Wednesday, October 26, 2016

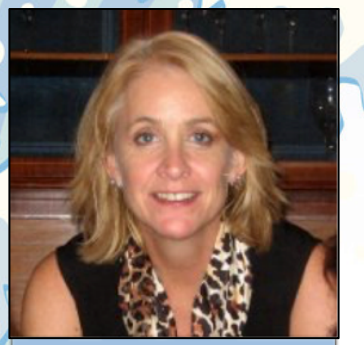
Urban Land Institute | 2016 Fall Meeting | Dallas, TX

Panelists

Surfing the Maverick

Riding the Wave of Disruptive Technologies

Platt Boyd
Branch Technology



Amy Erixon
Avison Young

Dave Bragg
Green Street Advisors

Mark Strama
Google Fiber

Elizabeth (Libby) Seifel
Seifel Consulting

Overview

Introductions

Presentations

Discussion

Resources

Any sufficiently advanced technology is indistinguishable from magic.

Arthur C. Clarke

Amy Erixon

Principal and Managing Director, Investments
Avison Young

AVISON YOUNG

Surfing the Maverick: Riding the Wave of Disruptive Technology

Fourth Industrial Revolution

1784

Mechanical Production equipment and engines driven by water and steam power

1870

Mass Production driven by the division of labour, assembly line and electrical lights

1969

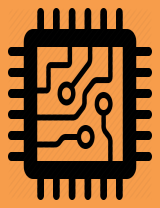
Automated Production through the use of electronics such as robots

2012

Additive manufacturing (3-D printing), IoT (Internet of Things) and application of cyber-physical systems to reorganize the way production and consumption occur

Moore's Law

Performance doubles every 2 years; price reduces by half

		Performance	*Efficiency*	*Price*
Computer Chips		3,500x	90,000x	1/60,000th of price
Automobile		300,000mph	2 Million miles per gallon	4 cent
Skyscraper construction		13.5 Million workers	35x the height of Mount Everest	< $1,000

Disruptive Technologies

Digital Revolution

Social

Mobile

Analytics

Cloud

Internet of Things

AR / VR

Re-engineering the workplace – process revolution

Big Data

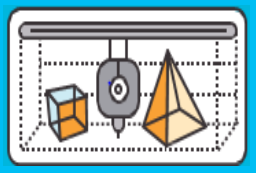
Workforce transformation (man and machine)

Intelligent enterprise (two-way relationships with customers)

Autonomous Vehicles

Robotics / Drones

Sharing Economy



Material science and engineering revolution

Modular construction

Embedded sensors

Biomimicry

Revolutionary materials

3-D printing

Internet of Everything (IOE)

PEOPLE
Connecting people in more relevant, valuable ways.

PROCESS
Delivering the right information to the right person (or machine) at the right time.

DATA
Leveraging Data into more useful information for decision making.

THINGS
Physical devices and objects connected to the Internet and each other without human input.

Cyber Physical Systems

Cyber-physical systems (CPS) are physical and engineered systems whose operations are monitored, coordinated, controlled and integrated by a computing and communication core.

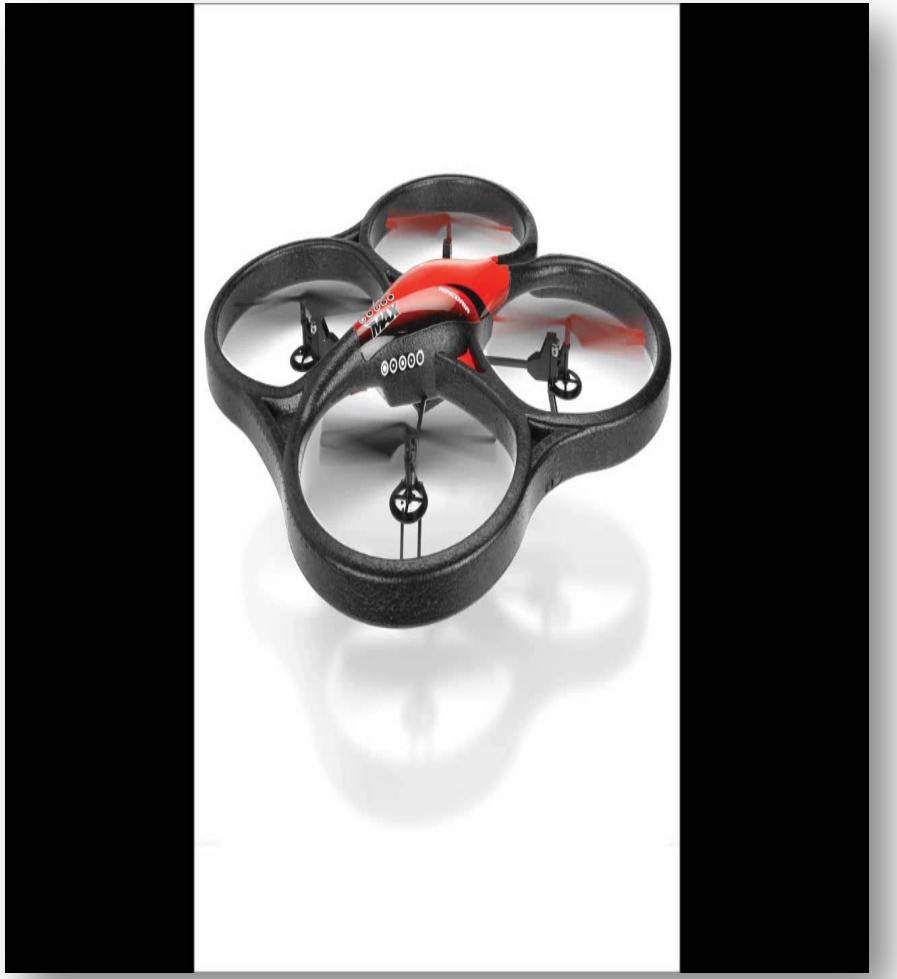
(Helsinki)

Robots and Drones

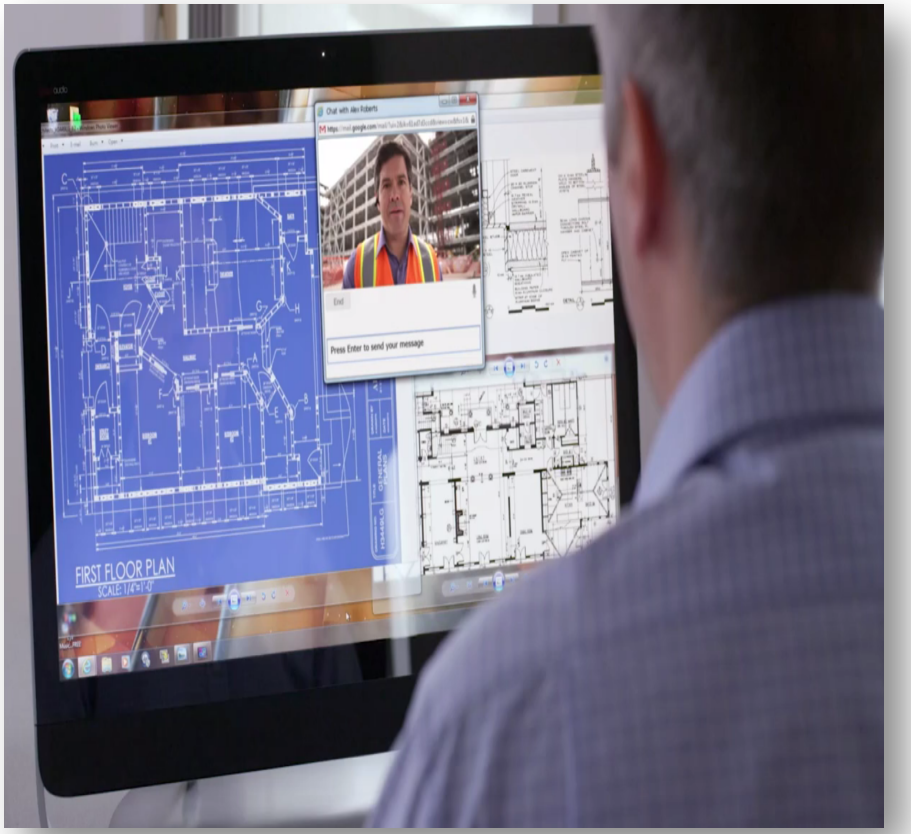
A drone is an unmanned mobile robot.

A drone may be remotely controlled or can fly autonomously through software-controlled navigation in embedded systems working in conjunction with GPS.

Uses: Traffic monitoring, remote tours, topographical mapping, surveillance.



Augmented Reality and Screensharing

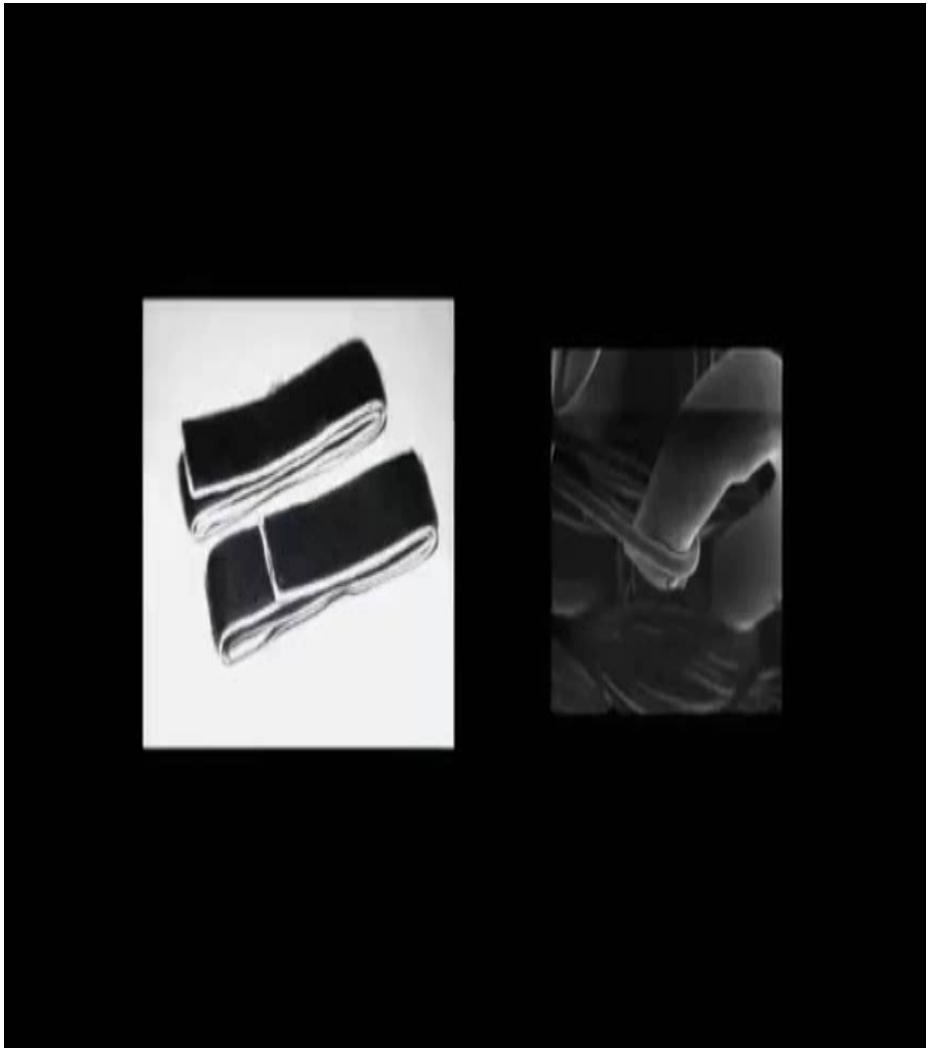


Virtual Reality

Biomimicry Technology and Design

Biomimicry is learning an idea from the natural world and applying it to solve a problem and achieve better performance in more natural, cost effective ways.

- The conscious mimicry of nature`s genius
- Without heat, deconstruction, chemicals and force
- Payoff: Up to 96% less waste, power and toxicity



