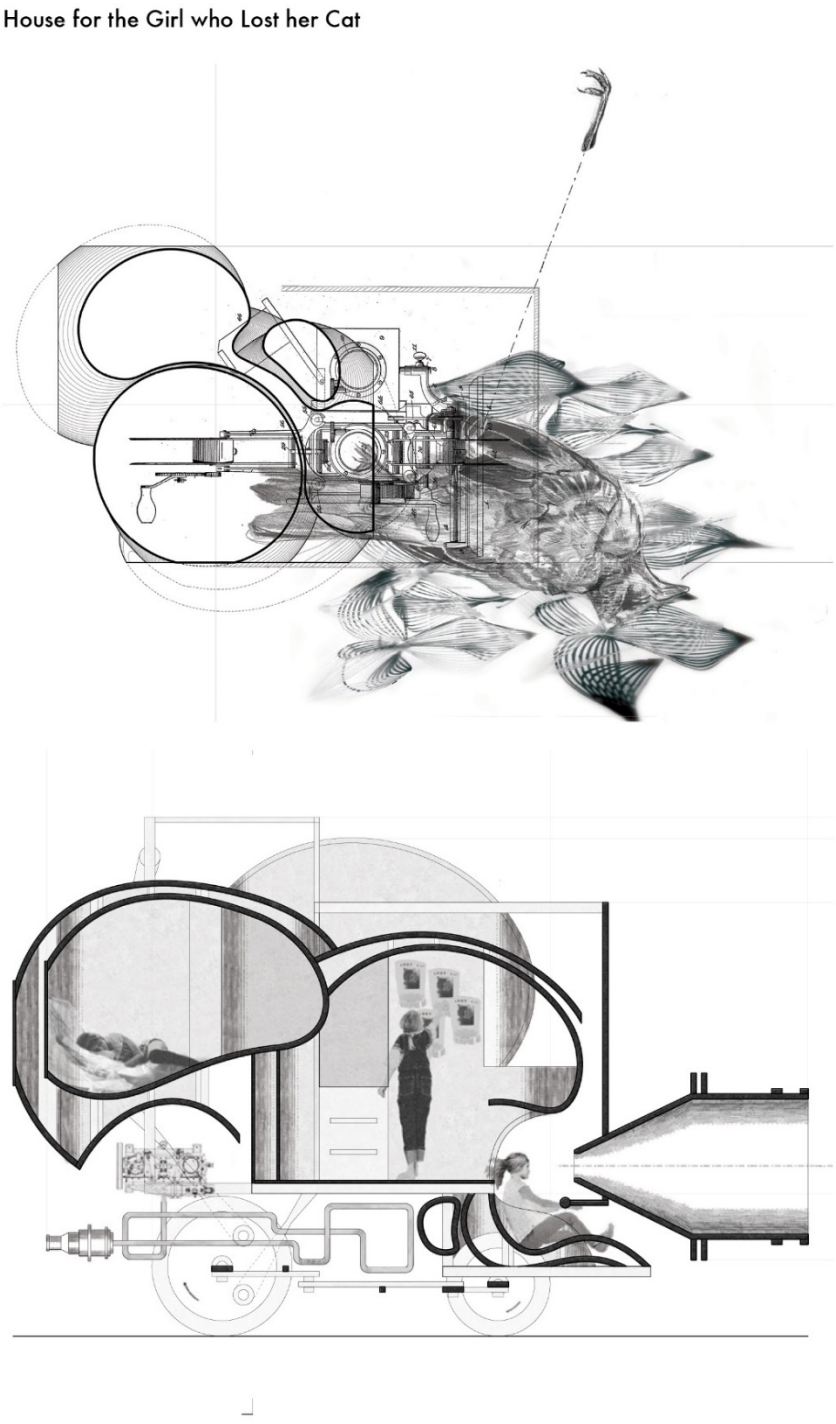
