

## Shape Evading Shapes: A Rapidly Deployable Epidemiology Clinic

This studio builds on a series of studios that project an architecture of the near future where long-standing building types that have historically been a backbone of social order and economy are forced to address a consolidation of new pressures. Of manufacturing, of computation, of data consolidation – of markets newly made not by elective choice but by wholesale change in how markets are operated and what they will tolerate. In this realm “everything must scale” (to use the ubiquitous Silicon Valley term “scale”) or become quasi obsolete. Is this a new realm of design when one thinks of architecture? This studio is part of a series of studios that have been based in this realm. They have focused on buildings that have fused architecture and program – they are architecture + economy + social order writ large over entire territories – fueling stations, schools and in this studio small scale clinics. They show up as historical denominators in large numbers, replicated across the landscape. In a novelistic way they subvert time – you see them everywhere the same; therefore, have you gone anywhere? They also capture a sense of what we as a population experience – we see ourselves and no-one, all of us, in these buildings as social instruments. While this is a new studio it does relate to prior work. You can see a Work Sample from Everything Must Scale (2) here:

<https://docs.google.com/document/d/1V9FRcHL3SyxhQODOy0cfEhflm4HTVTHI7jT6AFQZ2IE/edit?usp=sharing>



The role of the doctor evolves historically, the faith in medicine as science and the standardization of medical observation enables the concept of the discrete architectural clinic. This project is far from complete; COVID-19 has recast our focus on what is a clinic.

Above Left: Pablo Picasso, Science et Charité, 1897 / Above Right: Southern Pines nursing home resident Wayne Swint gets a birthday visit from his mother, Clemitee Swint, in Warner Robins, Ga., on Friday, June 26, 2020. “Face to face visits are not allowed but staff members help arrange window visits.” <https://www.seattletimes.com/seattle-news/health/days-grow-long-at-nursing-homes-as-virus-lockdowns-drag-on/>

### Program: The Clinic

The clinic is a specific program with exacting needs; one of those needs is to both address the COVID-19 virus; another is to remain safe and resist becoming a transmitter of the virus. It must embrace the ill and defend against its own user - its own subject. It must also host several subjects; clinical actors / front line workers trained in medicine and patients and the general public if need be for broad testing. These are degrees of epidemiological need; degrees of expertise and observance vs. a person in need. Age ranges will matter as well as various forms of privacy and human rights.

Working with the Richard Plunz / Victor Body Lawson studio our programming will come from consultations with the World Health Organization. The Plunz / Lawson studio will take the lead on siting and urban design. Our studio will take the lead initially on the design and engineering aspects of the clinic – its parts, materials, components and performance concerns. We will trade information at the fourth week allowing each studio access to findings and insights.

Prior studios in the **Everything Must Scale** series explored the future of *fuel/truck stops* in an era of electric / autonomous vehicles; the future of schools in an era of remote and *micro/teacher-less schools*. In both cases these building types emerged co-valent to program – we explored buildings that were in effect nonexistent without their programs.

Fuel stations and schools in the United States each number as many as 150,000 installations. They emerged over a century in conjunction with the machines; with a mechanistic organization of social life. The clinic is similar but depending on how we count their instance there are far fewer. Currently the United States counts 6146 hospitals. These amount to 924,107 staffed beds.

Our work on a small scale, rapidly deployable clinic is intended as a testing site and initial treatment site. A smaller scale gateway to a larger facility if needed. It thus has a time component to its programming and serves as a transitory space for sites where major hospitals are either overly full or not easily accessible. The work will require analysis to site but ideally the structure are dismountable – moveable.

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<b>Program</b>	Epidemiology testing and screening clinic designed for a neighborhood + a networked node of public health and micro-infrastructure at the urban scale in coordination with Professor Richard Plunz / Victor Body-Lawson "Re-Connecting Beirut" studio.  <b>The clinic will serve no more than 50 people and be sized by location as well as be dismountable and re-deployed. Scale will allow for detailed development of work.</b>
<b>Site</b>	Initial Test Site: <b>New York City.</b> Studio Final Site: <b>Beirut, Lebanon</b> in coordination with <b>Plunz / Body-Lawson Studio.</b>
<b>Scale</b>	Work will be developed to be deployed at scale, with a consideration for advanced manufacturing.
<b>Material</b>	Has the architectural discipline long prepared for this moment with concepts of tectonics, weight, budget, but also ceramics, glass, metals, and other anti-viral materials. How does advanced manufacturing, working at scale and with the capacity to engineer materials affect design.
<b>Space</b>	How do concepts such as negative pressure rooms coincide with histories of architectural space & volume; of space and atmosphere (chiaroscuro, sfumato)? Are there are concepts of air pressure that come to us within art and architecture that can affect the design of a COVID-19 clinic.
<b>Time</b>	How does architectural aspects of time help organize, sort and temporally orchestrate an epidemiological program.
<b>Need</b>	In an article published on July 22, 2020 in the New England Journal of Medicine, the authors pointed to two-sided problem in COVID-19 testing. The first was scaling a rapid testing procedure, the second was reaching underserved populations that were bearing the largest share of infections and had disproportionately less access to testing. While both of these issues is often spoken of in the media they also instantly bring to mind recent and long-term concerns in architecture that are increasingly seen as requiring a hybridization of urban and architectural expertise to address. The studio will seek to work in both of these sectors; a quality that is endemic to architecture and also an increasing tendency to see architecture a s form of micro-infrastructure. A component that actuates wider social and urban aspects of daily life. Source: Rapid Scaling Up of Covid-19 Diagnostic Testing in the United States — The NIH RADx Initiative. See: <a href="https://www.nejm.org/doi/full/10.1056/NEJMs2022263">https://www.nejm.org/doi/full/10.1056/NEJMs2022263</a>
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## Teams or Individual Works

Studio work is planned as individually done by each designer. Teams are possible and can be discussed. The overall studio will share information and progress with the "Re-Connecting Beirut" studio led by Richard Plunz and Victor Body-Lawson. Professor Plunz is also a Professor at the Earth Institute and Urban Design Lab.

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## Network of Advisors

We will also work with partners at **Stanford University Center for Design Research** and **Urban Futures project**.

## Stanford University

- **Urban Futures:** Michael Shanks (founder), Larry Leifer, Tamara Carleton, William Cockayne, Chris Ford, Michael Bell  
*Michael Shanks, Professor, Archaeology / d-School / the Center for Design Research.*

See: The Future of Learning on Everything Must Scale (3); Teacher-Less Schools. By Michael Shanks, Chris Ford, Stanford Urban Futures.  
<http://web.stanford.edu/group/archaeolog/cgi-bin/archaeolog/2020/05/11/the-future-of-learning-architectural-experiments/>

- **Center for Design Research (CDR).** Chris Ford, PhD, Candidate, Stanford University, CDR; Founding Editor, Technology, Architecture, Design  
<https://me.stanford.edu/research/labs-and-centers/center-design-research>

## Timed Collaboration

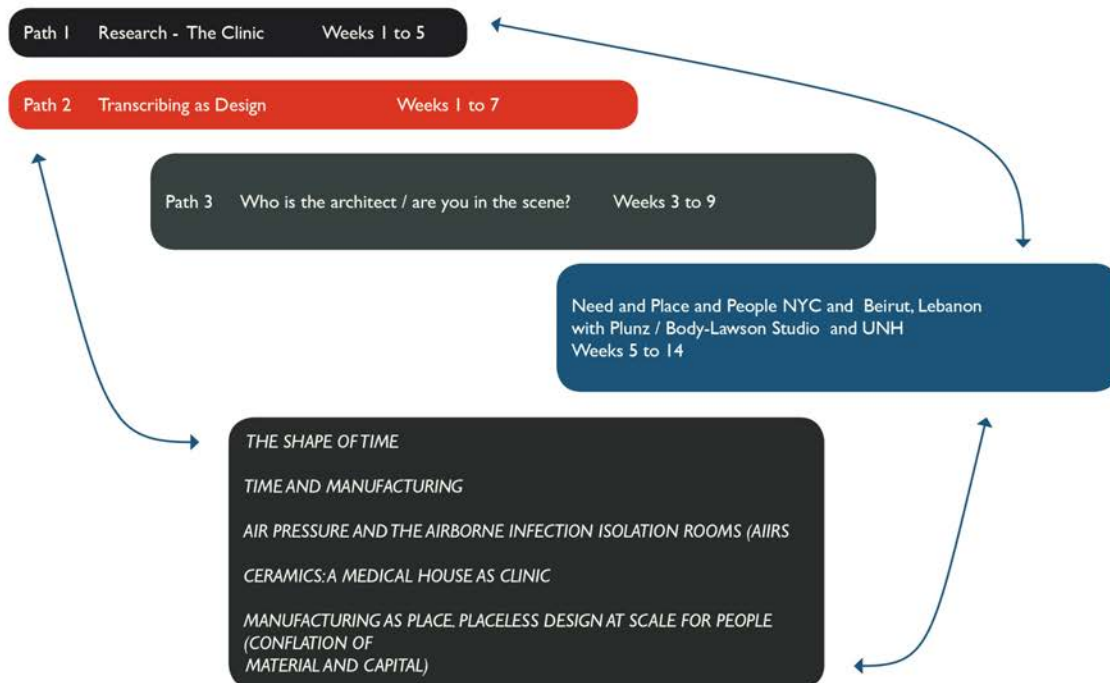
- Our initial focus will be on the materials, tectonics and supply chain qualities of such a clinic and how they are both specific to place and people and to wider histories and dynamics in materials and manufacturing.