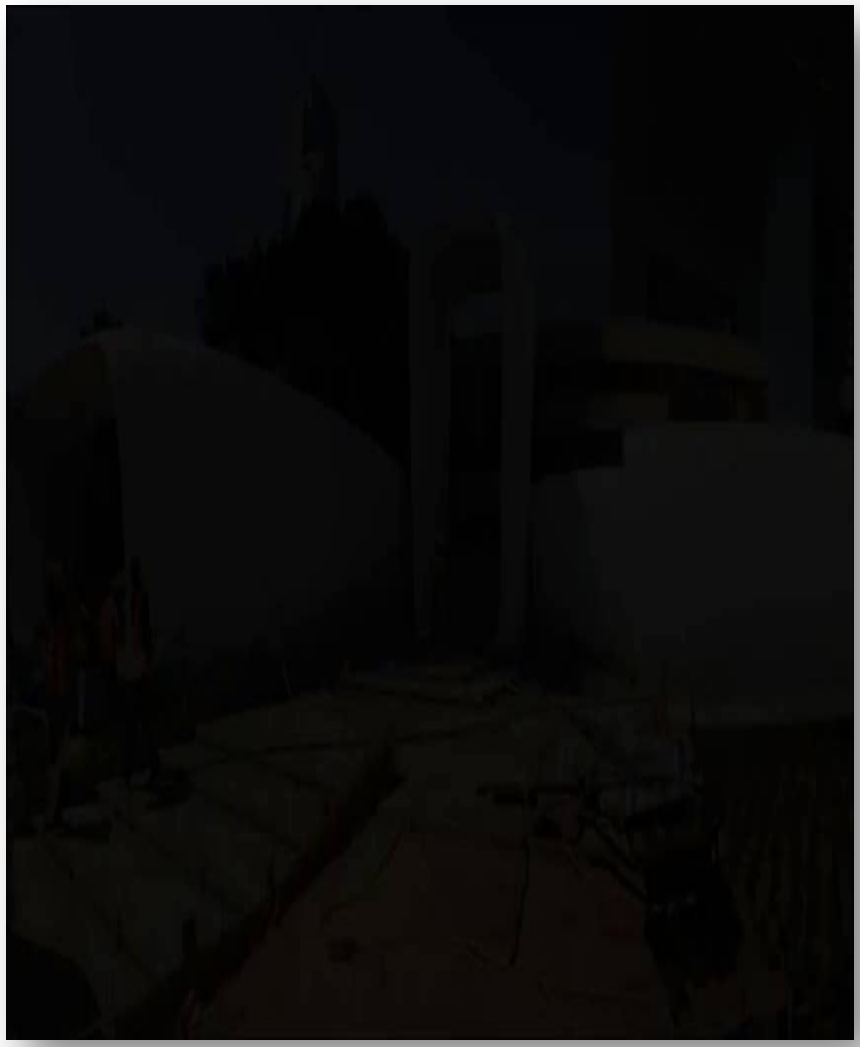
Micro-Robotic study of Behavior

3D Printing

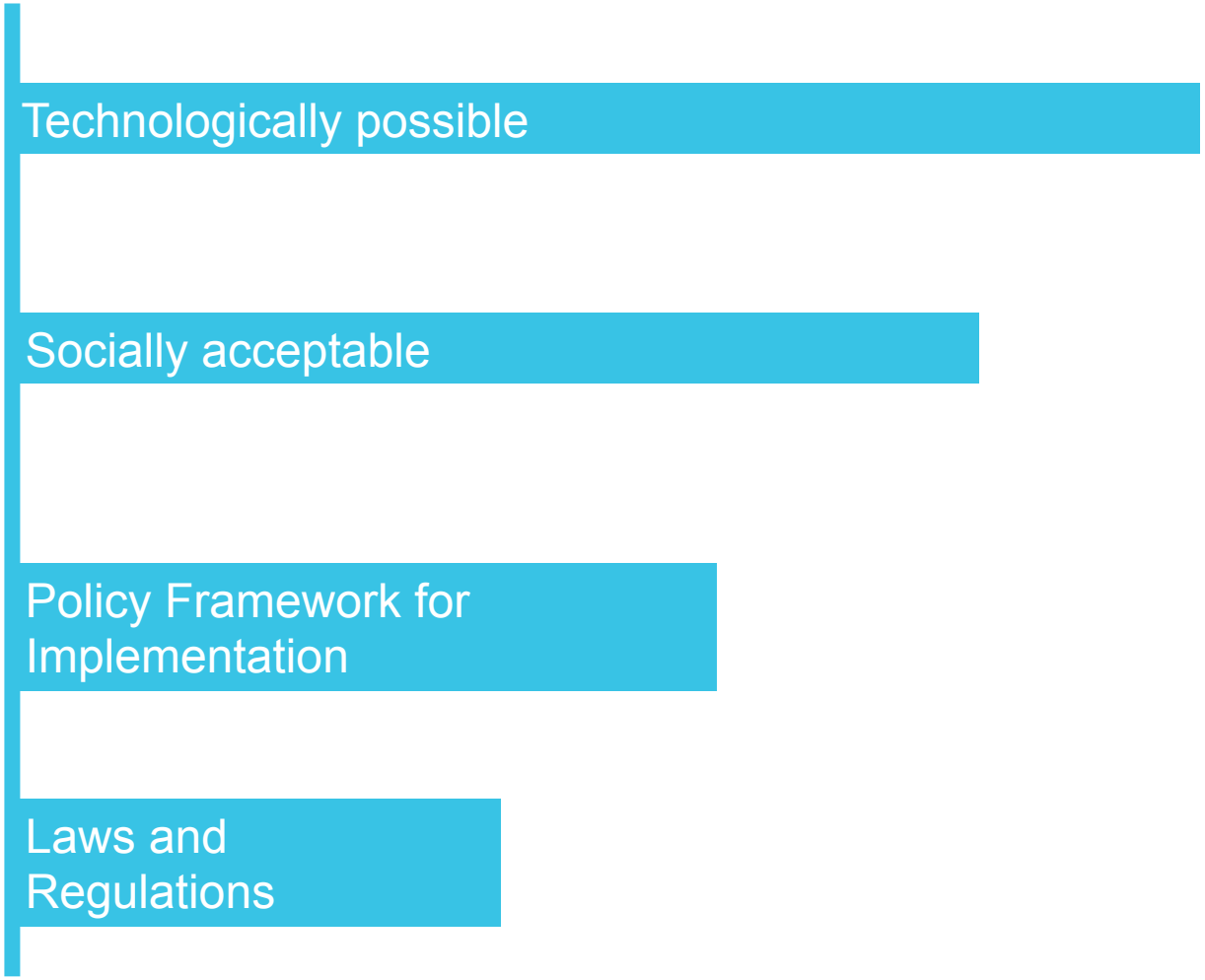
3D printing refers to processes used to synthesize a three-dimensional object in which successive layers of material are formed under computer control to create an object.

Objects can be of almost any shape or geometry and are produced from a digital file, 3D model or another electronic data source. Also known as an Additive Manufacturing (AM).

(Dubai)



Framework for Managed Change



Is the future closer than you think?

Thank you

AVISON YOUNG

Dave Bragg

Managing Director
Green Street Advisors

Green Street Advisors

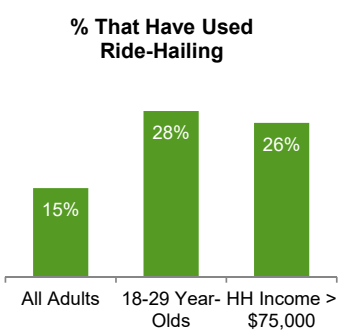
Green Street Advisors

Definitive Leaders in Real Estate Research for over 30 years

Beyond the IRR Model – Transportation Revolution

The Coming Revolution in Transportation

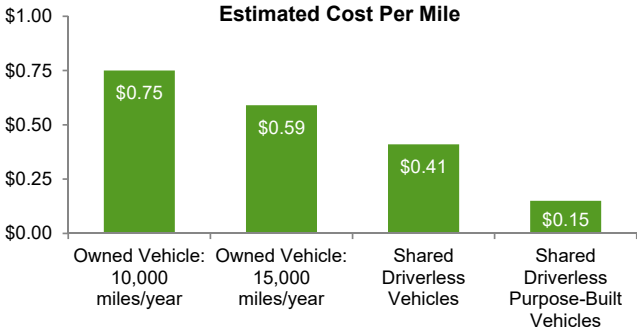
The Early Innings of Ride-Hailing



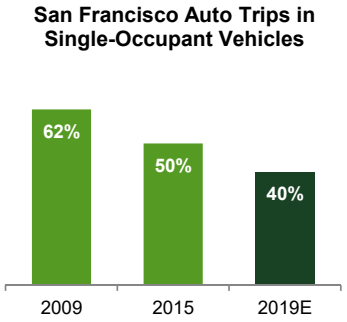
UBER

lyft

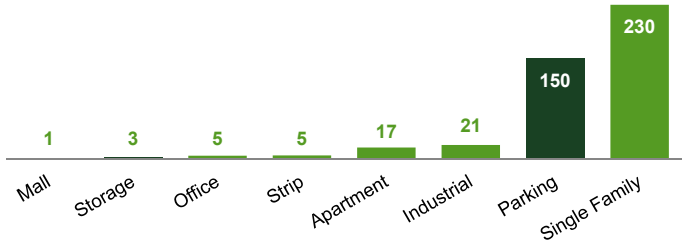
Driverless Ride-Hailing Will Be Affordable



San Francisco is a Leader

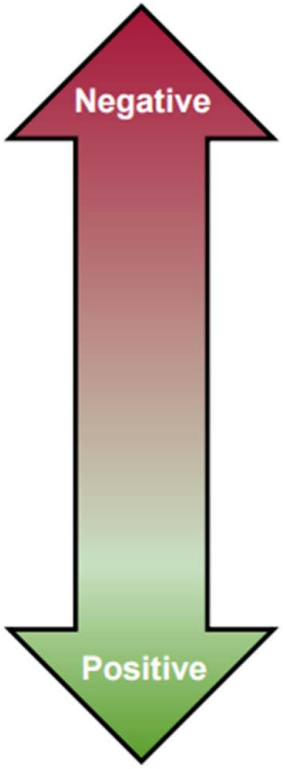


A 50% Reduction of Parking Needs is Possible



Green Street Advisors

Sector-Level Implications



Self-Storage:	A shift from two to one-vehicle households will open up garage space for single-family homeowners. Parking at apartment buildings can most easily be converted into storage.
Billboards:	Those riding in driverless vehicles will likely prioritize reading and entertainment over peering out the window.
Low-Quality Retail:	A solution for the 'last mile' puzzle would be a tailwind for eCommerce. Vehicles could run errands without the owner. Drugstores and commodity grocers should suffer.
Transit-Oriented:	Commuters' ability to take driverless vehicles to the train station or straight to work may reduce the premium currently garnered at transit-oriented real estate.
Industrial:	Driverless trucks will result in supply chain efficiencies and improved inventory throughput. Goods should spend less time sitting idly in warehouses, likely resulting in a drag on industrial real estate demand. Positively, eCommerce demand should explode.
CBD Office:	Workers' faster, cheaper, and less stressful commutes may incentivize companies to incrementally prioritize offices in city centers, where business is easier to conduct.
High-Quality Malls:	The densification of high-quality malls, which generally sit in the midst of infill areas, includes additional retail and/or other uses (e.g., add office, residential, hotel) and is a highly value-creating endeavor. Reduced parking needs will spur these opportunities.

Source: Green Street Advisors

Retail Case Study

Oakbrook Center Case Study

An opportunity to unlock 1.5 million sq. ft. of space!

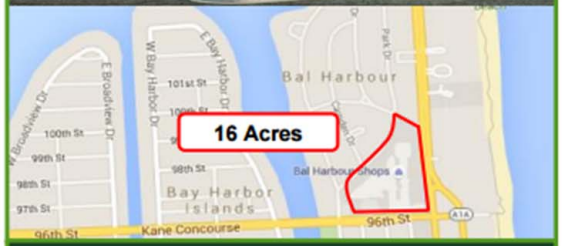
Property Characteristics	
Owner:	General Growth
Location:	Oak Brook, IL
MSA:	Chicago
Green Street Mall Grade:	A++
Cap Rate:	3.5%
Est. Sales/SF:	$850
Household Income (10 mile):	$88,000
Population Density (10 mile):	1.2 million

Future Densification Opportunity	
Land:	130 acres
Mall GLA:	2.4 million sq. ft.
Parking Ratio:	5.5 per 1K sq. ft. of GLA
FAR (Floor-Area-Ratio):	0.4
(Low FAR = Greater densification opportunity) Assume parking can be cut in half:	
New Parking Ratio:	2.75 per 1K sq. ft. of GLA
New FAR:	0.75
Potential to unlock 'ground level' GLA:	**1.5 million square feet!!**

Source: Green Street Advisors

Retail Case Study

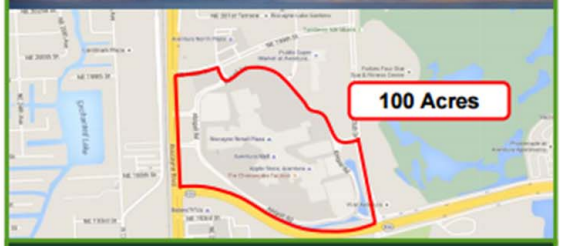
Bal Harbour Shops - A++ Mall



- Small land parcel
- Minimal surface lot parking
- Limited opportunity to expand

Aventura Mall's superior opportunity set 'outside the four retail walls' suggests that it would likely garner a lower cap rate than Bal Harbour Shops if the two malls were up for sale. Land parcel size and densification opportunities are important attributes for high-quality malls, and should be considered when ascribing cap rates to malls that might otherwise have similar performance metrics.

Aventura Mall - A++ Mall



- A large land parcel, particularly for Miami
- Parking structures and lots are adjacent to retail
- Significant densification opportunities