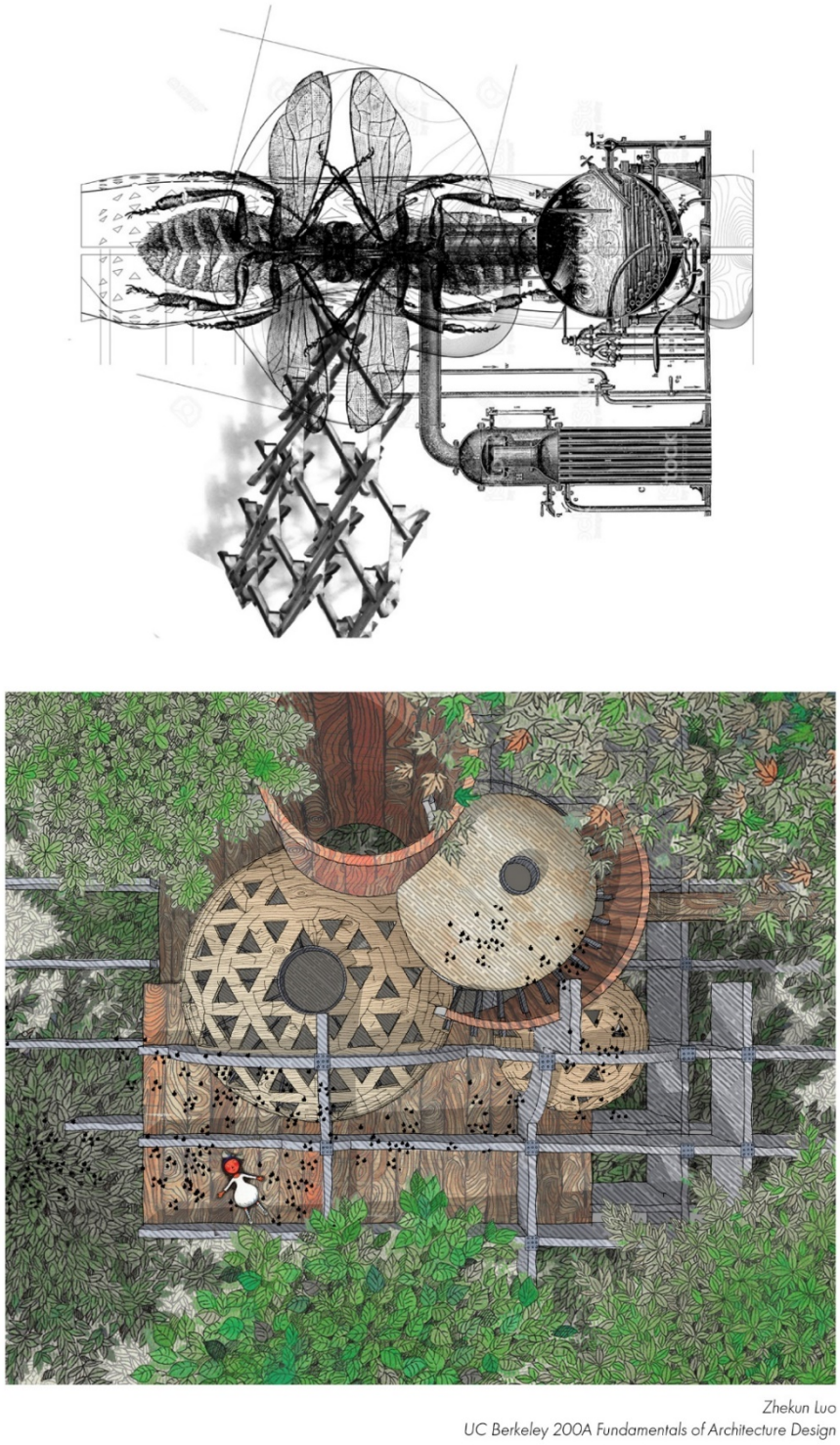


