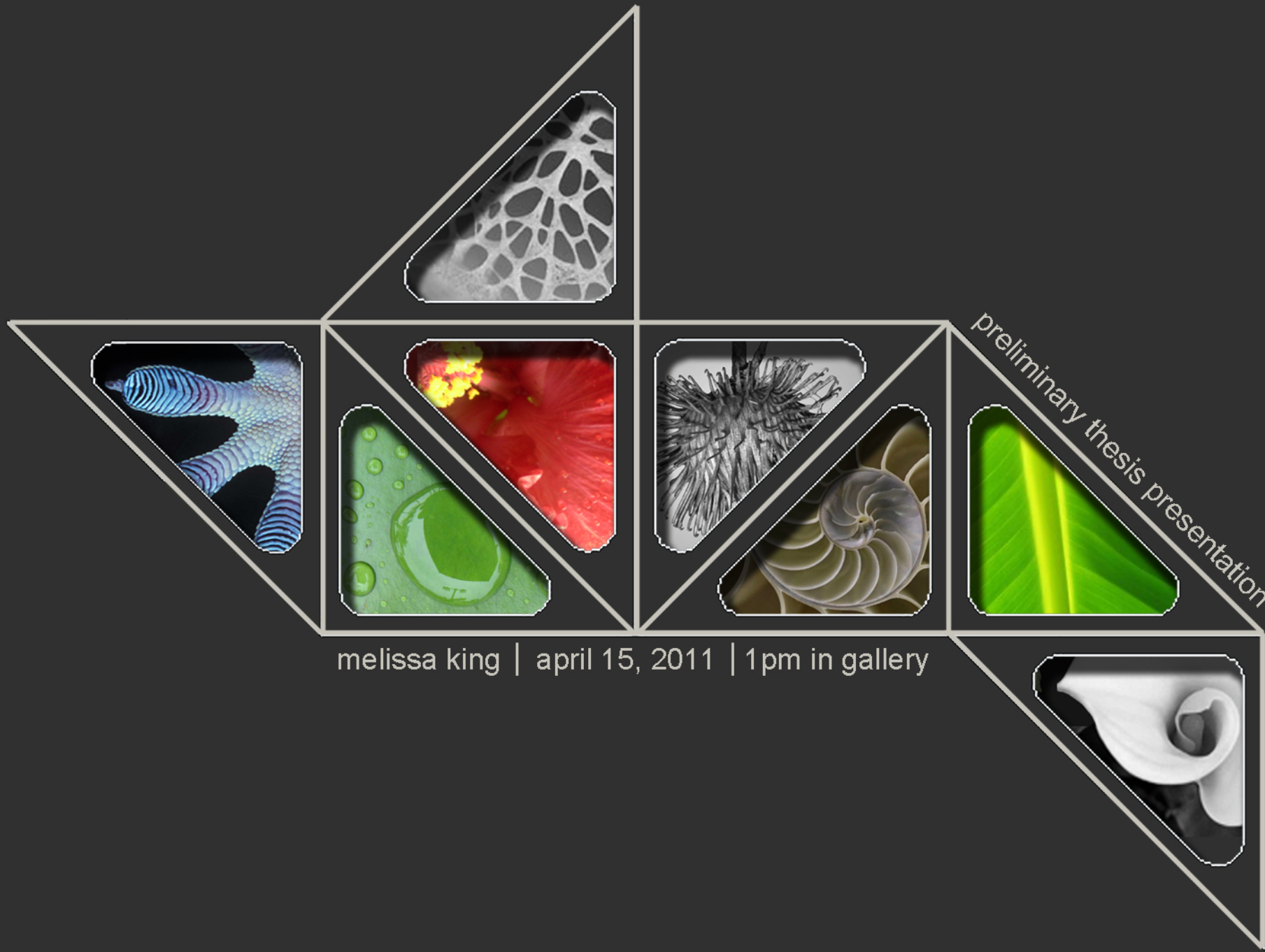


bringing
biomimicry
to life



melissa king | april 15, 2011 | 1pm in gallery

preliminary thesis presentation

[How to Browse?](#)

Browse Biomimicry

7,882 total results

Navigation sidebar:

- Groups
- Products
 - All Products (117)
 - Break down (1)
 - Get, store, or distribute resources (6)
 - Maintain community (3)
 - Maintain physical integrity (16)
 - Make (2)
 - Modify (1)
 - Move or stay put (0)
 - Process information (0)
- Strategies

Filter sidebar:

- By Name
 - A - C
 - D - F
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 - J - L
 - M - O
 - P - R
 - S - T**
 - U - W
 - X - Z
- Recently Modified
- By Status

Search results list:

- Sage Glass, Quantum Glass (Europe)
- Self-cleaning fabric
- Self-cleaning optical coatings
- Self-cleaning surface
- Self-healing Autonomous Material
- Self-repairing Concrete
- Shark paint
- Sharklet AF™
- Shinkansen Train
- Sir Marc Isambard Brunel's Tunnel Borer



Sage Glass, Quantum Glass (Europe)

Smart-windows possess variable tinting based on electronically stimulated pigment. They can provide substantial energy savings by reducing cooling/heating costs.