Source: Green Street Advisors

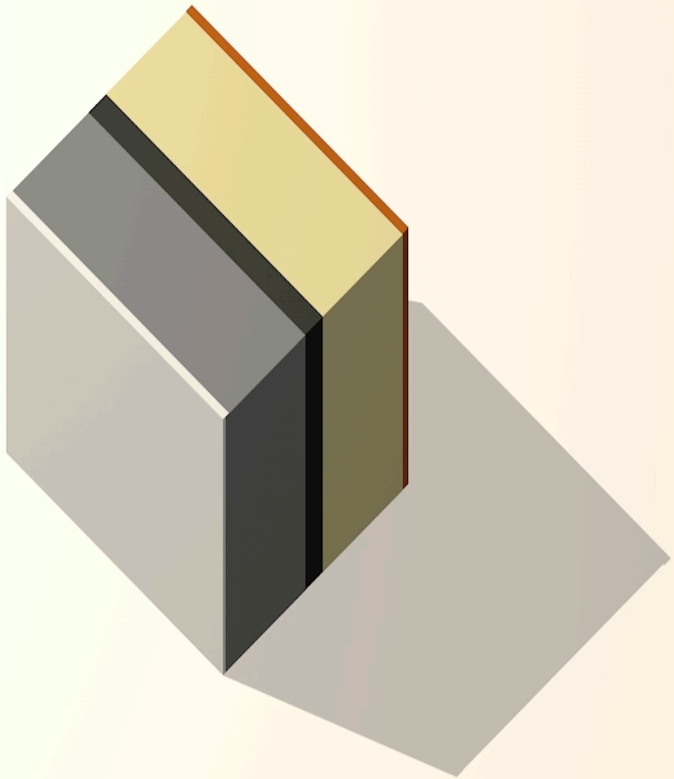
Platt Boyd

Founder and CEO
Branch Technology

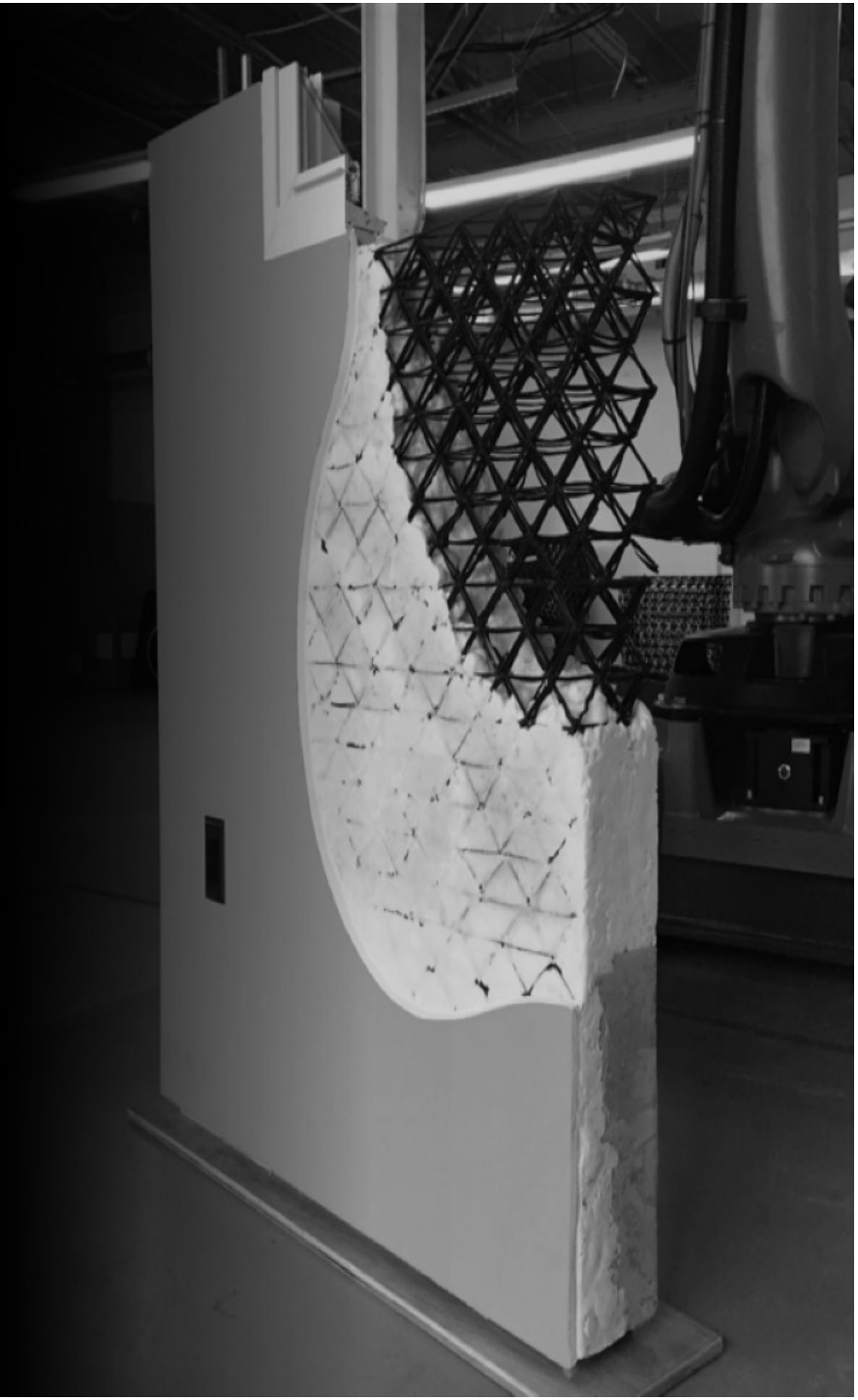
Branch
TECHNOLOGY


Branch™
TECHNOLOGY

WALL CONSTRUCTION

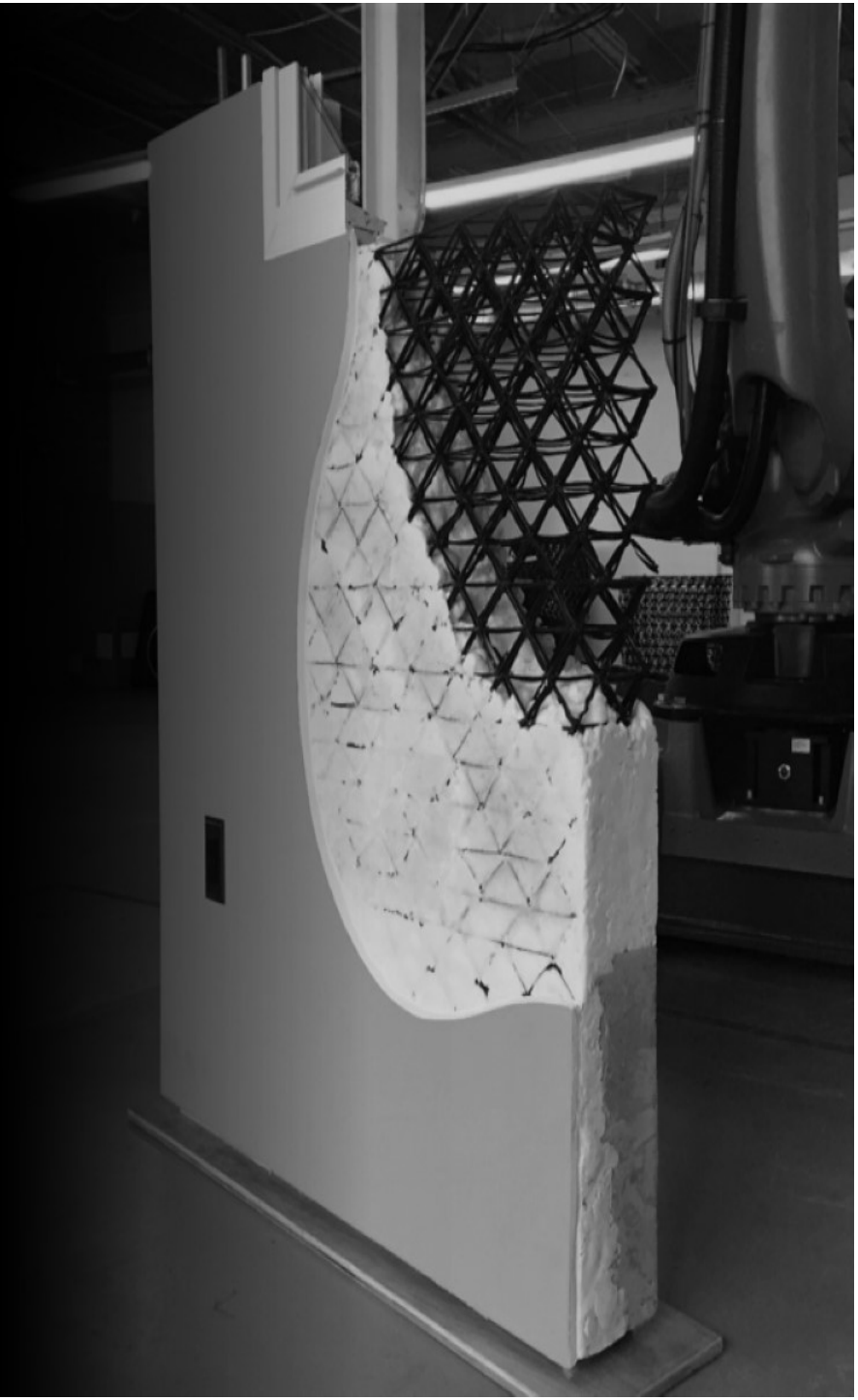


How It Works



How It Works

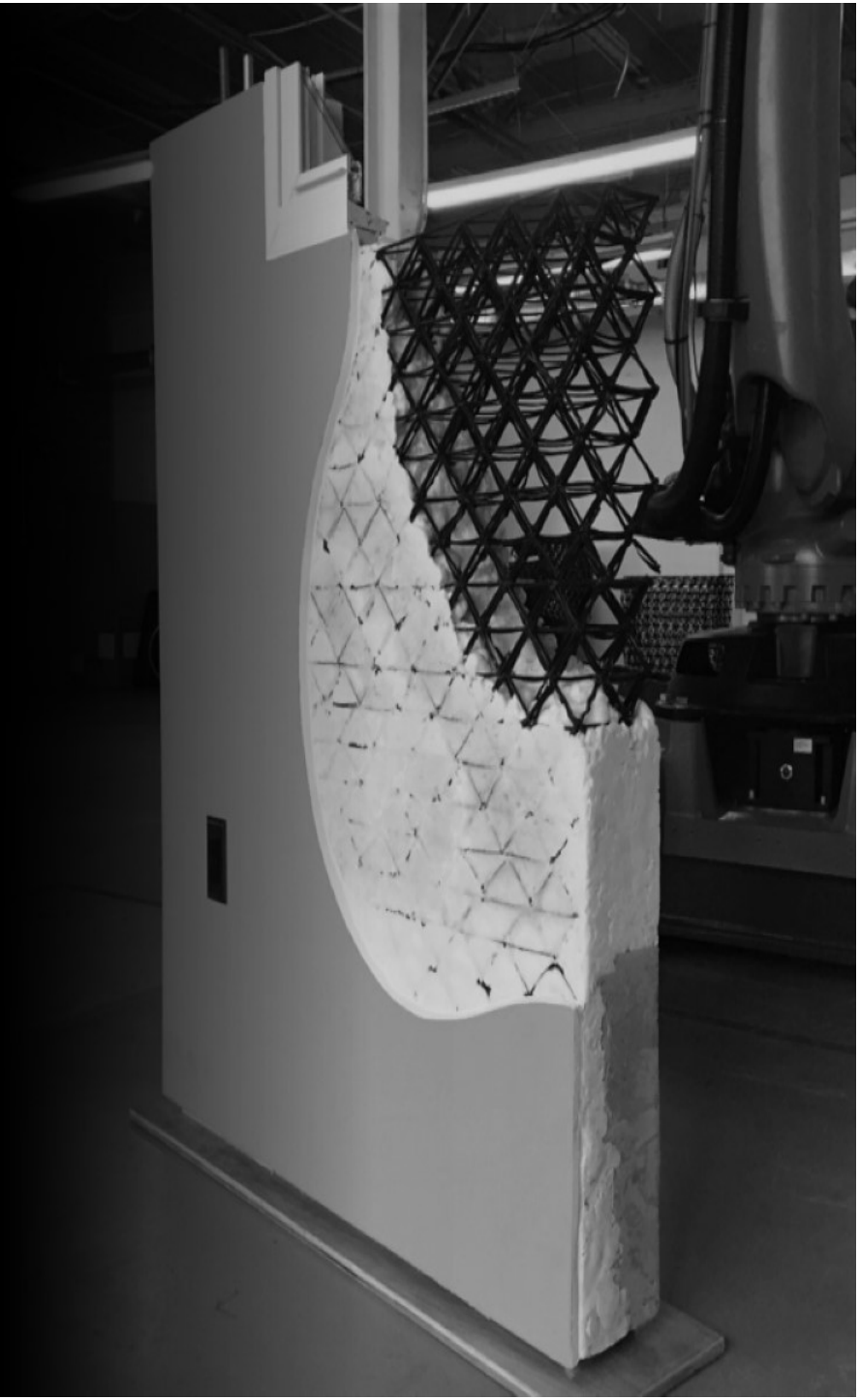
Prefabricated Frame



How It Works

Prefabricated Frame

Utility-Compatible

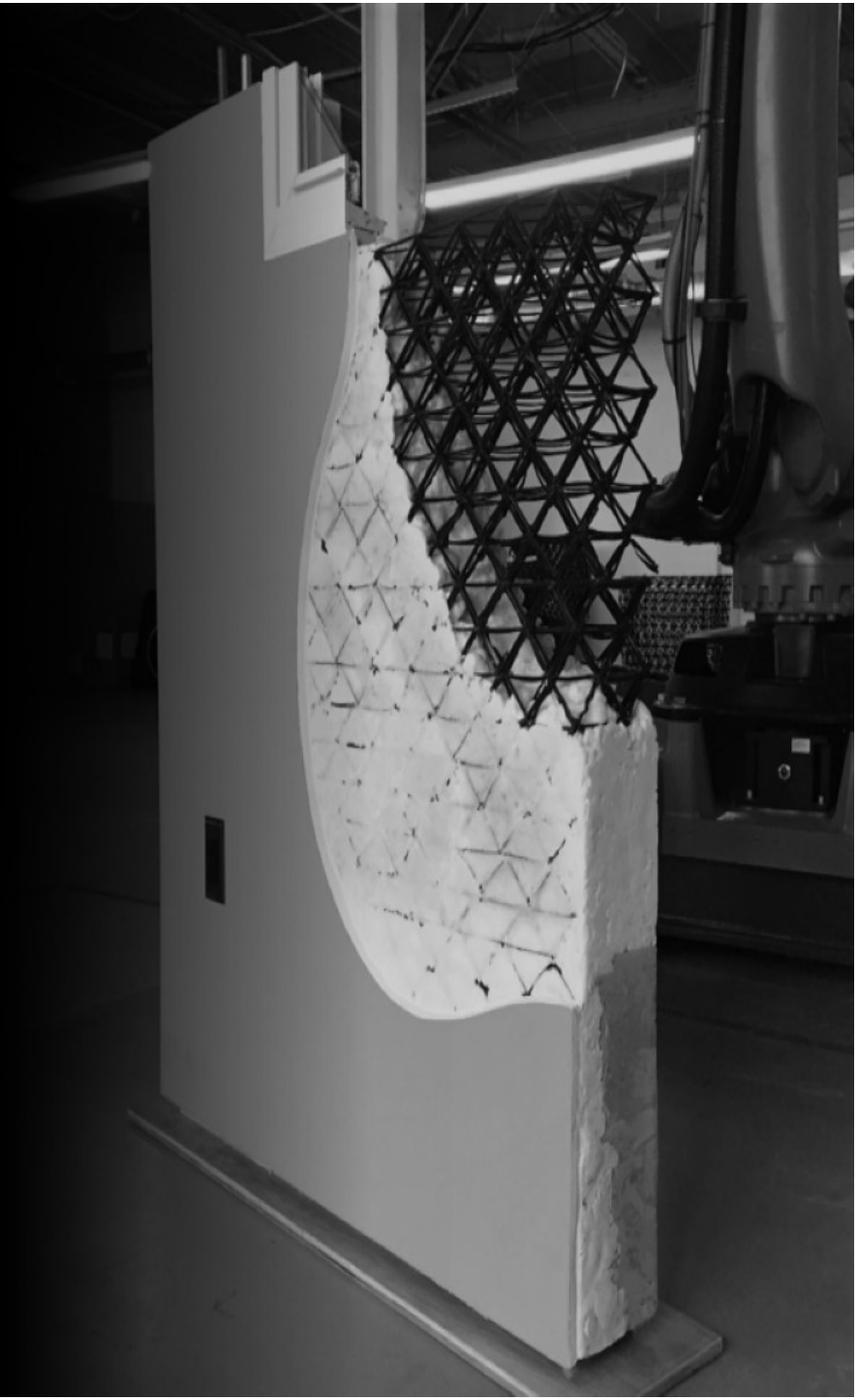


How It Works

Prefabricated Frame

Utility-Compatible

Familiar Materials



How It Works

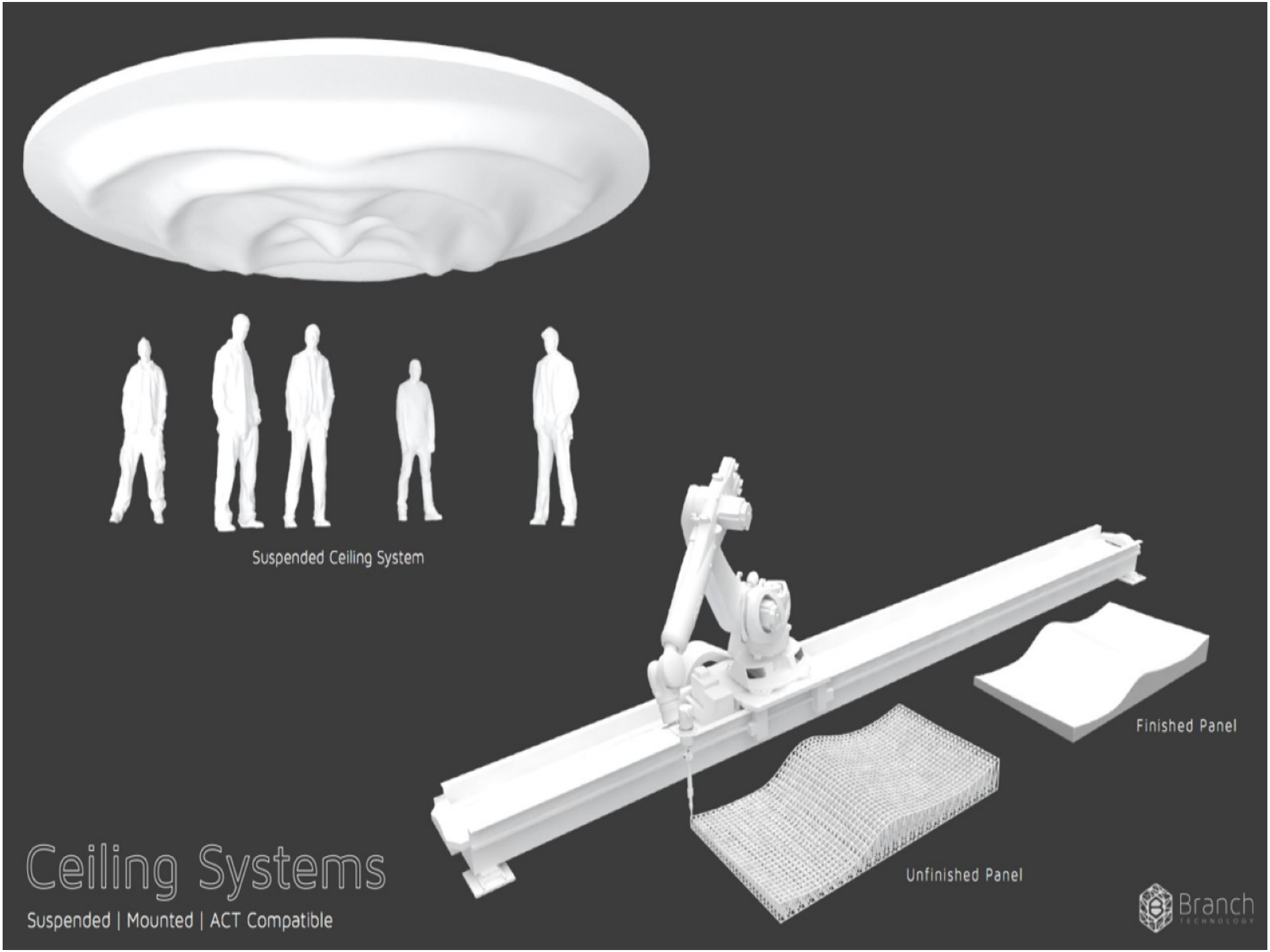
Prefabricated Frame

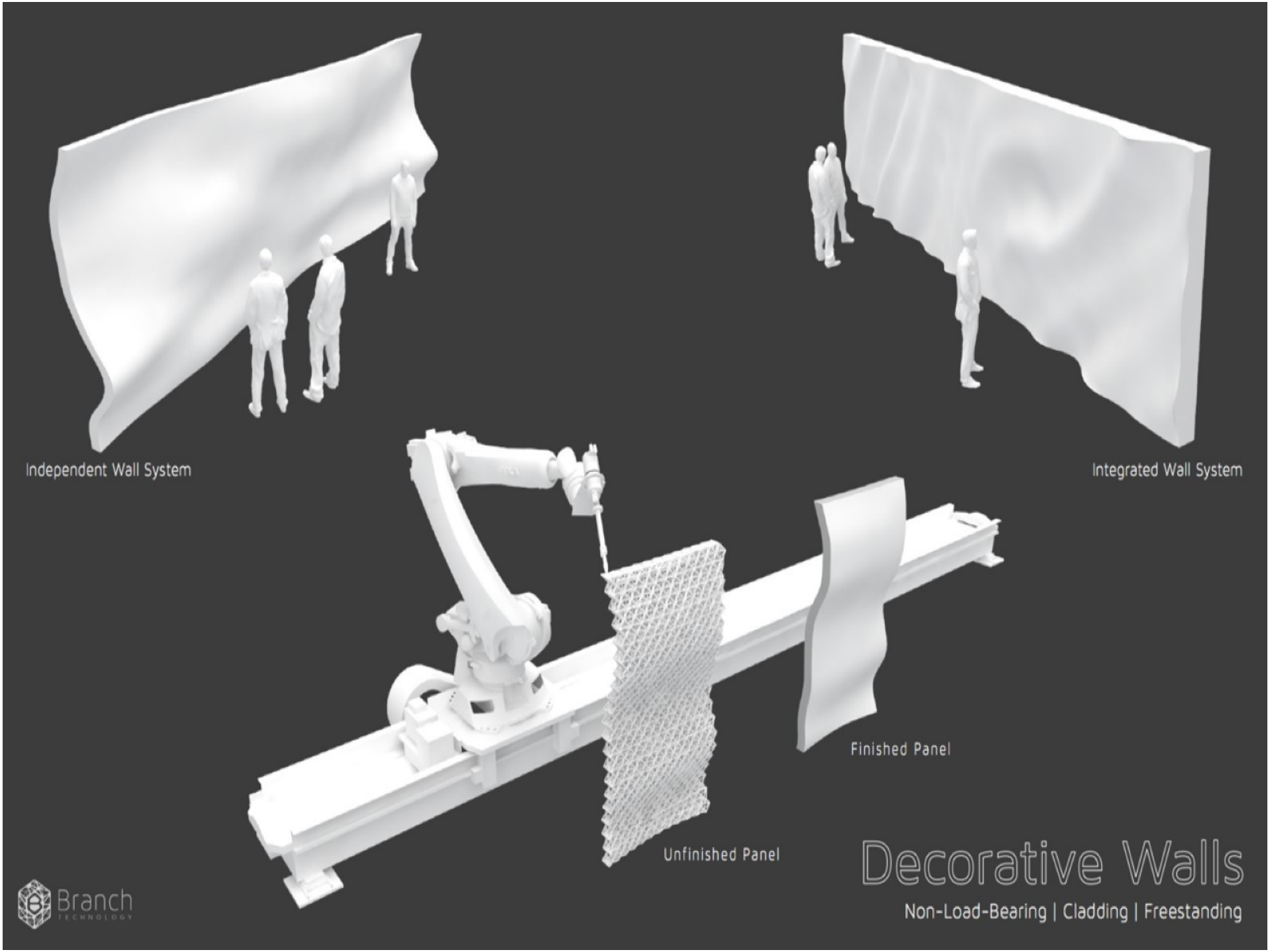
Utility-Compatible

Familiar Materials

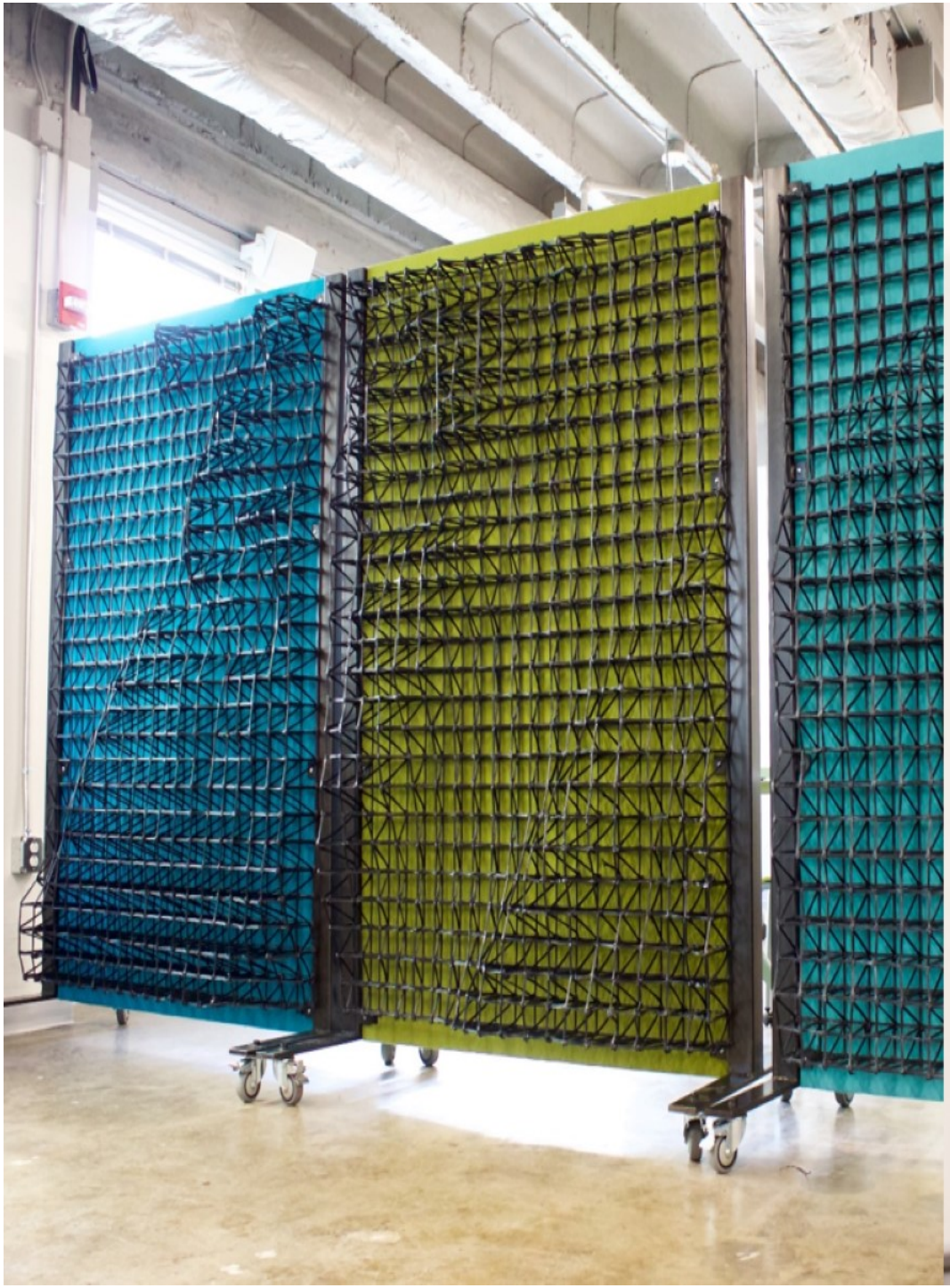
Custom Composite