Figure 12 House for the Girl who Lost her Cat
Reagan Lauder, UC Berkeley 200A Fundamentals of Architecture Design, 2017

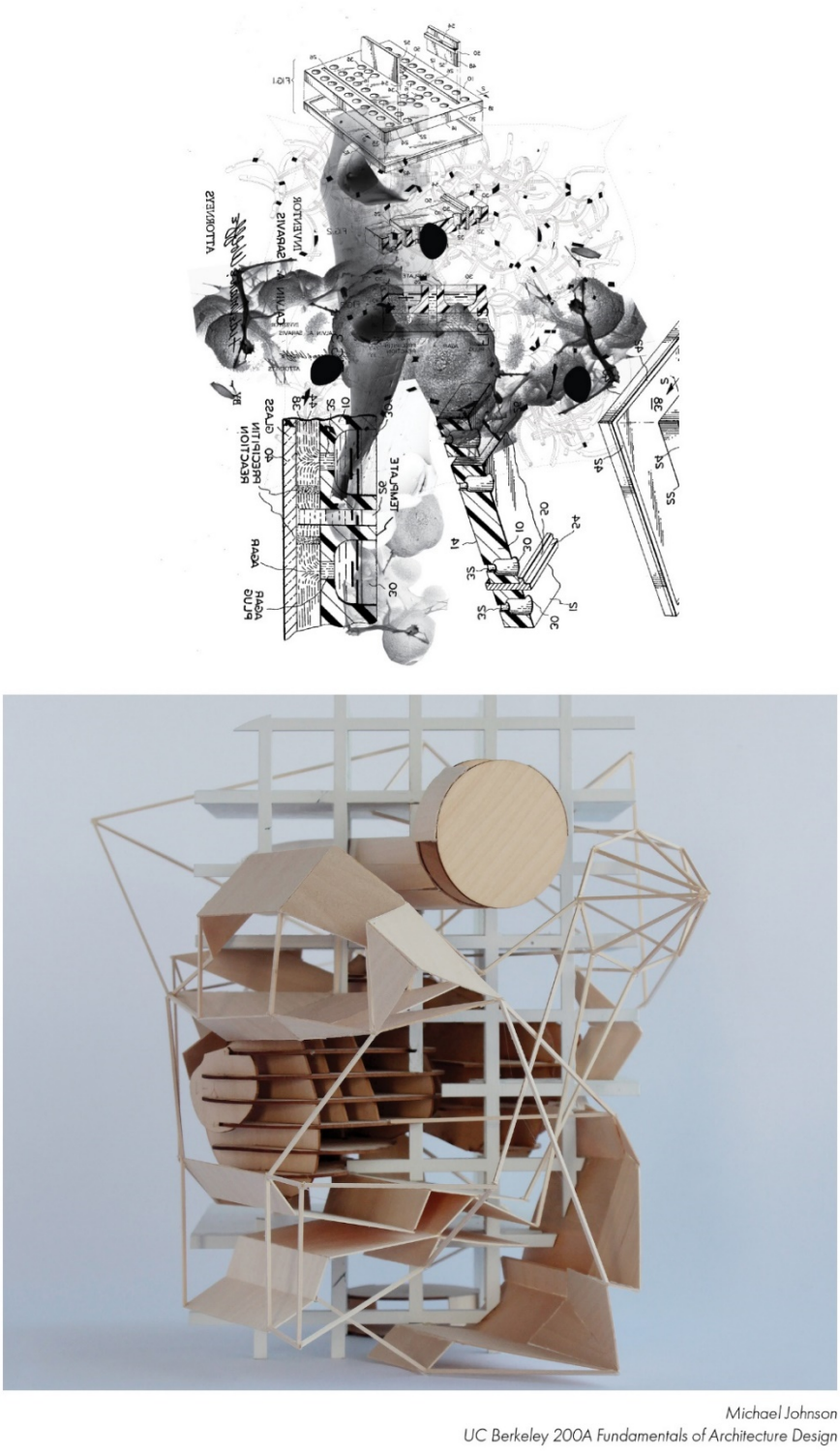
House for the Scarred Bee Keeper



Zhekun Luo
UC Berkeley 200A Fundamentals of Architecture Design

Figure 13 House for the Scarred Bee Keeper Zhekun Luo, UC Berkeley 200A Fundamentals of Architecture Design, 2017