- The Plunz / Body-Lawson studio will focus on site and regional issues; our studio will be more immediately focused on materials and manufacturing. This will bring a history of ceramics, glass, metals and other materials that meet the medical histories of architecture and medical practices. We will share information and begin to develop work in parallel after the fifth week of studio.

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**Three Parallel Paths:** The studio will initially break down into three categories or paths of work. We will blur the lines between these areas but collectively trace key themes about the history and future of clinics. Each designer is asked to take on all three of these paths at once – we can prioritize some over others, mix them or ignore one for a week at a time but the goal is to work on parallel paths to see the clinic as a programmatic and social invention, to see the clinic as a technical and material construction and to see it as a new design. One might see your days as a designer as moving between unique but interwoven projects. To do this phase of work well we will have to imagine we are in “training” and be able to switch modes of thought in a pace and rhythm that allows each vein of work to impact the others.

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## Path I      Reading + Research + The Clinic      Weeks 1 - 5

Epidemiology +    Architecture  
                         Urbanism  
                         Equity  
                         Materials  
                         Economy  
                         Scale

In teams of two we will present basics on recent cases of Field Hospitals and Emergency Clinics as realized around the world in response to COVID-19. This introductory phase of the studio will explore the medical and social aspects of the clinic. You are asked to help fill out our reading list but there are also essential texts we will take on and return to as the semester progresses.

How do medical care and architecture meet historically? Where are key issues of its future? What are the origins of the term clinic? How does a clinic differ from a hospital, a modern doctor's office, a pharmacy urgent care center?

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### Primary Reading:      Michel Foucault, *The Birth of the Clinic*.

As an introduction to the Foucault text we will begin with a 1974 review of the book as published by Christopher Lasch in **The New York Times**, on February 24, 1974.

<https://www.nytimes.com/1974/02/24/archives/the-birth-of-the-clinic-an-archaeology-of-medical-perception-by.html>

*"In the years immediately preceding and during the French Revolution, according to Foucault, men began to assign to medicine a central role in the reconstitution of society. A growing interest in epidemics and their prevention had focused attention on the connection between health and social conditions, giving rise to the hope that the Société Royale de Médecine, chartered in, 1778 and charged, among other things, with the study of epidemics, would diffuse throughout society a generalized medical consciousness."*

*In August, 1791, the "Gothic universities and aristocratic academies" were closed in order to open the learned professions to competition, experiment and the unobstructed flow of ideas. The immediate result, so far as medicine was concerned, was an influx of poorly trained doctors, some of them outright charlatans. The problem was to reconstitute the profession and establish some uniform means of certification without re-establishing the closed corporations of the old regime—to "require proof of capacity," in the words of a contemporary, without "re-establishing guild masterships," in short to reconcile the rights of individual liberty with those of public safety."*

*"The solution was found to lie in a new institution, the clinic — more precisely, in a restructuring of an older institution so thorough that the result was wholly original. The clinic dated from the late 17th century. It was a means of teaching, of demonstrating medical principles by enabling students to observe their workings in specific cases, selected to illustrate those principles in action. Faced with the crisis of certification in the 1790's and faced with the fact that the closing of the universities had forced many doctors, in effect, to teach themselves medicine in the hospitals, reformers began to realize that the clinic could be used not to demonstrate old truths but to discover new ones."*

The Birth of The Clinic, By Christopher Lasch, The New York Times, Feb. 24, 1974



A clinic's biological fail safes occur at every conceivable scale and are often material specific but nonetheless can seem chaotic and improvised. These include polymers and ceramics; color coding and recyclable materials. The studio will seek to understand as much of this scope as possible.

Above Left: Mayo Clinic offers pre-screened patients drive-through specimen collection for COVID-19 testing.

Source: <https://newsnetwork.mayoclinic.org/discussion/mayo-clinic-offers-pre-screened-patients-drive-through-specimen-collection-for-covid-19-testing/>

Above Right: Hospital employees work at a drive-thru COVID-19 testing facility tent outside University of Utah Health's South Jordan Health Center on Monday, March 16, 2020. Steve Griffin, Deseret News.

Source: <https://www.deseret.com/utah/2020/3/16/2181692/covid-19-testing-coronavirus-matters-importance-shortage-utah-state-exposure-symptoms-sick>

A recent Source: Beatriz Colomina, X-Ray Architecture – see: <https://vimeo.com/148216834>

## Path 2 Transcribing as Design Weeks 1 - 7

The term transcription is here used with specific reference to **Franz Liszt** (see below). This phase of work is not analysis but design by re-inhabiting an existing work's principals. The studio will run a parallel path project to learn from other works and in effect remake them as original. Through a process of **transcription** re-learn the works to show how they may become a new work of architecture. Perceivable and a form of knowledge. Transcribe a work of architecture and then use this knowledge to enact an experimentation: 1). Measure: Force (FEA); Force (thermal); Force (Scalar); Force (Vectorial). 2). Reverse the key theorem and principle that motivates the above works.

**Primary Readings:** Brian Kane, *Sound Unseen: Acousmatic Sound in Theory and Practice*, Yale University Press.

Source: <https://www.amazon.com/Sound-Unseen-Acousmatic-Theory-Practice/dp/0190632216>

**Primary Readings:** Franz Liszt. *The Piano Transcriptions of Franz Liszt*, by Philip Friedheim. *Studies in Romanticism*, Vol. I, No. 2 (Winter, 1962), pp. 83-96. Published by: The Johns Hopkins University Press

Stable URL: <https://www.jstor.org/stable/25599545>

*"Whoever attempts to determine the complete extent of Liszt's piano music faces a number of problems from the very beginning. Although Humphrey Searle has painstakingly compiled a catalogue of all the works of this composer, Liszt's habit of revising his earlier music and transcribing his own vocal and instrumental works for piano makes it extremely difficult to isolate the number of separate compositions. The problem is augmented by the numerous piano arrangements of music of other composers. Since these works range from literal transcriptions, as in the keyboard version of Weber's Overture, to ostensibly original compositions, as in the Hungarian Rhapsodies, it is very hard to decide where copying ends and creativity."*

What can we learn by drawing, transcribing earlier aspects of the architectural work that might inform a clinic?

This roster of case studies can be expanded with discussion – we will discuss these as we introduce the studio phase.

**On Air Pressure in Architecture: Viscosity of Space: Robert Slutzky on Le Corbusier (precursor to negative pressure rooms)**

- Mill Owners Building vs. The Toledo Glass Pavilion.

**On the Architecture and Health - The Psycho / Physio- logical House (architecture and mental and physiological health)**

- Richard Neutra Health House

- The Neutra Health House is well known; Sylvia Lavin's scholarship opens Neutra's architecture to a psychoanalytic realm of study.

- <https://mitpress.mit.edu/books/form-follows-libido>

**The Architectural and Human Body - Pressure / Light without Emission / Chiaroscuro Sfumato with mass.**

- The Bye House

- New York Times Building. See <https://facades.lbl.gov/newyorktimes/newyorktimes.htm>

**Ceramics and architecture at the turn of the last century (cleanliness and architecture).**

- Mies Van Der Rohe, Villa Tugendhat

**Compression without tension: Using simulated microscopic modeling (FEA) one visualizes molecular behavior material.**

- Henri Labrouste, Bibliothèque Sainte-Geneviève

**Extension: Without Mass / Centrifugal and Centripetal Space at Once. (a non-containing of the body).**

- Theo Van Doesburg - De Stijl

+ + + Hospital Rooms, Sanitariums, Everyday Clinics and Examination Rooms.