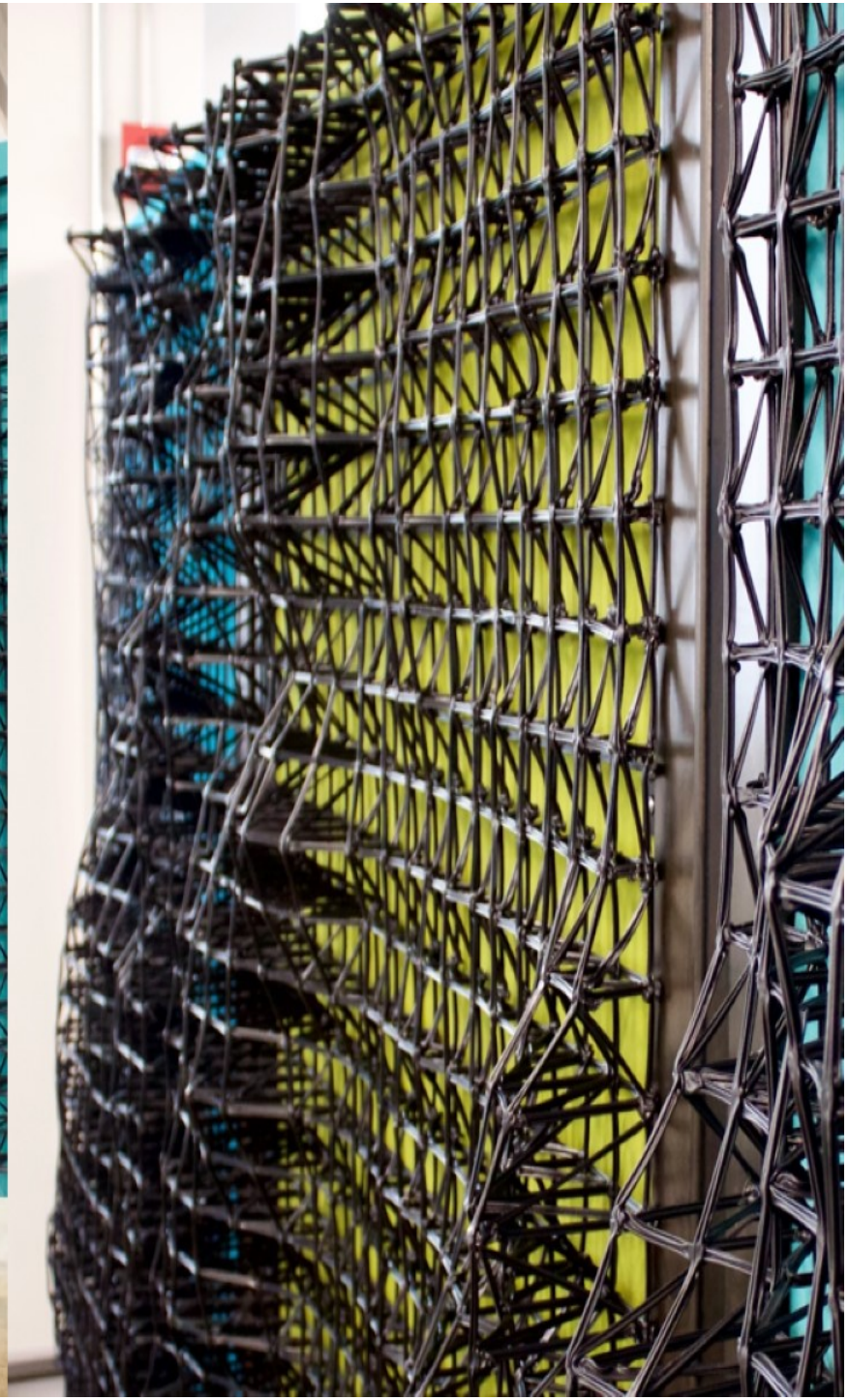
3x Stronger than Wood Framing

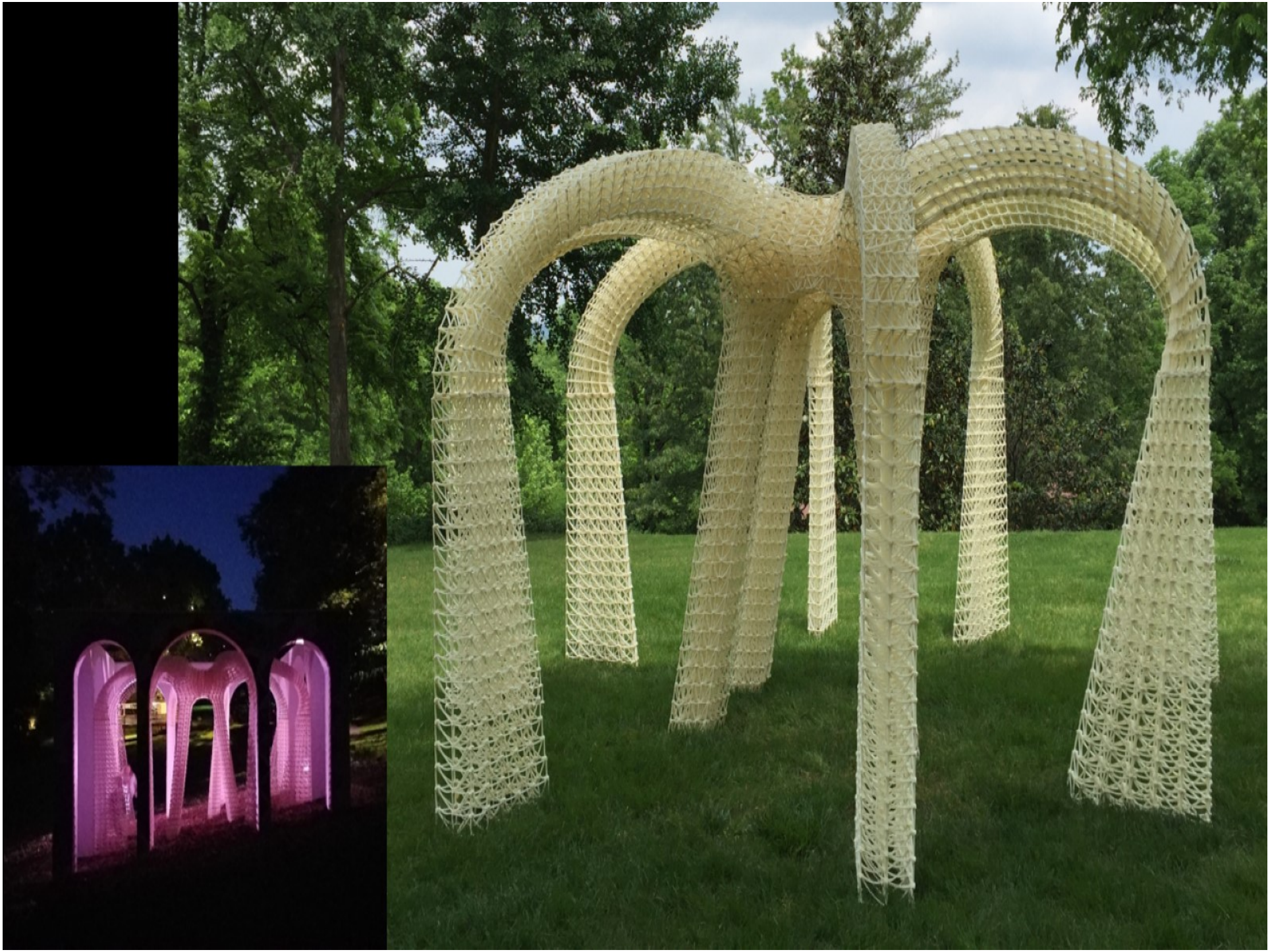

Suspended Ceiling System
Finished Panel
Unfinished Panel
Ceiling Systems
Suspended | Mounted | ACT Compatible
Branch
TECHNOLOGY

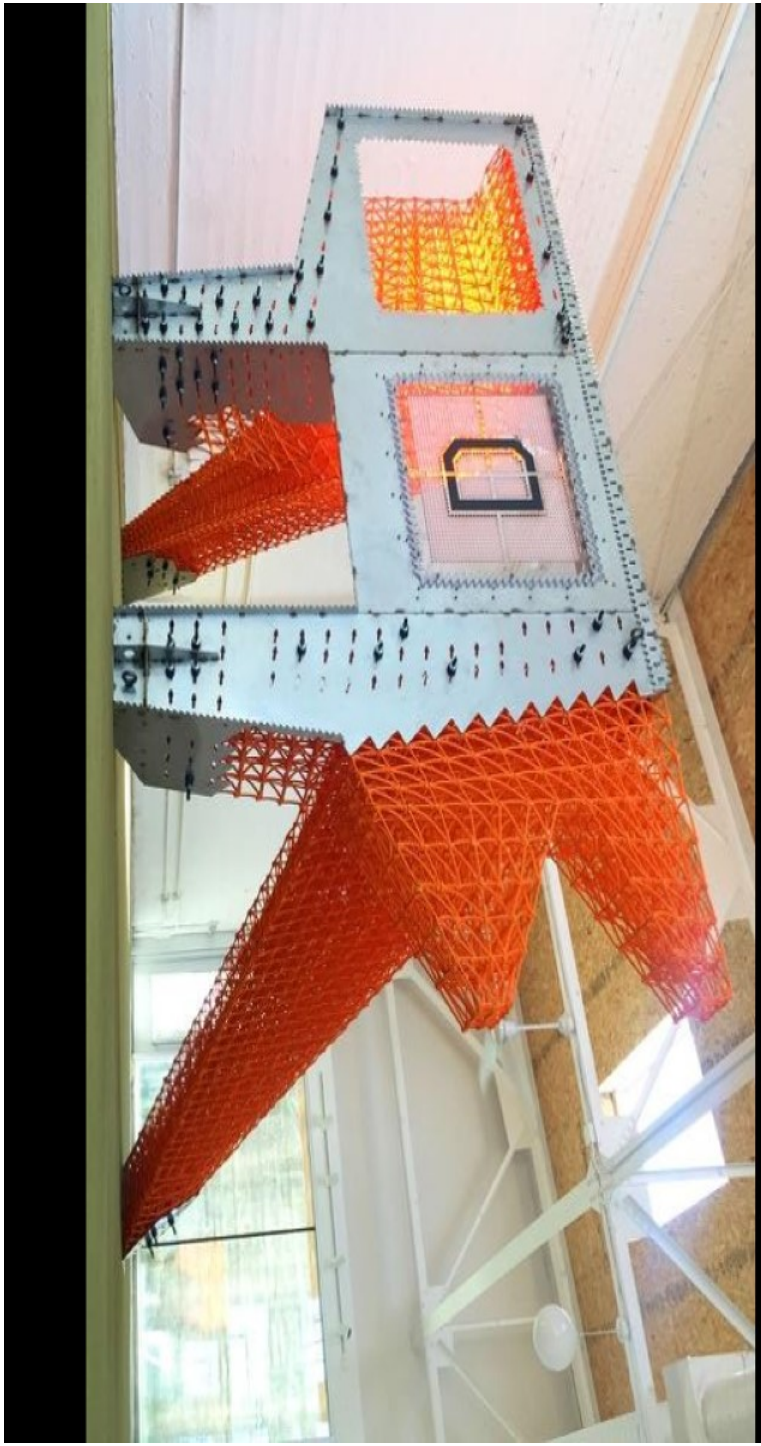

Independent Wall System
Integrated Wall System
Finished Panel
Unfinished Panel
Decorative Walls
Non-Load-Bearing | Cladding | Freestanding
Branch
TECHNOLOGY

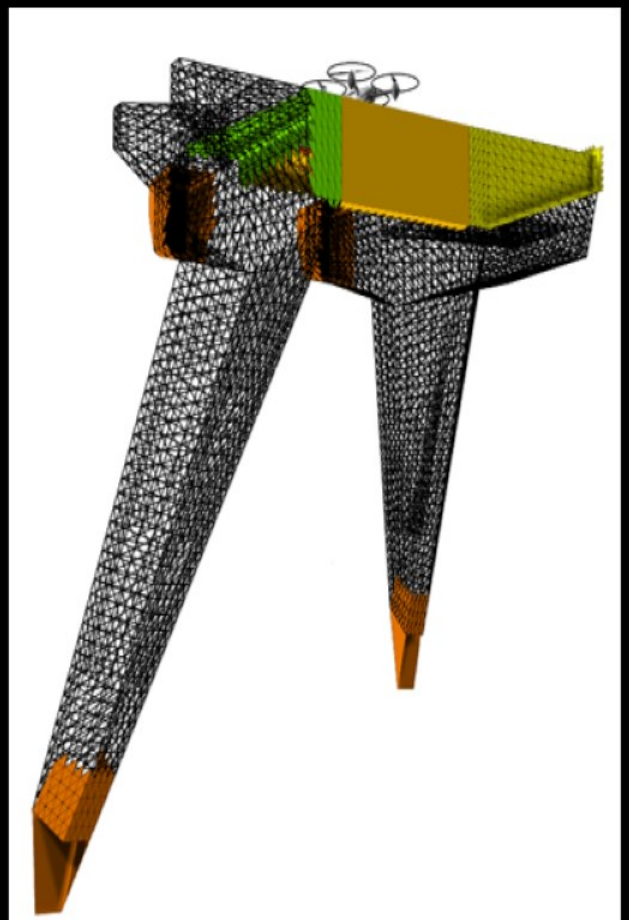

ARCHITECTURE











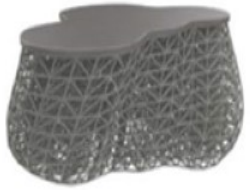
Furniture

FORMA thinking stool
dimensions: 24"x20"x18"

FORMA occasional table
dimensions: 52"x34"x16.5"

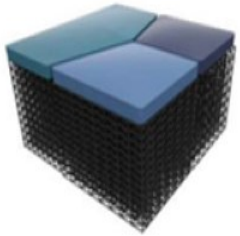
FORMA gathering table
dimensions: 56"x48"x29"