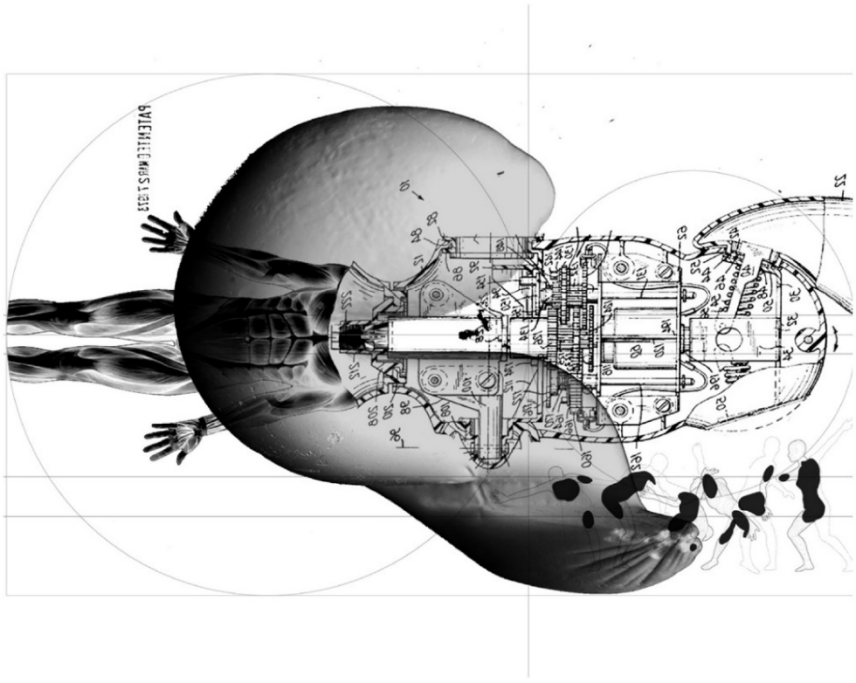
House for the Social Accelerationists

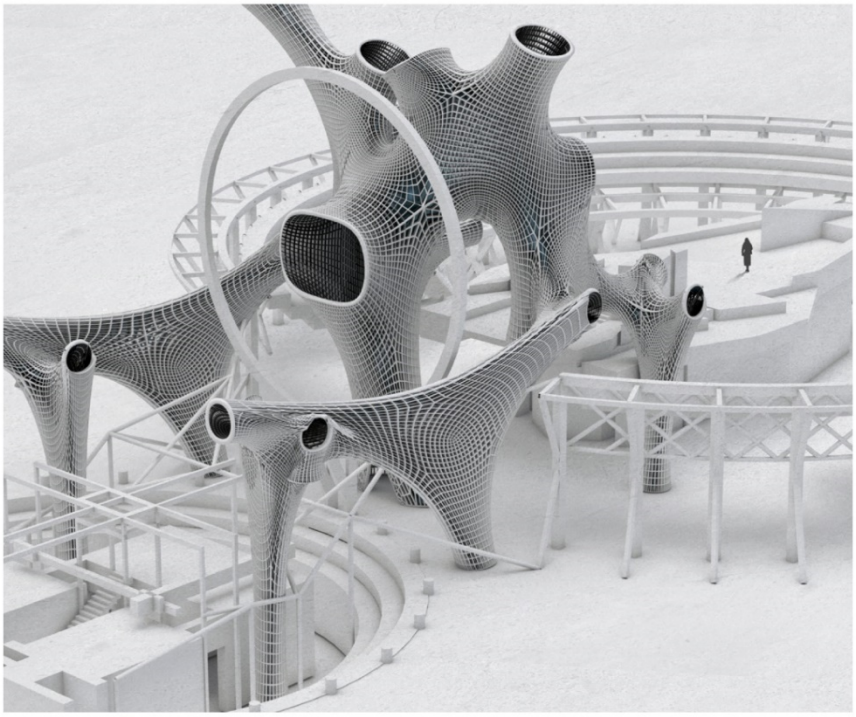


Michael Johnson
UC Berkeley 200A Fundamentals of Architecture Design

Figure 14 House for the Social Accelerationists Michael Johnson, UC Berkeley 200A Fundamentals of Architecture Design, 2017

House for Circus Performers





Maxine Tang
UC Berkeley 200A Fundamentals of Architecture Design

Figure 15 House for Circus Performers Maxine Tang, UC Berkeley 200A Fundamentals of Architecture Design, 2017