Please add your own suggestions and discuss with MB

## Transcribe Draw plan / Draw Section

- Reverse Engineer by way of analysis
- Bill of Materials (explicate all parts and their Material weights, volume, surface / Spatial volume, balance, forms)
- Structural principles and analysis (FEA) / Thermal analysis.



A Sample: Henri Labrouste, Bibliothèque Sainte-Geneviève (1843 and 1850), Paris. Finite element analysis shows Labrouste's use of iron relies on ornamental design to circumvent (prevent) tension in form. The work is a lesson in material properties, historical language, and structural engineering. Source: Visible Weather / Bell-Seong Architecture

## Path 3 Weeks 1 to 9

### Who is the architect and what are the limits of influence on their work?

In Lisa Uddin's writing on the artist Noah Purifoy Uddin analyzes the context within which the art world received Purifoy's 1960's works. Emerging in an era that had contemporaries such as Frank Gehry in architecture or Robert Rauschenberg in art Purifoy was seen as an artist in a Dada vein or a then contemporary term "junk art" or "junk modernism". The working in and with cast offs from a mainstream society. Uddin gives a much deeper context to the exact world Purifoy inhabited and shows it as distinct from that of the mainstream art world - Purifoy was working in the post-riot Watts neighborhood of Los Angeles where he was both a resident and witness to the violence of rioting, but also the loss and segregation. He was an art teacher - an activist using art as a social language. He also worked in the aerospace industrial realm of Southern California - at Douglas Aircraft, where he worked on metal and air frames. In Uddin's text you begin to see how the broad grain of social and art denominators barely touch the actual grain of life and in Purifoy's case his art comes to life in new ways. It allows you to see an unacknowledged realm of creation and creators but also a zone of human life that was previously averaged out as like its seemingly similar and more predominant neighboring practices. As the studio enters into work on sites and place Purifoy and others whose lives bridge the industrial and its prevalent practices meet the handmade, the human made and the frame of mind and need of specific people and place. We can open this more broadly but the key question is to see the grain of human life and creativity more precisely. Where are you in this matrix?

*"The designation of junk modernism approaches what waste thinker Brian Thill names as "the derelict": "that immense underclass of things that have much more quickly or surreptitiously [than ruins] fallen outside of visibility and desire in our time: the indifferent, the lost, the wayward, the leaking, the ugly, the truly abject and unwanted— all the meddlesome waste caught between the things we've built up in our minds as meaningful and majestic."7 Rather than reifying the violent connection between a junk so described and African Americans from South Central Los Angeles, I consider how this community of color was able to with-stand procedures of dereliction that yoked normative architectural modernism to whiteness and ravaged urban sites and objects to blackness. These were the same confluences that fed a logic of*

*looming extinction for people who could not or would not buy into midcentury prosperity and mass consumption. And they are confections that, more broadly, have helped posit nonhuman waste and “wasted humans” as mounting and interchangeable byproducts of the Good Life.”*

*“To support his studies, Purifoy found part- time employment, including night shifts at the Douglas Aircraft defense plant, one of four major companies in the region’s booming aviation industry. There he operated a shearing machine that cut metal into templates, connecting him to a staple material in the architecture of both aircraft and modern houses. 14 His subsequent job as a window trimmer found him at Cannell and Chaffin Interior Designs on Wilshire Boulevard, an LA- based firm with a distinguished clientele and an establishment take on the California modern look. Interiors staged for the company’s Oasis Model House circa 1954, for example, featured a moderate use of low- profile wood furnishings and floating shelves, but took more liberties with open- space living areas and industrial touches such as a built- in heat lamp over the kitchen counter.”*

**Source:** Lisa Uddin, “And Thus Not Glowing Brightly Noah Purifoy’s Junk Modernism” in *Race and Modern Architecture: A Critical History from the Enlightenment to the Present*. Irene Cheng, Charles L. David, Mabel O. Wilson, eds., Pittsburgh, Pa.: University of Pittsburgh Press, 2020. P. 308

Accessed August 29, 2020. doi:10.2307/j.ctv1lcwb7.



Above Left: The Sink; Junk Art, Noah Purifoy and Judson Powell (Group effort). As shown in: *The Art of Communication as a Creative Act*. From: 66 Signs of Neon, Simon Rodia Commemorative Watts Renaissance of the Arts Festival, Los Angeles, 1966; Above Right: “Noah Purifoy in front of a photographic installation of the Watts rebellion, by Harry Drinkwater, at the 66 Signs of Neon exhibition at the University of Southern California, Los Angeles, c. 1966” Photograph courtesy of Harry Drinkwater. See: <https://hammer.ucla.edu/now-dig-this/artists/noah-purifoy>.

*“66 Signs of Neon exists on several levels: as an art exhibition dominated by assem-blages of artifacts of the Watts riots; as a one-to-one format of communication between individuals who otherwise would not or could not communicate; as an evolving system of philosophy. “*

*“For 66 Signs of Neon, the time of concep-tion was the Watts holocaust of August, 1965. Sixty-six was born nearly 12 months later, In a labor of 30 days immediately preceding the First Annual Watts Art Festival, where the collection initially was exhibited. The festival, expected to be the life span of 66 Signs, be-came instead merely its infancy.”*

*"Judson and I, while teaching at the Watts Tower Art Center, watched aghast the rioting, looting and burning during the August hap-pening. And while the debris was still smol-dering, we ventured into the rubble like other junkers of the community, digging and search-ing, but unlike others, obsessed without quite knowing why."*

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Are you in the scene like Purifoy? Are you a field worker visiting the site? In your own architecture? Are you splitting your time; working at Douglas Aircraft and making art from the remains of unrest (Purifoy)? The studio asks you to find this role and define it.

The studio will attempt to design for real world constraints. Recognizing this we will also address our academic setting – the architect is not a separate actor, outside the scene. Where in the scene do you find yourself – what do you allow to affect your frame of mind. If one looks to literature writers frequently write themselves into novels or plays. A character reveals the novelist; a point of view or a vein of thought not publicly admissible. You will each be asked to carefully define how you see your role; while this may be self-evident in the work we will ask you to sketch out and inhabit your role and its thus its capacities.



**In the field or in the studio?** How do we admit the full scope of what is possible into the design process? Both worlds being value, are they even that distinguishable today? Community Solutions has pioneered field work to address homelessness – with engagement in 70 cities in the United States. GSAPP brings other expertise to the table – often at a distance.

On being (the character) Kilgore Trout in Kurt Vonnegut novels; or the author as reporter in the writing of Joan Didion or Joyce Carol Oates or \_\_\_\_\_.

In Kurt Vonnegut's novel, *Breakfast of Champions*, a character named Kilgore Trout appears as he does in several of Vonnegut's works. In the 1973 publication Trout is a kind of witness and creator at the same time. He experiences the world in an immediate first-person tense but as the interpolator of evidence he remakes everything he sees. He gives them sense where there was none.

Vonnegut's characters are prone to being literal and simultaneously complete disconnected from intent – when a rented **HERTZ** truck drives by one character imagines the truck is in pain. Throughout literature characters in novels serves as proxies for a world the author creates – in Vonnegut's case they often are deeply alienated from the world they occupy but are also able to vividly experience that alienation not as something to recover from but to harvest and indeed reveal the source of. The characters, were, of course us – a later day figure at the  $\frac{3}{4}$  mark of the century in a matrix of normalized violence – the human in situations that no history had prepared them for.

The studio will draw on a very diverse range of images, situations, prompts and mediatic concerns – the world we swim in today. **With a novelistic character in mind each designer is asked to nominate a proxy – a character who helps you allow the upheaval and violence of our time into creative reply. To address the depth of the crisis before us.**

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From Kurt Vonnegut's *Breakfast of Champions*, 1973, Chapter 19. (line breaks are from Vonnegut's original text)

*I was on a par with the Creator of the Universe there in the dark in the cocktail lounge. I shrunk the Universe to a ball exactly one light-year in diameter. I had it explode. I had it disperse itself again.*

*Ask me a question, any question. How old is the Universe? It is one half-second old, but that half-second has lasted one quintillion years so far. Who created it? Nobody created it. It has always been here*

Kurt Vonnegut, *Breakfast of Champions*, Chapter 19.