ANTHOZOA gathering table
dimensions: 42"D
**bio-polymer

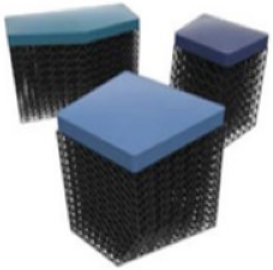


ANTHOZOA occasional table
dimensions: 36"x24"x16.5"
**bio-polymer

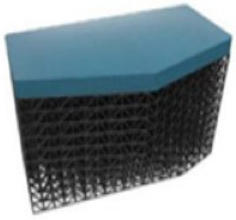
ANTHOZOA side table
dimensions: 18"x18"x18"
**bio-polymer



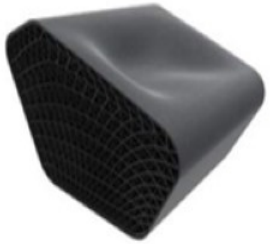
VOXCELL seating arrangement
dimensions: 36"x36"x18"



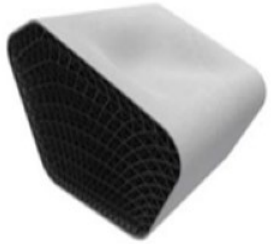
VOXCELL collaboration stool
dimensions: 22"x18"x18"



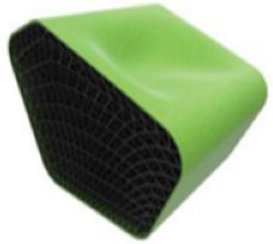
VOXCELL collaboration bench
dimensions: 36"x20"x18"



G1 lounge chair in charcoal
dimensions: 42"x34"x28"



G1 lounge chair in natural grey
dimensions: 42"x34"x28"



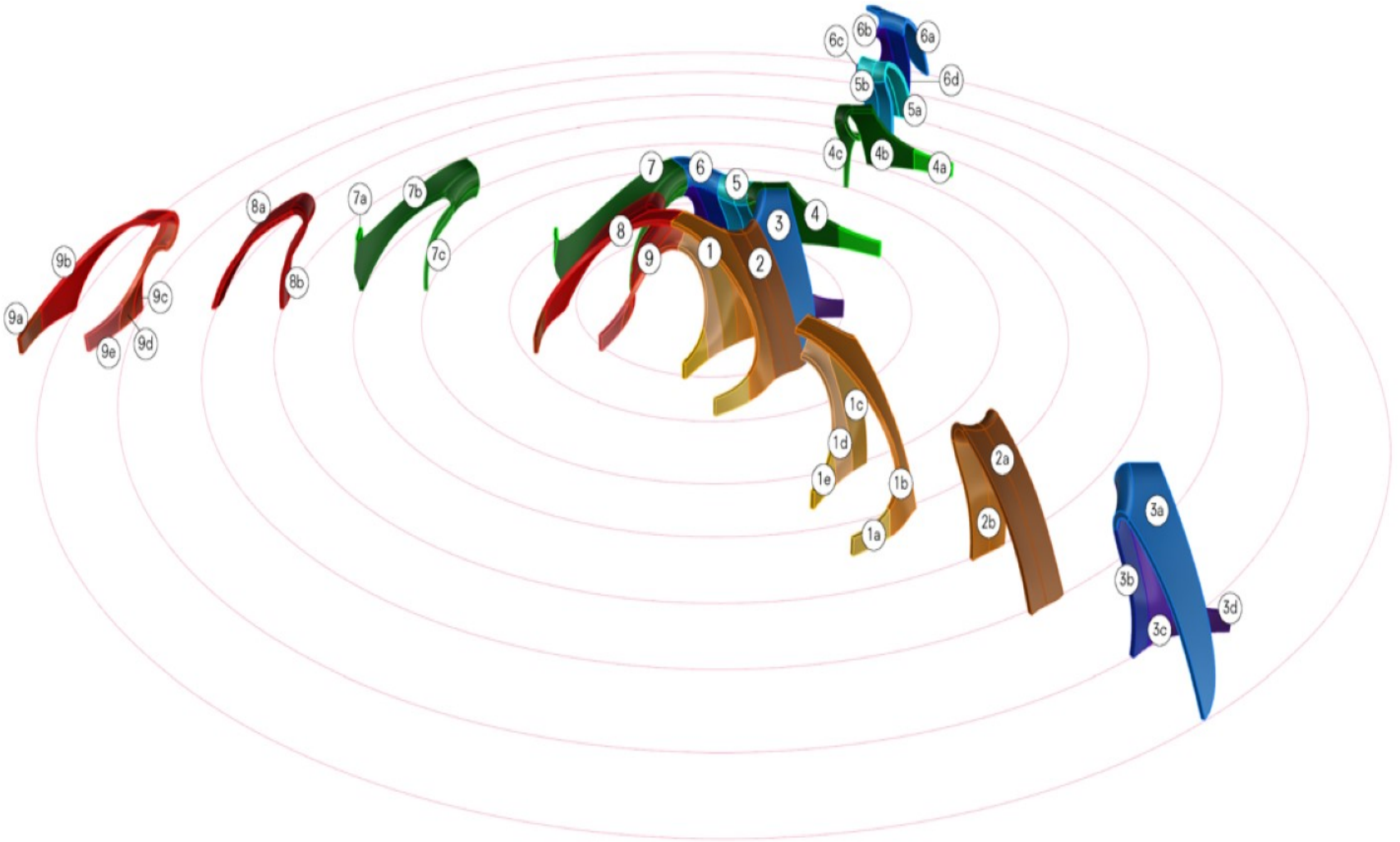
G1 lounge chair in lime
dimensions: 42"x34"x28"