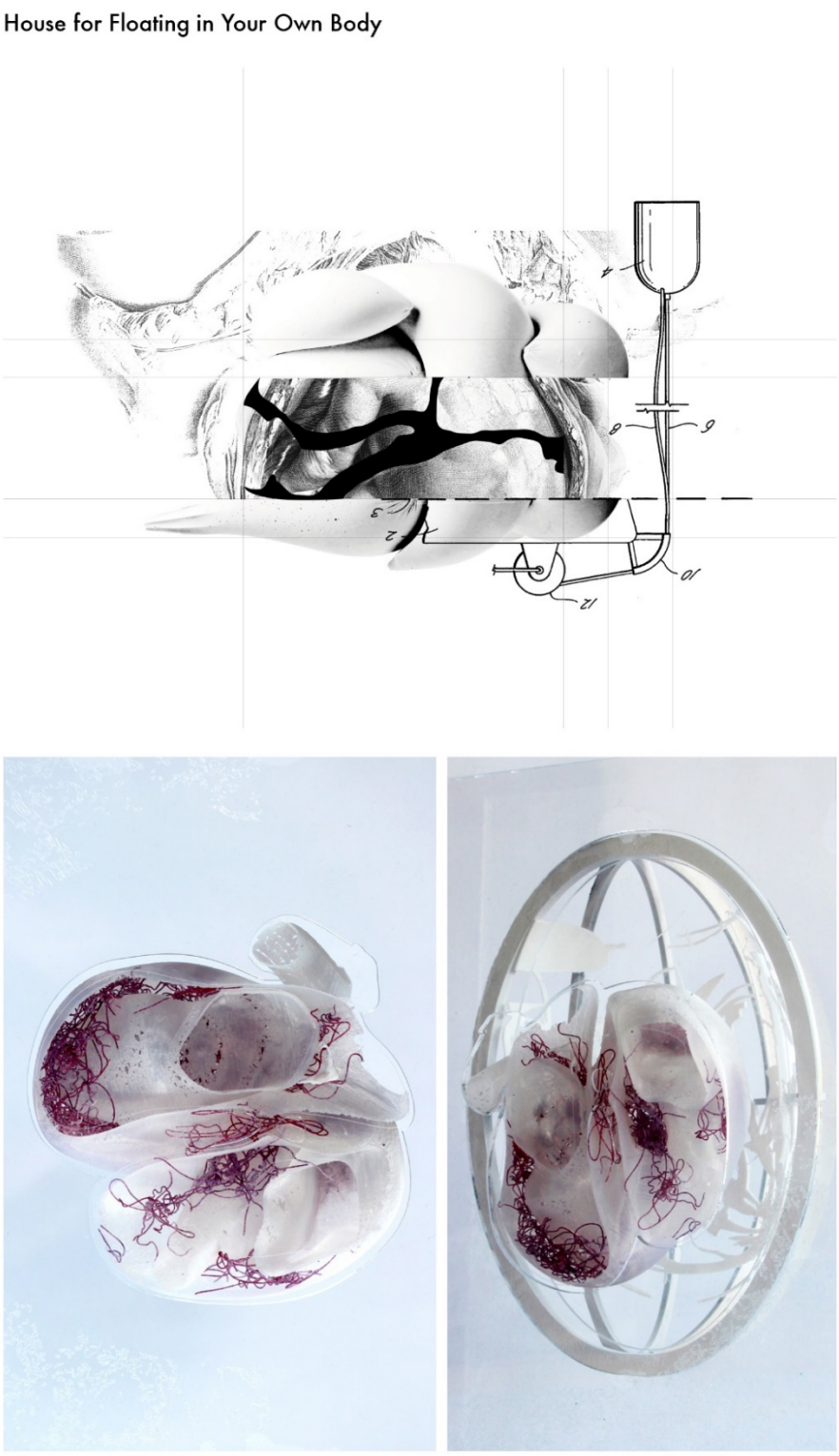
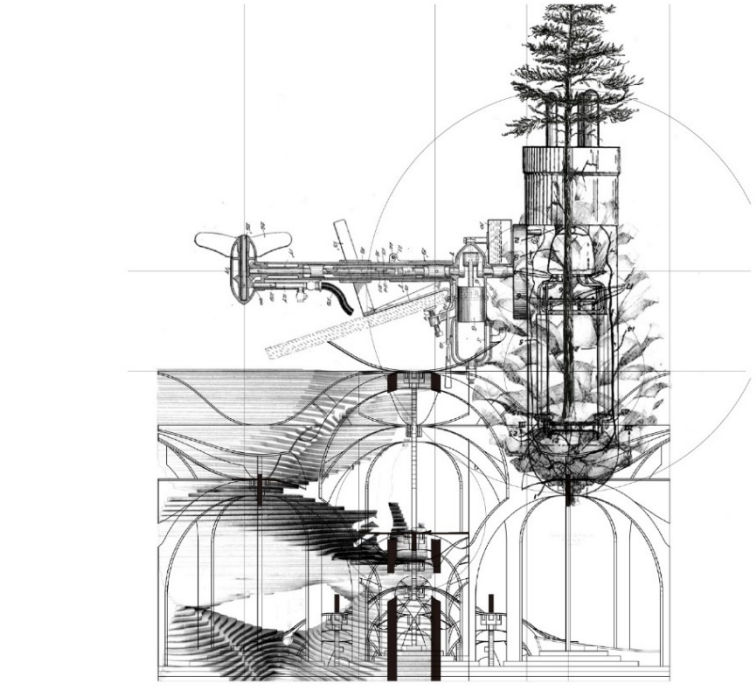


Figure 16 House for Floating in Your Own Body Samantha Gebb, UC Berkeley 200A Fundamentals of Architecture Design, 2017

House for A Little Prince and His Pine Tree



Susie Yan
UC Berkeley 200A Fundamentals of Architecture Design

Figure 17 House for A Little Prince and His Pine Tree Susie Yan, UC Berkeley 200A Fundamentals of Architecture Design, 2017

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1. Hejduk, John. Vladivostok. New York: Rizzoli, 1989

2. Darden, Douglas. Condemned Buildings. New York: Princeton Architectural Press, 1993

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5. Joseph Paxton. The Crystal Palace. 1851. http://library.artstor.org/asset/PC_30547_10026. Web. 9 Apr 2018.