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→ Listen:

*The waitress brought me another drink. She wanted to light my hurricane lamp again. I wouldn't let her. "Can you see anything in the dark, with your sunglasses on?" she asked me.*

*"The big show is inside my head," I said.*

*"Oh," she said.*

*"I can tell fortunes," I said. "You want your fortune told?"*

*"Not right now," she said. She went back to the bar, and she and the bartender had some sort of conversation about me, I think. The bartender took several anxious looks in my direction. All he could see were the leaks over my eyes. I did not worry about his asking me to leave the establishment. I had created him, after all. I gave him a name: Harold Newcomb Wilbur. I awarded him the Silver Star, the Bronze Star, the Soldier's Medal, the Good Conduct Medal, and a Purple Heart with two Oak-Leaf Clusters, which made him the second most decorated veteran in Midland City. I put all his medals under his handkerchiefs in a dresser drawer.*

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### Where does architecture meet the most urgent questions of our time.

As COVID-19 rapidly expanded around the world a collective witnessing of the crisis engulfed the public's consciousness. We saw both real evidence of an epidemic and also collectively imagined it's the biology of the virus and its spread. We tried to imagine what this meant for daily life and the wider state of cities, of markets and even capitalism.

The epidemic is *live* - its form, should it have one is constituent to time. It is biological. It was carried, however, on inert objects and things. It bring to the fore every aspect of architecture and cities. It manifest the immensely complex ability of humans to see - i.e., to imagine – forms in time. To think and therefore see. In doing so it harkens a profound respect for the depth of the human mind; it also brings forth intellectual work on time itself and its role in how we see our place in events; requiring us to see as George Kubler notes a type of imaginary net that is capable of giving us access to the grain of events that constitute and often define daily life.

Our studio will begin with a reading of Kubler's 1961 text, *The Shape of Time* and quickly follow with a series of studies to understand how time and its sculptural (spatial) manifestations leaves us in the midst of crisis and confusion, but also invoke in all us immense "talent" to see past this.

In the photos above, we see extremes of industrialized care and often the literal architectural work of form, program and time - how can we as architects address these extremes and bring empathy and care to them.

Photo journalism often has captured the divide between architecture and virus: the Instrumental and empathetic; the resident, citizen meeting the industrial hospital – the welcoming of a military escalation and orchestration of medicine. An enmeshing of place, design, people.



real



cinema



real



real

**Upper Left - Javits Center Field Hospital.** New York: The rapidly assembled field hospital resembled the office interiors from Jacques Tati's, 1967, *Playtime*. The film, made over six years, reveals a set of characters who experience a single day and encounter a series of new program/architectural types – including the modern office, an airport, a gridded apartment façade and automobiles in motion.

Source: <https://www.dailymail.co.uk/news/article-8160603/New-York-state-coronavirus-death-toll-soars-519.html>

**Lower Left and Right:** New York Times, March 28, 2020, *The World's Epicenter*. Of the 9,134 deaths from the coronavirus in Italy, more than 1,600 have been in the Bergamo region. Above, Claudio Trivelli, 61, who tested positive. Page A12. The NY Times featured the above photograph on its front page prompting many to notice its Caravaggio like quality. The Red Cross, saturated red uniforms, the family and medical professionals. The patina of the wall surface and the bedspread.

Source: <https://www.nytimes.com/interactive/2020/03/27/world/europe/coronavirus-italy-bergamo.html>

## Need and Place     Beirut, Lebanon with Plunz / Body-Lawson Studio     Weeks 5 - 14

The site and scope of need is situated with aid from fellow designers in the Plunz / Body-Lawson studio whose studios will help us navigate the complexities of place.

We will work with specifications and need defined by:

- **United Nations Habitat** (UNH). **UNH** documents addressing COVID-19 worldwide help bring specific knowledge to assessing need. We will begin with a UNH document focused on Lebanon and expand this within ours and our partner studios.

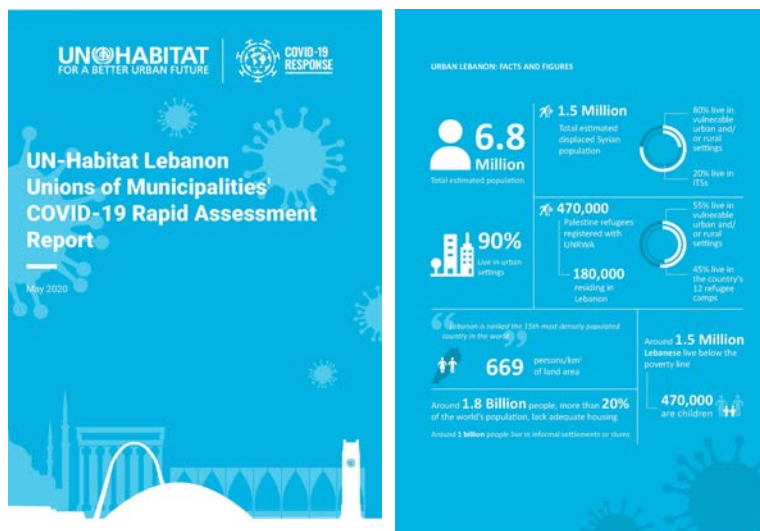
The studio as a whole will also bring other public health leadership research to the issue of a clinic.

See: <https://unhabitat.org/covid-19>

Excerpt below from: <https://unhabitat.org/un-habitat-lebanon-unions-of-municipalities-covid-19-rapid-assessment-report>

*"In addition to this complex urban environment, weak governance and political instability have left local authorities with limited financial and administrative support from the national level and hence capacity to respond to largescale emergencies or plan well for the future. The ongoing Syrian refugee crisis is one example where municipalities, already struggling to provide adequate services to the Lebanese population, face additional pressure to support refugee communities. While around 20 per cent of the Syrian refugee population is hosted in informal tented settlements (in mainly rural locations) and supported under the Lebanon Crisis Response Plan (LCRP), the remaining population reside in poor urban neighbourhoods and fall de facto under municipality responsibility (UNHCR, UNICEF and WFP, 2019). The COVID-19 pandemic further highlights the lack of decentralized support and empowerment of local authorities in Lebanon. Being at the front line of the response at the local level, it is clear that a critical gap exists and needs to be urgently addressed, if Lebanese local authorities are to weather future emergencies and avoid complete breakdown of services and functionality. Both of these crises – the Syrian refugee crisis and COVID-19 – are additionally drastically compounded by the severe and ongoing socioeconomic crisis."*

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## Excerpt from the Plunz / Body-Lawson Studio brief on UN Habitat and Beirut.

The role of **UN-Habitat** has been an important resource since its establishment in Lebanon, aimed at enhancing the local administration's capacities through a multi-faceted approach starting with:

- 1) Enhancing their technical capacities to better plan and sustain required actions and linking them to territorial administrations and national authorities,
- 2) Promoting evidence-based approaches in order to allow these administrations to better understand and evaluate their challenges and widen their planning perspectives,
- 3) Ensuring proper community engagement.

**UN-Habitat** has been able to intervene and apply its mission in various Lebanese contexts especially in poor urban localities, with the aim of leaving no one behind. As a custodian of the sustainable development goal (SDG) 11, UN-Habitat considers the city and its dwellers as the catalysts of all other SDGs and aims to achieve the New Urban Agenda 2030 goals by improving the living conditions for all. Within these considerations, shelter and access to public spaces have been identified as two challenging sectors vis-à-vis an exponential demand for both housing and livelihood opportunities along with the high influx of migrants and refugees. UN-Habitat Lebanon Country Programme was able to launch the first local national urban policy, conduct several researches on the country's housing, land and property (HLP) status, and engage with the communities of dense vulnerable urban neighbourhoods to upgrade and rehabilitate their urban basic services, public spaces and shelters.

**Studio Site:** The site context is a section of Gemmayze Street in the Mar Mikhaël quarter and located 200 meters from the blast Ground Zero. It has sustained extensive damage, including many unsafe or collapsed buildings. It will require extensive rebuilding. The hub for our site is the famous Saint Nicholas Stairs, together with several other nearby site options along the street to the east. The neighborhood was home to a mix of long-term now elderly residents with new population related arts and other cultural production. In recent years its activities made it a popular destination for the city. As fabric it comprises a mix of "heritage" buildings, comfortable housing from the last century, and some recent new construction. The ground floors tend to be dominated by a variety of commercial uses.