Biopolymer

Design Miami Pavillion

shop

Design Miami Part Diagram




Every Building is Unique

Problem

Inefficient

$30B

Wasted Materials

$73B

Wasted Labor

Ineffective

$22B

Paper Coordination Errors

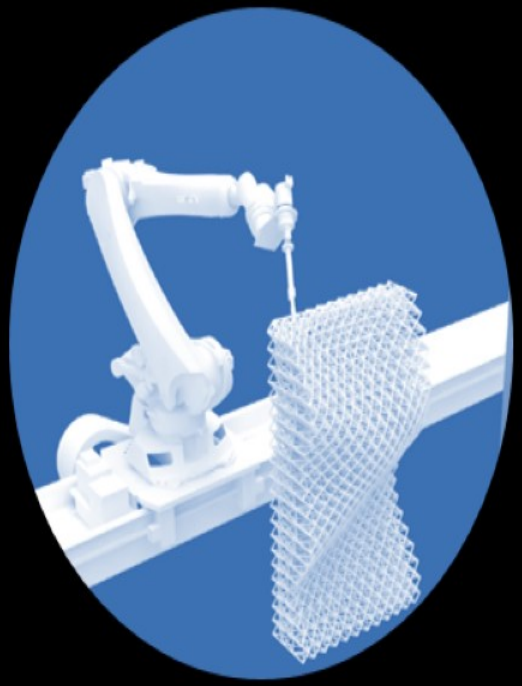
Costly

5-10X

Customization Cost

Solution Cellular Fabrication

Innovative



1.7X

More Productive

$256B

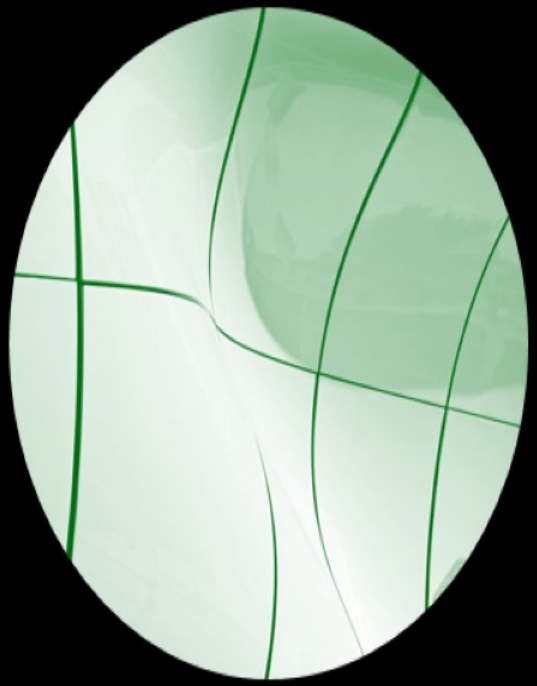
Added Capacity

Efficient

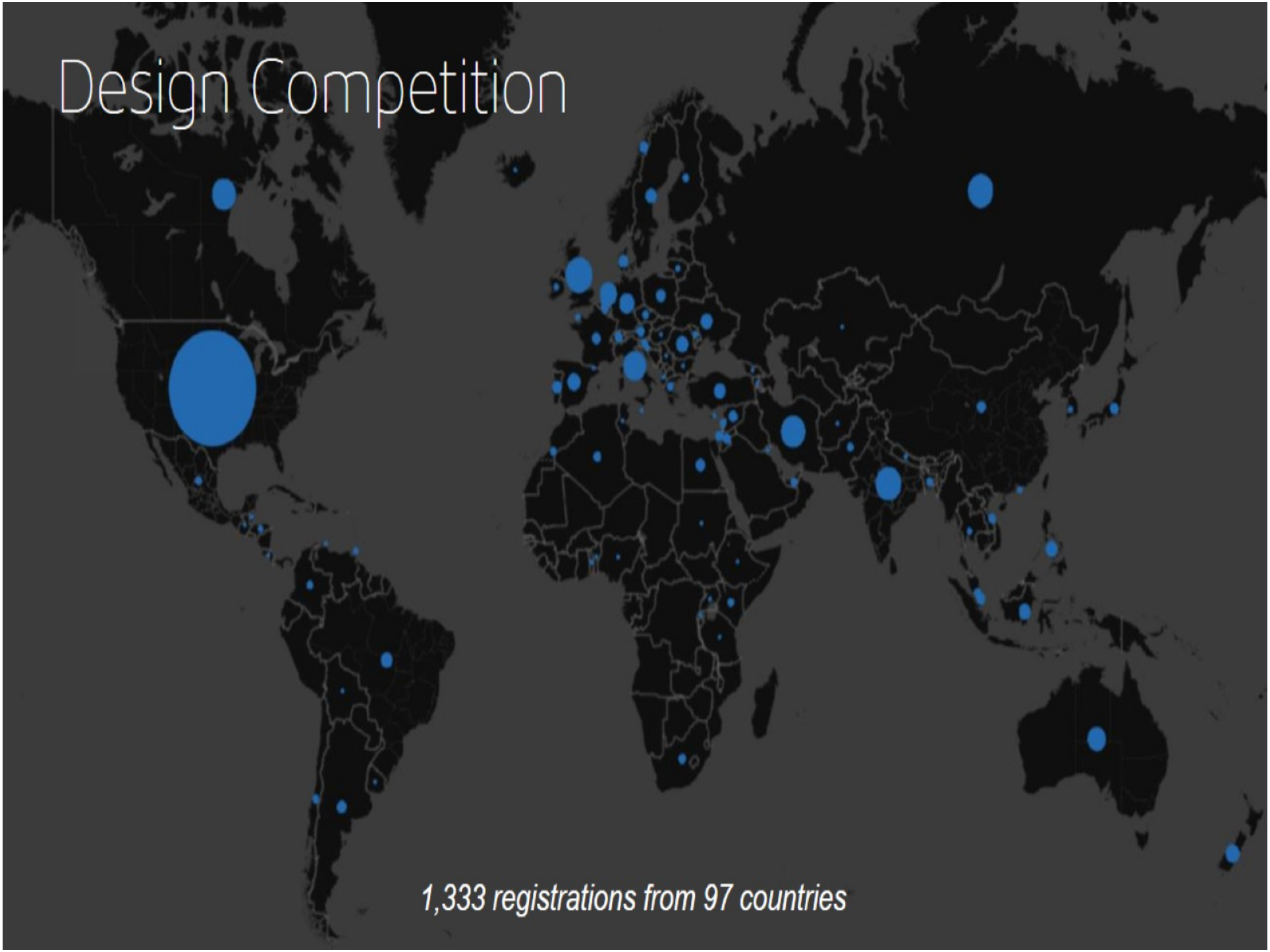
$29B

Material Savings

Economical



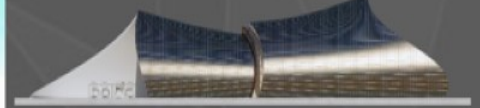
Democratized Design Freedom


Design Competition
1,333 registrations from 97 countries

Peoples Choice Award

URBAN LEAF

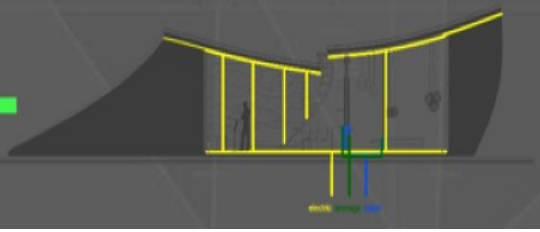
Nature always gave humanity the shelter needed.
As we become more and more evolved, we tend to forget all our discoveries about nature and how it behaves. Humanity always bends nature to it's will, when in fact, we should be in a perfect symbiosis with it.
Urban LEAF proposes similarities between nature way of building and human way of living. It's cylindrical shape follows the most stable shape that nature can build without interrupting the inhabitant way of perception to the space.
Urban LEAF offers fluidity and tries to disconnect the human inhabitant from the traditional building impediments striving to become self sufficient. We made it so that the energy won't be an issue, covering the LEAF with flexible foto-voltaic cells and providing it with batteries so that energy can be stored and eventually given back to the grid. We limited the usage of materials closing it with two large windows, stripping it from other possible cavities in the structural mesh. The median window is designed to ensure natural lighting in the median section of the LEAF and also connecting the two parts of the structure. The LEAF is separated in two major areas. Day area where we can find a generous living and open space kitchen and a work space. Night area with a spacious bedroom and a dressing room. The LEAF is also provided with ventilation system that keeps the air clean, floor warming system and ventilo-convectors. The interior walls and kitchen are made and placed so that it can take advantage of the construction method that Branch Technlogy proposes. Urban LEAF is set out to give an example trough it's shape, functionality and technology, opening new ways of developing the way we build and ultimately the way we live. Thanks to Branch Technologies, the way of bulding just got easier.



south - east facade

north-east facade

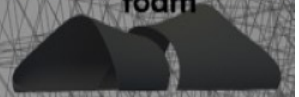
north - west facade



south-west facade

exterior finish

foam



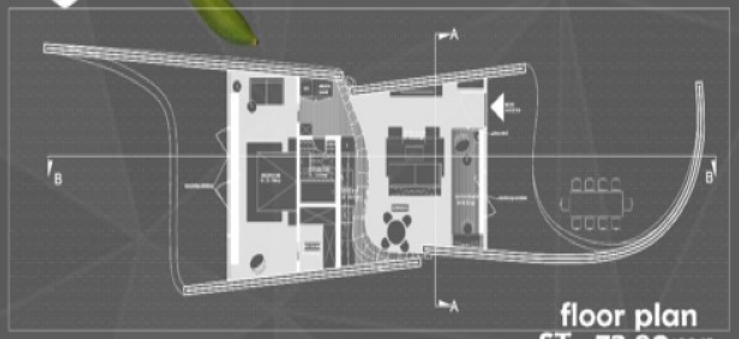
3d printed structure

concrete

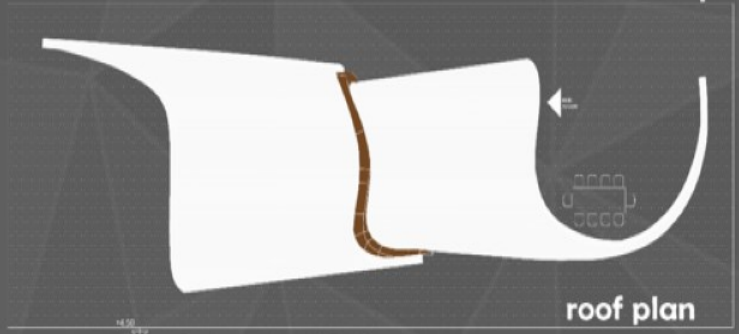
interior finish

Peoples Choice Award

URBAN LEAF



floor plan
ST= 73.80mp



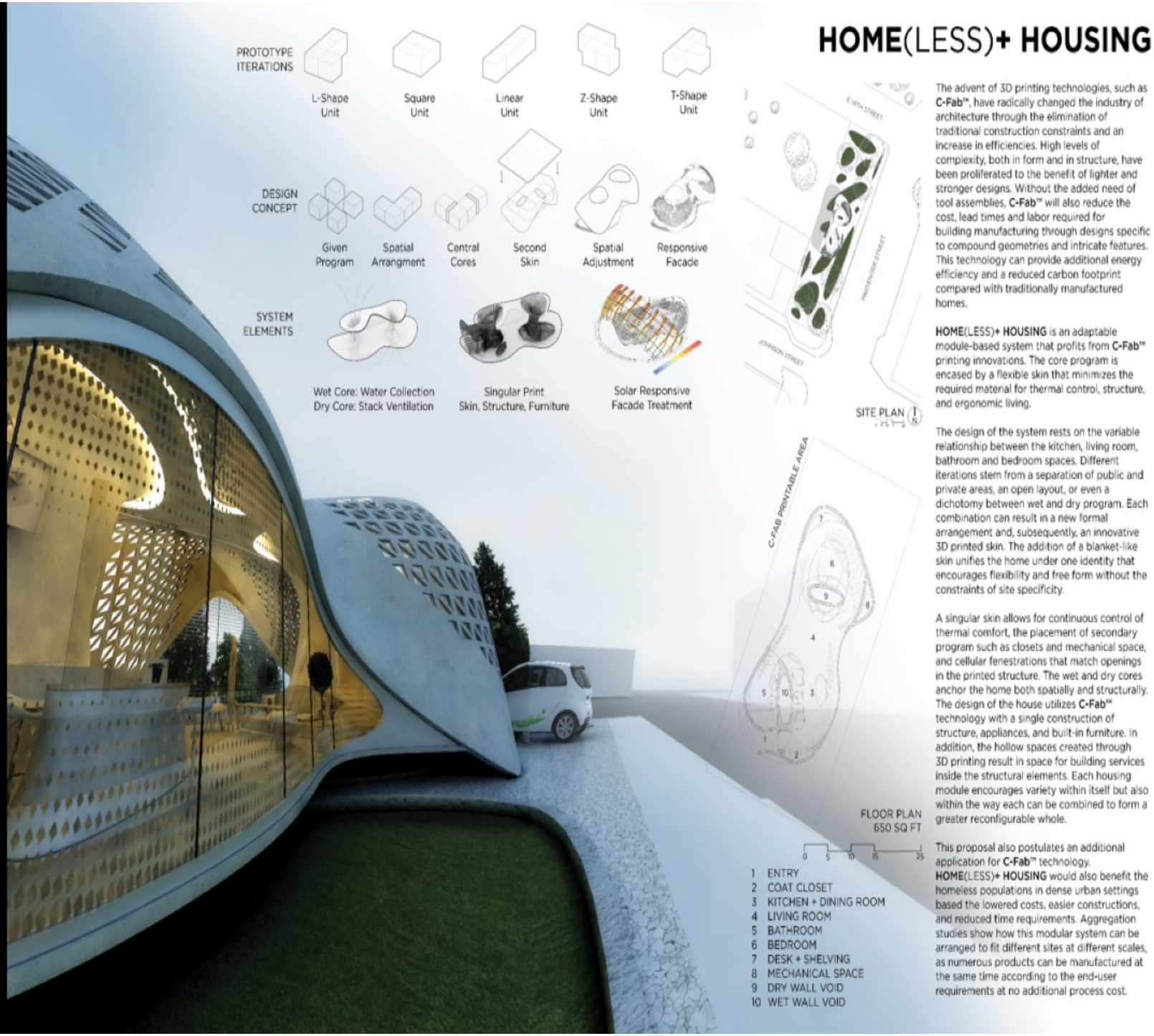
roof plan

AA section

BB section

Visionary Award

HOME(LESS)+ HOUSING



The advent of 3D printing technologies, such as **C-Fab™**, have radically changed the industry of architecture through the elimination of traditional construction constraints and an increase in efficiencies. High levels of complexity, both in form and in structure, have been proliferated to the benefit of lighter and stronger designs. Without the added need of tool assemblies, **C-Fab™** will also reduce the cost, lead times and labor required for building manufacturing through designs specific to compound geometries and intricate features. This technology can provide additional energy efficiency and a reduced carbon footprint compared with traditionally manufactured homes.