Above: In his essay "Latent Parallelepipeds" Farès el-Dahdah, described the concrete bunkers used to protect art in the Beirut National Museum. The entombments, created in the midst of civil war, were protective and meant as temporary. el-Dahdah proposed they be maintained after the war; in effect as a conflation of the original and a new form of monument and art. See: *Slow Space*, edited by Michael Bell and Sze Tsung Leong, 1998, Monacelli Press. <https://www.amazon.com/Slow-Space-Michael-Bell/dp/1885254733>

## Conceptual Denominators

The studio will ask each designer to address a range of areas of design and thought – aspects of architectural work that come from history – these may be seen as precursors to demands of our time. You are asked to test your work against history to see where there were potentials that now meet our time.

We can add to these, refine focus to one more than others.

These are a start and a way to share concepts as we begin.

## A. George Kubler's *The Shape of Time* (Is a Clinic a Shape Evading Shape).

**Everything Must Scale** refers to products, to design and engineering, that are only possible at scale. The COVID-19 pandemic in this instance is both a specific moment in urban history, but also part of a wider new milieu within which capitalism and development meet new denominators – this forces a new spatial quality.

In the case of COVID-19 we are in effect evading a virus even as we must approach it head on to treat it. The phrase “shape evading shapes” is introduced later in the syllabus; it asks us to consider how we design for a virus and the terms draw on an influential book by George Kubler – his 1961 *The Shape of Time*. Kubler. Kubler's relatively modest book – in scale – was written while he was a professor of Art History at Yale. The book concepts gives to “things” a social and temporal dimension, proposing that the grain that structures our perception (of things, of history) has been too narrow and inadequate to grasp the spectrum of events that courses through the appearance of things.<sup>1</sup> The aesthetic experience of life – of things – is dimensionally infinitesimal and temporal even as it remains what one would unexpectedly call form (something we imagine is easily scale-able). “Shape evading shapes,” as a phrase comes from the artist Robert Smithson's reading of Kubler – of form and time. In our case; clinic and virus. The decidedly inorganic space of the clinic and the live infectious disease. The clinic must accept and repel the virus. It also emerges within a set of qualities and conditions of our time. In the two images below; one a photograph depicting the field hospital at Javits Center (Manhattan). The other a 1944 collage by Mies Van Der Rohe. The collage, shows what Mies titled a concert hall inside a steel truss - clear span factory structure. The similarities are striking, depicting the emergence of social programs, material techniques and capital; human life in a maelstrom of seemingly autonomous material/money dimensions. An anthropology and archeology running parallel – perhaps completely apart but side by side.

*“But The Shape of Time drew the greatest share of its interest in offering system for describing historical change in the visual arts, one with deeply structuralist implications. A radical rejection of linear art history, it flatly dismissed the iconographic accounts of the period as so much pallid symbolism. Instead, Kubler's approach was organized around the principle of formal sequencing, emphasizing the structures and taxonomies of historical change over an investigation into the meanings and content of artifacts themselves. While such a method squares with the formalist legacy of art criticism in its acute attention to morphology, it would nonetheless provide a critique of its dominant iterations in the postwar era, particularly in its position toward historical development”*

“Ultramoderne”: Or, How George Kubler Stole the Time in Sixties Art, Pamela M. Lee, Grey Room, No. 2 (Winter, 2001), pp. 46-77, The MIT Press

Stable URL: <https://www.jstor.org/stable/1262542>

*“The shapes of time are the prey we want to capture. The time of history is too coarse and brief to be an evenly granular duration such as the physicists suppose for natural time; it is more like a sea occupied by innumerable forms of a finite number of types. A net of another mesh is required, different from any now in use.”*

*“Conventional histories of architecture, sculpture, painting, and the cognate crafts miss both the minute and main details of artistic activity.”*

*“Sculpture is more than iconography or iconology. Its power to suggest both space and time is inaccessible to ordinary meaning by being self-referential”*

George Kubler, “The Shape of Time. Remarks on the History of Things”, pp. 32 – 33.

*George Kubler, like Ad Reinhardt, seems concerned with “weak signals” from the void. Beginnings and endings are projected into the present as hazy planes of “actuality.” In The Shape of Time: Remarks on the History of Things, Kubler says, “Actuality is . . . the interchronic pause when nothing is happening. It is the void between events.” Reinhardt seems obsessed by this “void, so much that he has attempted to give it a concrete shape – a shape that evades shape. Here one finds no allusion to “duration,” but an interval without any suggestion of “life or death.” This is a coherent portion of a hidden infinity. The future crisscrosses the past as an unobtainable present. Time vanishes into a perpetual sameness.*

Robert Smithson, Quasi-infinities and the Waning of Space

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<sup>1</sup> See: “Ultramoderne”: Or, How George Kubler Stole the Time in Sixties Art Author(s): Pamela M. Lee Source: Grey Room, No. 2 (Winter, 2001), pp. 46-77 Published by: The MIT Press Stable URL: <https://www.jstor.org/stable/1262542> “Drawing from the language of anthropology, geology, linguistics, physics, archaeology, philosophy, astronomy, and mathematics, it moved freely between discussions of the “potters of Kaminaljuyu” to graph theory to Darwin to the Carracci. Thus, it served Kubler's interests of “enlarging the scope of aesthetic experience,” as much as it underscored the importance of a multicultural approach to the discipline.” (p. 54)

*Most notions of time (Progress, Evolution, Avant-garde) are put in terms of biology. Analogies are drawn between organic biology and technology; the nervous system is extended into electronics. and the muscular system is extended into mechanics. The workings of biology and technology belong not in the domain of art, but to the "useful" time of organic (active) duration, which is unconscious and mortal. Art mirrors the "actuality" that Kubler and Reinhardt are exploring. What is actual is apart from the continuous "actions" between birth and death. Action is not the motive of a Reinhardt painting. Whenever "action" does persist, it is unavailable or useless. In art, action is always becoming inertia, but this inertia has no ground to settle on except the mind, which is as empty as actual time.*

Robert Smithson, *Quasi-infinities and the Waning of Space*



Above Left: Socially Distanced National Reserve Troops @ Javits Center Field Hospital, New York City. March 2020.  
<https://www.dailymail.co.uk/news/article-8160603/New-York-state-coronavirus-death-toll-soars-519.html>

Above Right: Mies van der Rohe, Concert Hall project, 1944. MoMA, Archive, gift of Mrs. Mary Callery. Graphite, cut-and-pasted photo reproduction, cut-and-pasted papers, cut-and-pasted painted paper, and gouache on gelatin silver photograph mounted on board.  
 George Kubler, *The Shape of Time*

## B. Time and Program / Time and Manufacturing

*Time - rapidly deployable structure*

*Time - human body and medical treatment*

*Time - materials and inorganic tectonics*

*Time - urban design and development*

This studio will design a small clinic intended to be deployed under the emerging conditions of COVID – 19 and potential future epidemics. We will work in parallel to the Plunz - Lawson studio and focus on issue of materials, tectonics, supply chain and manufacturing in ways that allow our work serve many constituencies and emerging needs. As prototypes these will be deployable as a prototypes for testing.

We will not travel to studio sites but the work will rely on information and data to address specifics of need, programming and place – of specific people at times.

## C. Air Pressure and the Airborne Infection Isolation Rooms (AIIRs)

In the design of **Airborne Infection Isolation Rooms (AIIR)** architectural design must become more specific about how it manages air pressure differentials between rooms, ante-chambers and hallways. The room that hosts a potentially infected patient must be negatively pressured in comparison to the hallways or ante chambers adjacent to it. Excerpts from a **Center for Design Control** document on AIIR design and specifications enunciates the overall design goals but is not specific about how this is achieved. The terms at first glance would exceed architectural thought and design but they also bring up and rely on central aspects of architecture.

They speak to rooms vs. ante rooms vs. hallways. They speak towards a more refined but nonetheless common and essential aspects of air pressure balancing in HVAC controlled spaces.

## Guidelines for Environmental Infection Control in Health-Care Facilities (2003)

<https://www.cdc.gov/infectioncontrol/guidelines/environmental/background/air.html>

*Hospital preparedness for bioterrorism and other public health emergencies such as emerging airborne infectious diseases requires strategic planning to ensure that all components of respiratory protection programs, including environmental controls, are in place for airborne infection isolation rooms (AIIRs). Hospitals have insufficient facilities to provide airborne infection isolation for large numbers of patients with airborne infectious diseases presenting in a short time period.<sup>1, 2</sup> However, AIIRs have been increased recently, due to requirements of National Bioterrorism Hospital Preparedness Program.<sup>3</sup>*

For the purposes of this guide, pressure refers to the differential pressure between two spaces (FIGURE 1).

In health care settings, the two spaces are typically the isolation room and the corridor. For AIIR, the room should be negatively pressurized in relation to the corridor. This helps to prevent infectious particles from escaping the room envelope. If an anteroom is present between the AIIR and the corridor, the AIIR may be negatively or positively pressurized to the anteroom. However, if the AIIR is positively pressurized to the anteroom, the anteroom must be negatively pressurized to the corridor.



A United Nations Habitat guides shows protocols for a negative pressure hospital room. Made using off the shelf components and secured by cleaning protocols and human repair.

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The hallway is militarized. If one takes a hallway as a starting point we can refer to the recent essay "Corridor Spaces," by Professor Mark Jarzombek (MIT Architecture History/Theory). Jarzombek's research focuses on the emergence of the corridor in architecture. He begins by referring to the Latin root of the term and a corridor as a person – not a space.

*"In the fourteenth century, in both Spanish and Italian contexts, a corridor referred not to a space but to a courier, someone who as the word's Latin root suggests could run fast. A corridor might have been a scout sent behind enemy lines, a governmental messenger, a carrier of money, or even a negotiator arranging mercantile deals and marriages."*

[https://web.mit.edu/mmj4/www/downloads/criticalinq36\\_4.pdf](https://web.mit.edu/mmj4/www/downloads/criticalinq36_4.pdf)

Jarzombek writes that the first architectural corridors sustained a militaristic connotation; as spaces where rapid communication (with troops) was possible. A hospital corridor in this way is similar; allowing a temporal and rapid communication with medical professionals and patients.

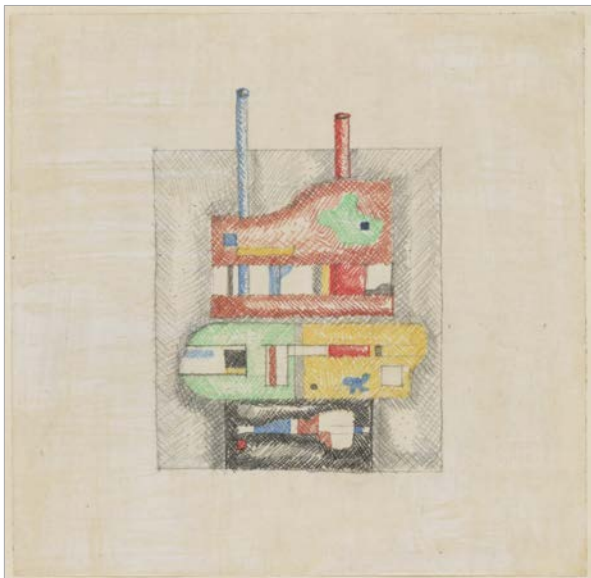
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### Infection Control as Reverse Plasticity

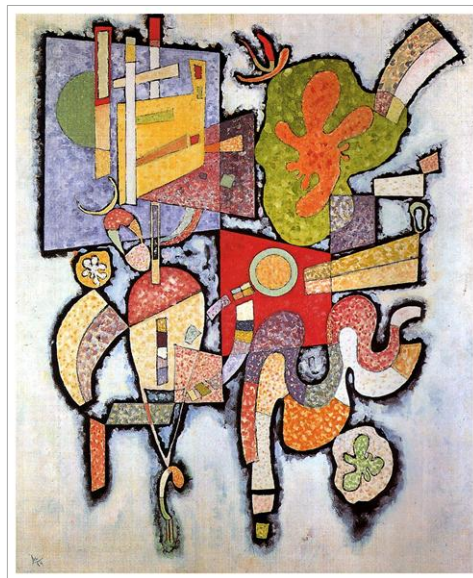
If one takes a negative air pressure as a starting point one example of a touchstone is Robert Slutzky's essay "Aqueous Humor." Published in *Oppositions* 19/20, in the Winter/Spring of 1980 the essay focused on the evolution of plastic space in Le Corbusier's work. In Slutzky's reading space had an alluvial quality, a viscosity that resonates with the liquid/fluid in the eye. Vision is here not a matter of geometry and the outlines of form but of the total alluvial quality of the work; its space in the atmosphere and the eyes initial perceiving of what is effectively form interlocked with space. With a liquid alluvial – thick space. We will cover this essay carefully seeing where it offers resonance with our time. In the work of Le Corbusier Slutzky saw a quality of Cubism – we are not intending to reinvent Cubism in the studio but to ask where in the history of architectural thought and concepts are aspects of air pressure made real, palpable – design-able. Is a negative pressure room in effect reverse plasticity?

*The "aqueous vision" embodied by the Cubist painting from 1910 on finds its architectural expression at a slightly later historical moment in the work of Le Corbusier. In his development one discovers a progressive and typically Cubist "thickening" of space, the work becoming increasingly coagulated by a highly structured, ambiguous union of form and content unique in modern architecture.*

### Primary Reading: Robert Slutzky, Aqueous Humor, *Oppositions* 19/20, Winter/Spring 1980



Above Left: John Hejduk, Wall House 2 (A. E. Bye House) Project, Ridgefield, Connecticut (Combined elevation and plan) 1973



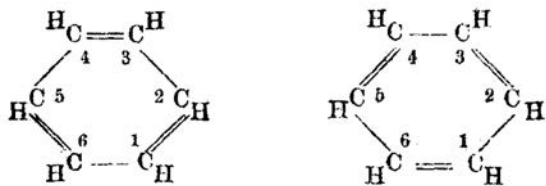
Above Right: Wassily Kandinsky, *Complex Simple* 1939



Paul Lubowicki, **Orphanage (Rocking Horse, Boat)** 5<sup>th</sup> Year Thesis Project, The Cooper Union, 1976 -77

## D. Ceramics: A Medical House as Clinic

In estimating the contemporary relevance of Mies van der Rohe's Berlin based architecture of the 1920's Sanford Kwinter, theorist, founder and critic, drew our attention to Mies' apparent awareness and curiosity with discovery of the Benzene Ring as discovered by Kekulé. For Kwinter the goal was to move our attention from the specific form of Mies' architecture and towards its place within a chemical/material era that he saw as defining the very substrate of development in Germany at the time. Kwinter has written of Mies as not only aware of the discovery of the Benzene Ring but also ultimately affected by the era's increasing capability in chemical engineering and its affects at all levels of society and political consequence. Mies' use of steel and glass in this regard becomes coincident with the rise of ceramics and other engineered materials but also their application into infrastructure at all levels. Material here is a constituent of the very matrix of an economy and its spatialization as a city and thus social life. The early twentieth century saw a rapid rise in uses of ceramic materials at every scale of design.

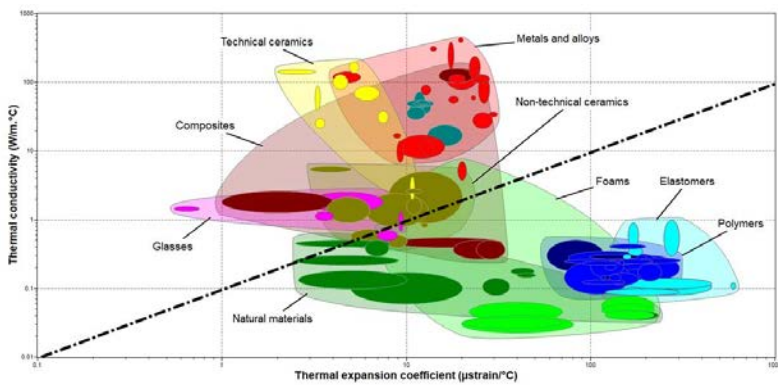


Benzene Ring, August Kekulé, 1865 "With Kekulé chemistry became architecture, (or at the very least, applied geometry) and a whole new branch of science – stereochemistry – opened up." "Sanford Kwinter, "Mies and Movement: Military Logistics and Molecular Regimes," in *The Presence of Mies*, edited by Detlef Mertins, Princeton Architectural Press, page 89.