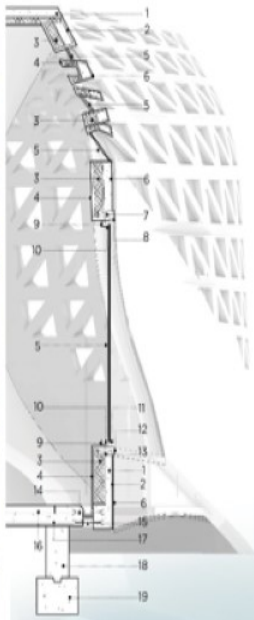
HOME(LESS)**+ HOUSING** is an adaptable module-based system that profits from **C-Fab™** printing innovations. The core program is encased by a flexible skin that minimizes the required material for thermal control, structure, and ergonomic living.

The design of the system rests on the variable relationship between the kitchen, living room, bathroom and bedroom spaces. Different iterations stem from a separation of public and private areas, an open layout, or even a dichotomy between wet and dry program. Each combination can result in a new formal arrangement and, subsequently, an innovative 3D printed skin. The addition of a blanket-like skin unifies the home under one identity that encourages flexibility and free form without the constraints of site specificity.

A singular skin allows for continuous control of thermal comfort, the placement of secondary program such as closets and mechanical space, and cellular fenestrations that match openings in the printed structure. The wet and dry cores anchor the home both spatially and structurally. The design of the house utilizes **C-Fab™** technology with a single construction of structure, appliances, and built-in furniture. In addition, the hollow spaces created through 3D printing result in space for building services inside the structural elements. Each housing module encourages variety within itself but also within the way each can be combined to form a greater reconfigurable whole.

This proposal also postulates an additional application for **C-Fab™** technology. **HOME**(LESS)**+ HOUSING** would also benefit the homeless populations in dense urban settings based the lowered costs, easier constructions, and reduced time requirements. Aggregation studies show how this modular system can be arranged to fit different sites at different scales, as numerous products can be manufactured at the same time according to the end-user requirements at no additional process cost.

Visionary Award



1 SPRAYED CONCRETE
2 MOISTURE BARRIER
3 3D PRINTED MATRIX w/ ICC COMPLIANT CLOSED CELL INSULATION
4 5/8" STUCCO INTERIOR FINISH
5 1" "LOW E" INSULATED GLASS w/ STRUCTURAL SILICONE
6 5/8" EFIS FINISH
7 2" X 4" HEADER
8 DRIP EDGE
9 2" EXTRUDED ALUM. MULLION SYSTEM
10 SILICONE SEAL
11 BACKER ROD
12 WINDOW SILL
13 2" X 4" SILL PLATE
14 1/2" DIA. BOLTS @ 32" O.C.
15 "C" CHANNEL w/ 2" RIGID FOAM INSULATION
16 POLISHED CONCRETE FLOOR
17 4" P.C. SLAB w/ WELDED WIRE FABRIC
18 10" P.C. WALL w/#5 BARS VERTICAL & HORIZONTAL
19 18" X 12" POURED CONCRETE FOOTING w/ #5 BARS

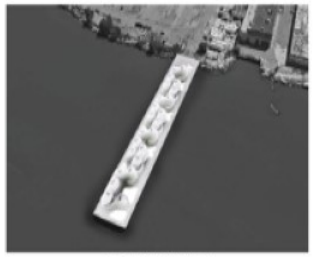
WALL SECTION + CONSTRUCTION DETAILS

HOME(LESS)+ HOUSING

AGREGGATION STUDIES

LOW DENSITY

This aggregation generates a more traditional neighborhood with reduced cost and time requirements. Accompanied with a fluid free form design, it eliminates the idea of single streets, but allows for transparency in the community.



MEDIUM DENSITY

Utlizing empty edge conditions, this grouping allows for greater growth at a human scale. The units stack structurally around the core shafts allowing for the orientation of the unit itself to respond to the different parameters of the site, while creating public spaces for community interactions.

HIGH DENSITY

Vertical stacking allows for an aggregation of the most units on the smallest site and limit the extraneous impact on the surrounding neighborhoods. Moreover, this growth begins to suggest the use of 3D printed housing for a more luxurious high-end residential tower.

Grand Prize

Curve Appeal

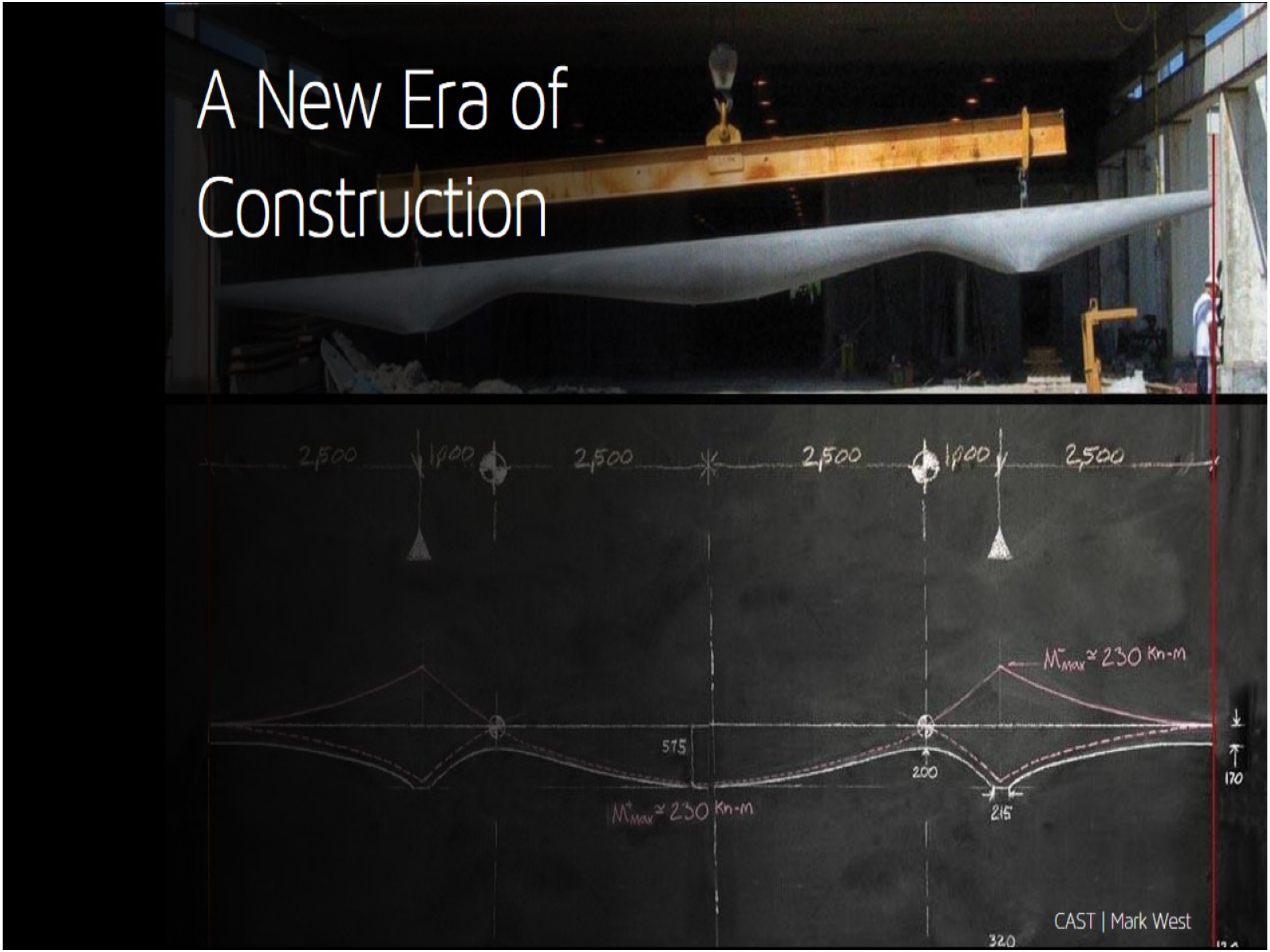
Exterior Rendering

Curve Appeal

Exterior Rendering

Natural Structures

A New Era of Construction



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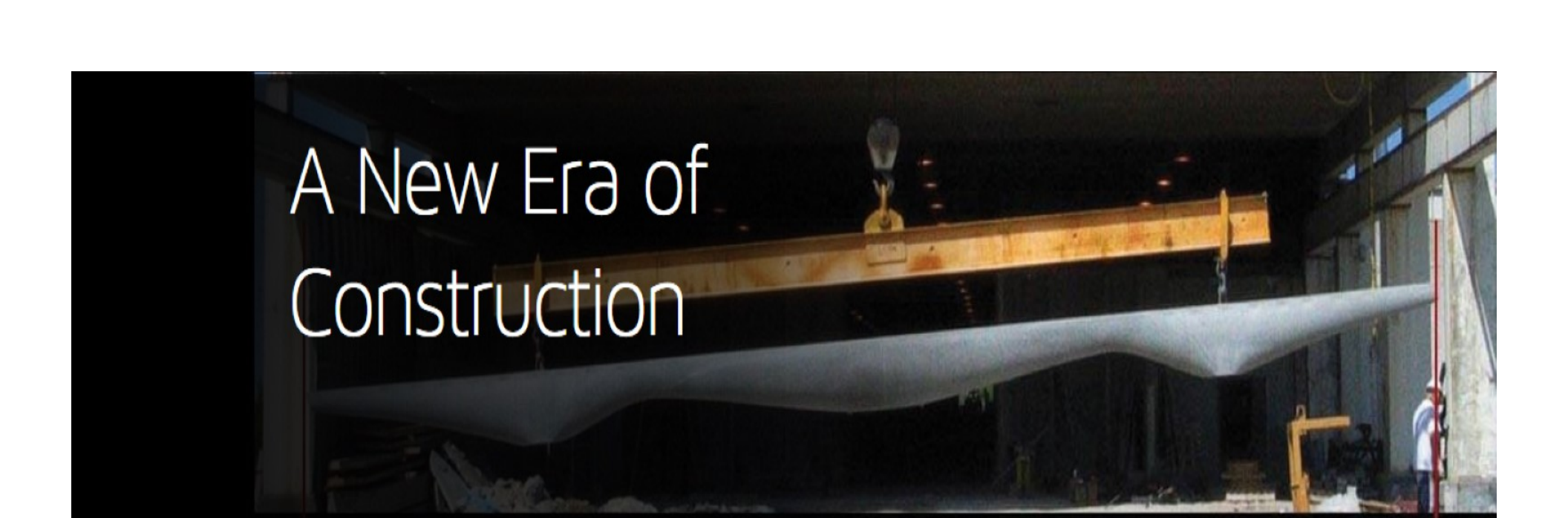
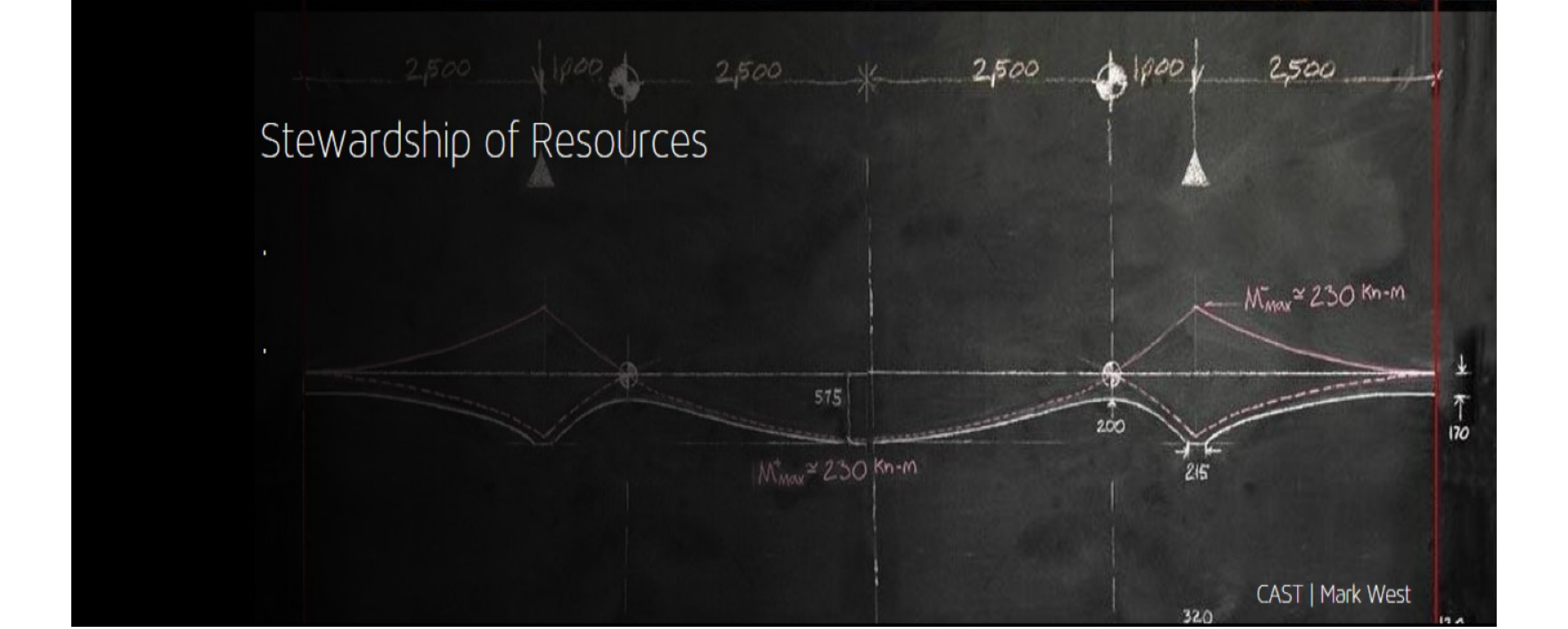
A New Era of Construction



Stewardship of Resources



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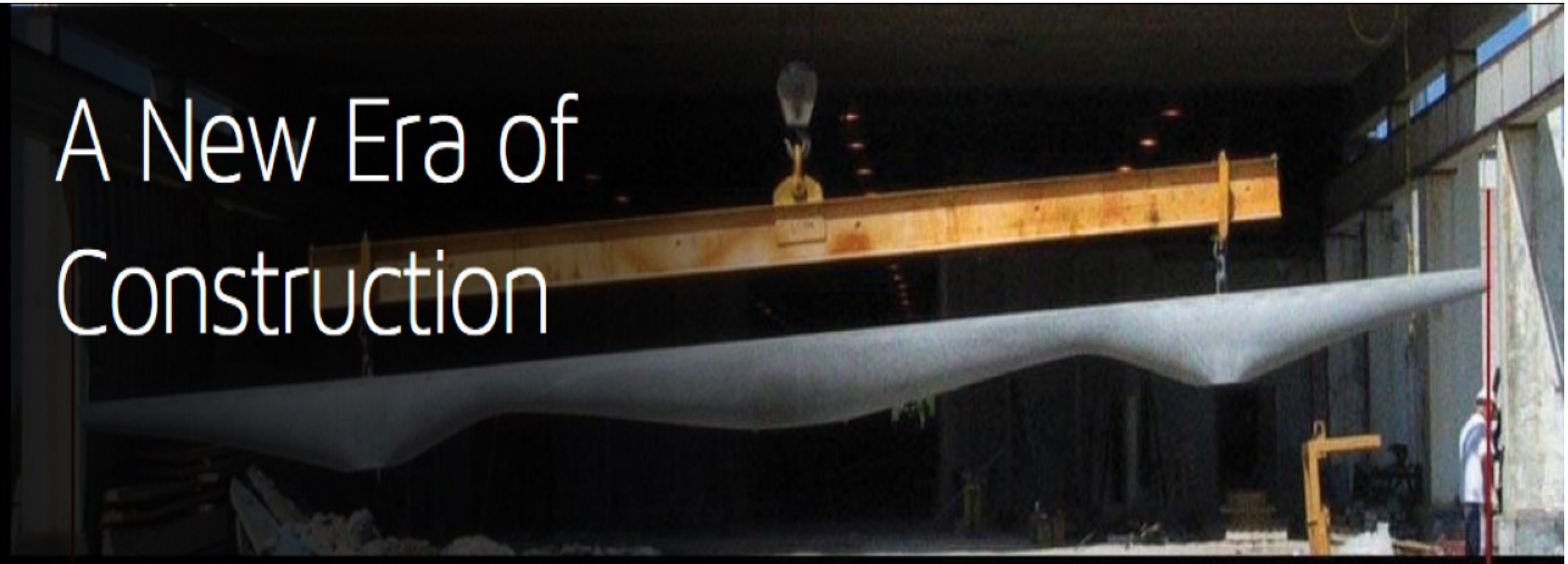
A New Era of Construction



Stewardship of Resources

Enhanced Productivity

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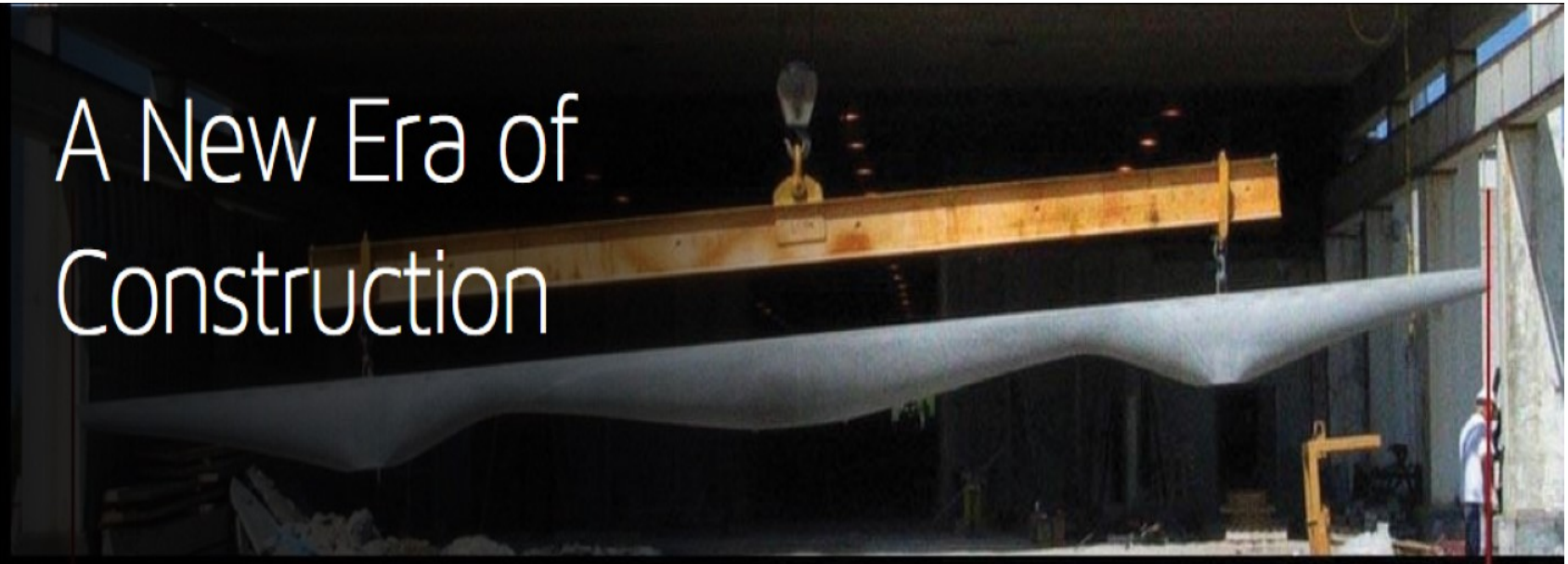
A New Era of Construction



Stewardship of Resources

Enhanced Productivity

Democratized Design Freedom

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Form A New Direction

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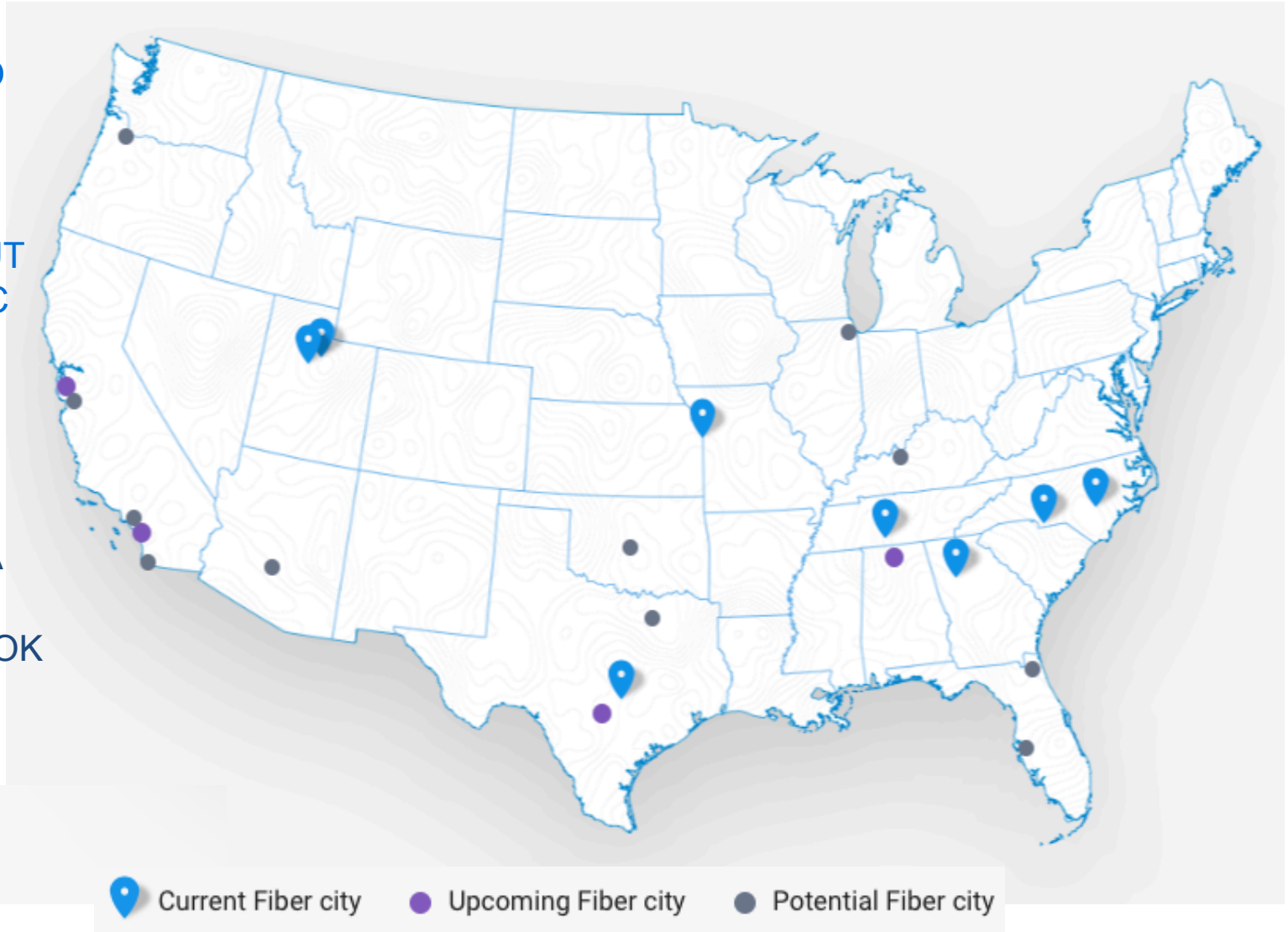
Google fiber

Google Fiber Expansion Plans

CURRENT
Atlanta, GA
Austin, TX
Charlotte, NC
Kansas City, MO
Kansas City, KS
Nashville, TN
Provo, UT
Salt Lake City, UT
The Triangle, NC

POTENTIAL
Chicago, IL
Dallas, TX
Jacksonville, FL
Los Angeles, CA
Louisville, KY
Oklahoma City, OK
Phoenix, AZ
Portland, OR
San Diego, CA
San Jose, CA
Tampa, FL

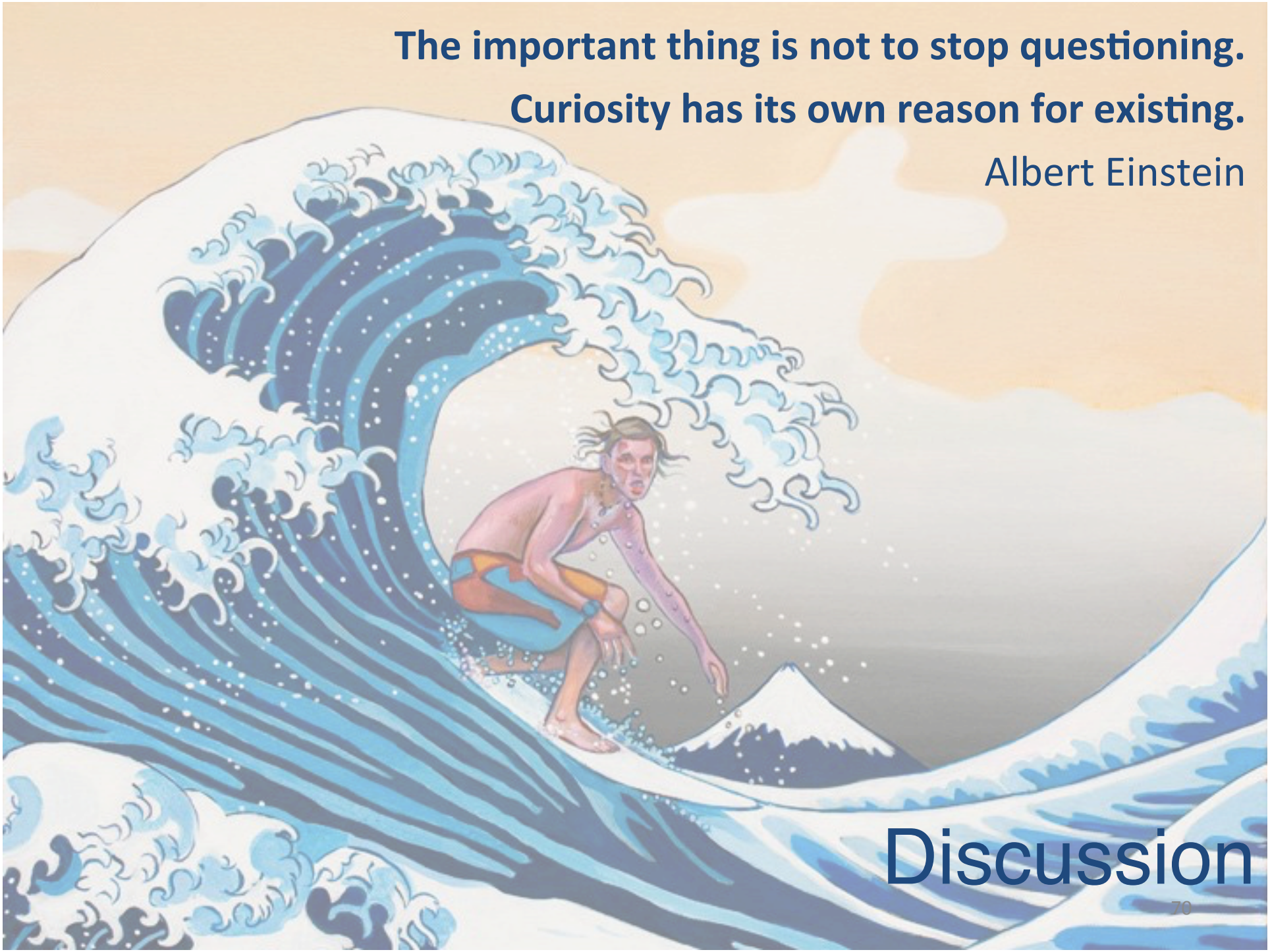
UPCOMING
Huntsville, AL Irvine, CA San Antonio, TX San Francisco, CA



The important thing is not to stop questioning.

Curiosity has its own reason for existing.

Albert Einstein



Discussion

The only questions that really matter are the ones you ask yourself.

Ursula K. Le Guin

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