Above Left: Lilly Reich. German People - German Work. Berlin, 1934. Glass exhibit. Photograph Courtesy The Mies van der Rohe Archive, The Museum of Modern Art, New York. "Her installations demonetize the commercial transactions implied in the display, by putting the aura back into mass-produced goods, or at least into their exhibition."  
Source: Cruel Metonymies: Lilly Reich's Designs for the 1937 World's Fair Author(s): Esther da Costa Meyer.  
Source: <http://www.jstor.com/stable/488661>

Above Right: Le Corbusier, Maison La Roche, ceramic sink, alloy water faucet, steel window frame, glass. 1923



Above: Stanley Saitowitz, Transvaal House, 1978, South Africa, porcelain bathroom fixtures, steel plumbing, concrete floor, corrugated metal shower.

Above: Ashby chart of material behavior.

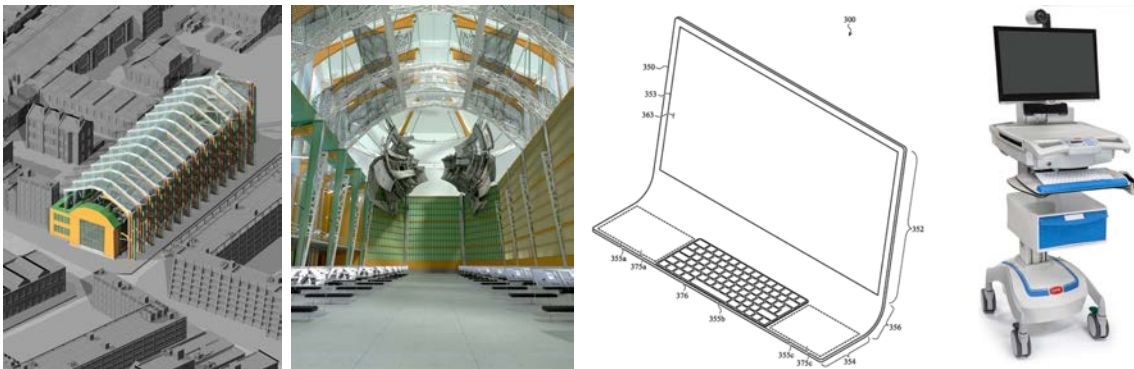
## E. Manufacturing as Place. Placeless Design at Scale for People (Conflation of Material and Capital)

This phase of studio will focus on working at scale; this invokes the manufacturing uses of the term and means to design, engineer and manufacture for large numbers. Working at scale allows higher access to R+D; greater specialization and more refined tooling or material science and modelling. It can bring work closer to people or further away depending on how you imagine production and its capacities.

Our smaller scale work will then be tested against far larger scales. Here will collaborate with the Plunz / Lawson studio - Does urban density and the anthropology of how we are urban change in the design and location of a clinic? Will medical care continue to be organized in centralized large hospitals or can a new smaller clinic in fact reach parts of the world that have been traditionally cut off. The studio will begin with a series of explicit architectural qualities one might demand of a clinic; it will then progress towards siting, urban and social concerns.

A selected Manufacturing Facility and Means (see samples below – to be discussed in studio).

The project is sited inside what you declare to be a scope of manufacturing and product manufacturing scale. This may include the work you have transcribed in phase 2, a new factory capacity (such as an automated factory etc.). Or a local scale of production related to future site work. Below three aspects of design at scale; architecture and material histories; advanced and lower level ensemble component integration.



Above Left: "Architecture as the possibilities of the Universe" by Hyeokyoung Lee (AAD 2019).  
Lee transcribed two works of architecture making one the site of the other comparing their generative concepts.  
Transcription: Schröder House (Utrecht, NL) – Gerrit Rietveld 1924  
AEG turbine factory (Berlin) – Peter Behrens 1909  
Concept: coordinate systems and geometry.  
<http://web.stanford.edu/group/archaeolog/cgi-bin/archaeolog/2020/05/11/the-future-of-learning-architectural-experiments/>

Above Center: A patent drawing for a possible future iMac conflates optics, keyboard, thermal management, structure all in one unit. With a new manufacturing processes the long-standing Apple tradition of unifying Kinesthetics, hardware, software, attention (+) increases. The cost to design and scale such a product is immense.

Apple: "An electronic device may include a glass housing member that includes an upper portion defining a display area, a lower portion defining an input area, and a transition portion joining the upper portion and the lower portion and defining a continuous, curved surface between the upper portion and the lower portion. The electronic device may include a display coupled to the glass housing member and configured to provide a visual output at the display area. The electronic device may include a support structure coupled to the glass housing member and configured to support the computing device."

Above Left: Capsa Healthcare - M38e Telepresence Cart (off the shelf components configured as an ensemble of functions)

## Schedule

*Bell Studio 600 North*

**Monday 1:30 – 4:30 PM**

*Wednesday 6 – 9 PM*

*Thursday 9 – 12 AM*

*Plunz/Body-Lawson Studio*

*Monday 6 – 9 PM 600 South*

**Wednesday 1:30 – 4:30**

*Friday 1:30 – 4:30*

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September

**Week 1**

09 Wednesday Lottery

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**Week 2**

14 Monday - Primary Studio 1:30 – 4:30 PM Review Syllabus with MB – Introductory Discussion

16 Wednesday - Avery Studio: 06:00 – 09:00 PM Bell Lecture - Molecular Architecture Atmosphere – People

17 Thursday - Avery Studio 9:00 – 12:00 AM Phase 1 Studio Initial Research Presentations on the Clinic  
+ Introduce Phase 2 – Transcribe

Programming a Clinic for COVID-19.

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**Week 3**

21 Monday - Primary Studio 1:30 – 4:30 PM

Bell Lecture – Materials and Manufacturing

23 Wednesday

24 Thursday

Review Phase 2 in progress.

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October

**Week 4**

28 Monday - Primary Studio 1:30 – 4:30 PM

Shape Evading Shapes - WITH Plunz Body-Lawson Studio

30 Wednesday

Michael Shanks, Professor of Classics, Stanford University

01 Thursday

Tectonics and Materials of the Clinic

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**Week 5** Site, Human Need, Place

05 Monday - Primary Studio 1:30 – 4:30 PM

Complete Phase 2 and Projective work on Clinic as Transcription

Exchange with Plunz / Body-Lawson studio

07 Wednesday

08 Thursday

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Week 6

12 Monday - Primary Studio 1:30 – 4:30 PM Crossover with Plunz Body-Lawson Studio

14 Wednesday

15 Thursday

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Week 7

19 Monday - Primary Studio 1:30 – 4:30 PM

21 Wednesday

22 Thursday

Mid Term Review

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Week 8

26 Monday - Primary Studio 1:30 – 4:30 PM

28 Wednesday

29 Thursday

November

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Week 9

02 Monday - Primary Studio 1:30 – 4:30 PM Joint Review with Plunz Body-Lawson Studio

04 Wednesday

05 Thursday

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Week 10

09 Monday - Primary Studio 1:30 – 4:30 PM

11 Wednesday

12 Thursday Review

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Week 11

16 Monday - Primary Studio 1:30 – 4:30 PM 18

19 Wednesday

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## Week 12

23 Monday - Primary Studio 1:30 – 4:30 PM

25 Wednesday

26 Thursday Thanksgiving

## December

### Week 13 Production

30 Monday - Primary Studio 1:30 – 4:30 PM

02 Wednesday

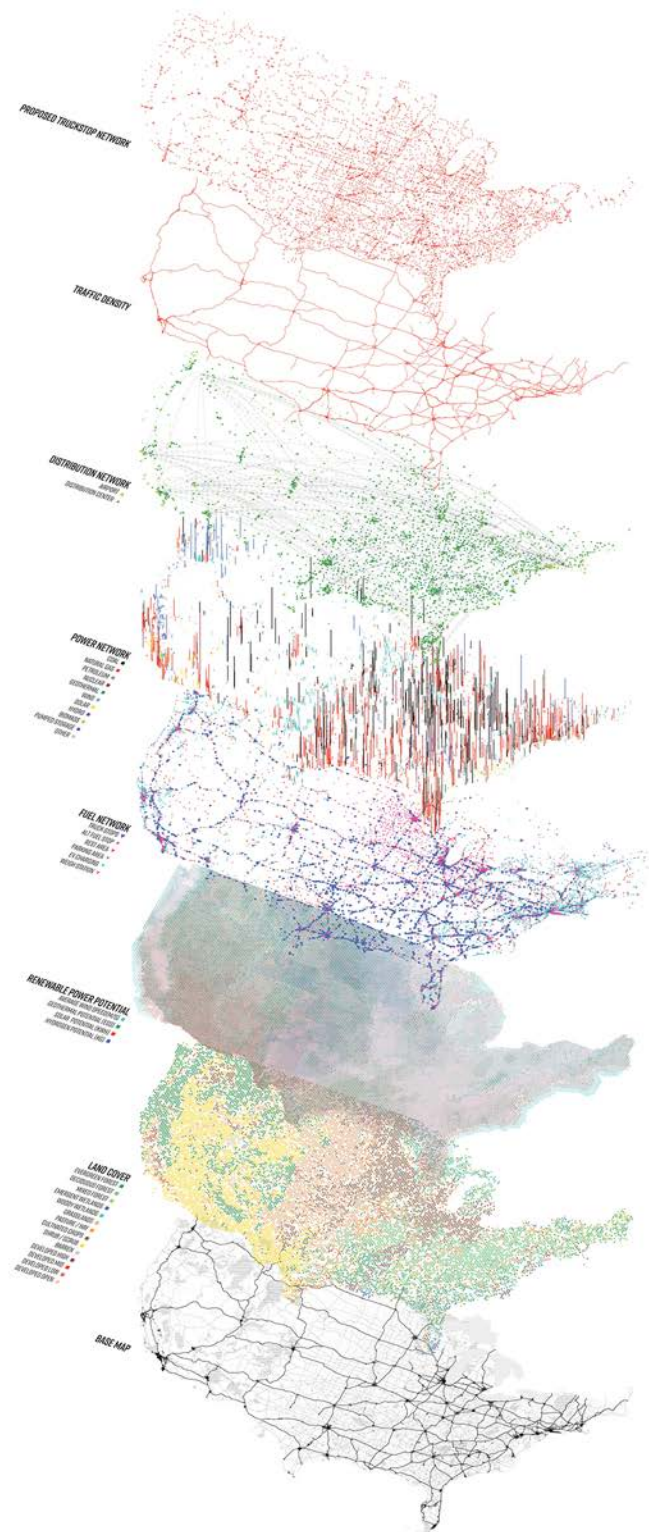
03 Thursday

### Week 14 Production

07 Monday - Primary Studio 1:30 – 4:30 PM

09 Wednesday Wednesday

Final Review

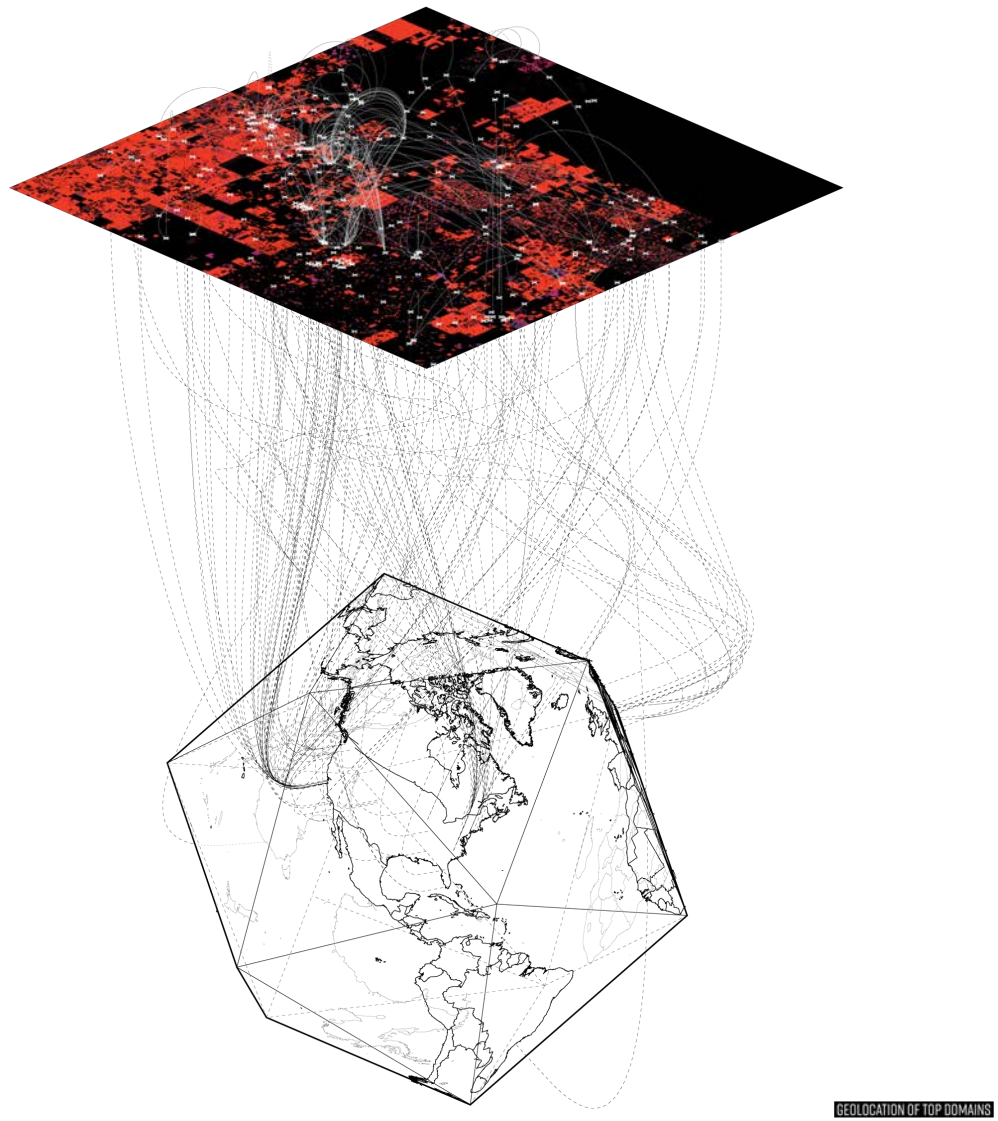


**Michael Soderberg:** United States distribution network, power network, renewable energy potential, land cover in **Everything Must Scale (I)**. From the small work of architecture to national infrastructure GSAPP explorations of immense and small-scale works.

**Everything Must Scale (1) and (2)** examined the future of fueling stations in the United States. We explored what occurs to the nation's 160,000 +/- gasoline fuel stations as vehicles become increasingly electric and automated; when charging occurs at home or work. The fueling station, a building type, emerged in a short period of 100 years, and is today becoming obsolete. **Everything Must Scale (3)** explores what will become of schools as education is increasingly automated, achieved without the same type or number of on-site teachers and in the realms of software and media as education becomes less place specific and can occur almost anywhere. The studio will open lectures to address issues of architecture and scalar realms of economy, energy, and the forms of power or authority that shape the built world. This will include examinations of how expanded the presence of automation, renewable energy, new forms of mobility meet older forms of settlement, architecture, and place.



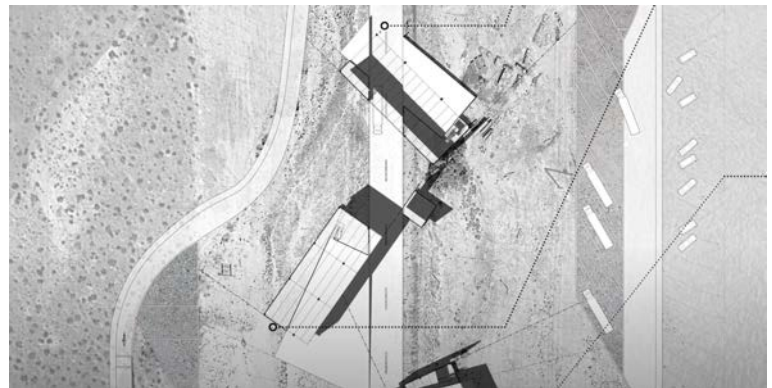
James Piacentini, GSAPP, **Everything Must Scale (2)** – Station Map (geo-locating fuel stations/ United States atop the continent's terrain)– Fall 2019.



**Michael Soderberg: IP Address mapping:** Digital communications via internet and world wide web and model of earth. Soderberg tracked IP address and data exchange in Everything Must Scale (2).



Qi Yang, AAD 2020, Mind in Motion – Everything Must Scale (3) The Teacher-Less School.



Miranda Shugars, M. Arch 2017; Paradigm Shift: Concord Naval Weapons Station Regional Park and the Popular Grid  
<https://www.youtube.com/watch?v=jzFUyGCIfX8>

Huazhou Liu, M. Arch, 2019: The Future of the Truck Stop in an era of electric and automated trucking.  
<https://drive.google.com/file/d/1T-9nrLsHdmrgZsvQXfpNhZIKSNMrjs27/view>