Tags: NYSERDA, 2011-02-01
Category: product
Last Updated: 03/28/2011

[Visit product page >](#)

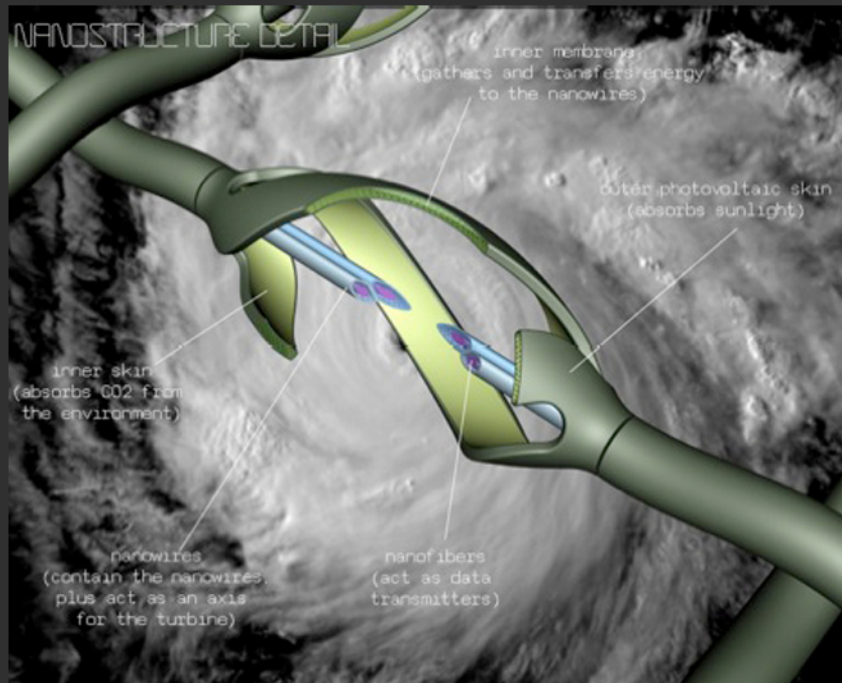
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asknature.org is a growing database of 2,100+ technological innovations and ideas, each inspired by Nature's genius.

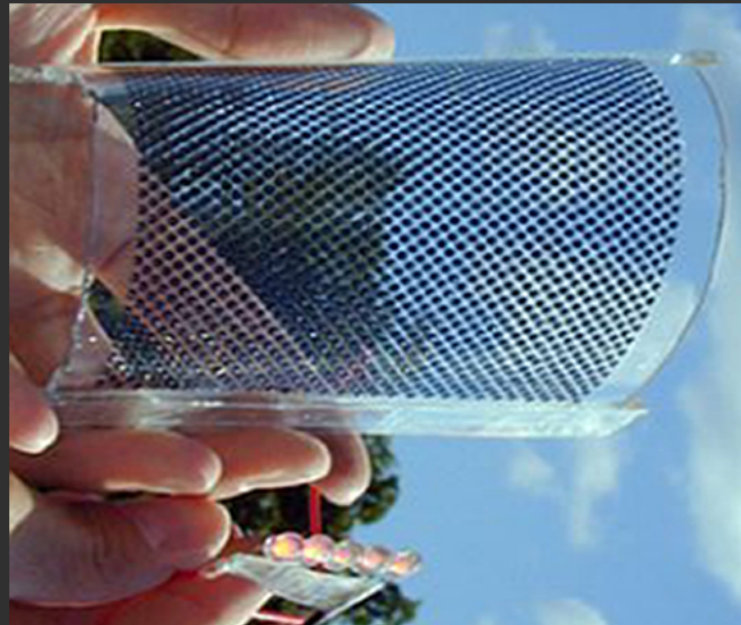
ventilation



Skin absorbs sunlight through a photovoltaic skin and transfers it to the mini-turbines which filter CO2 as wind passes through them.

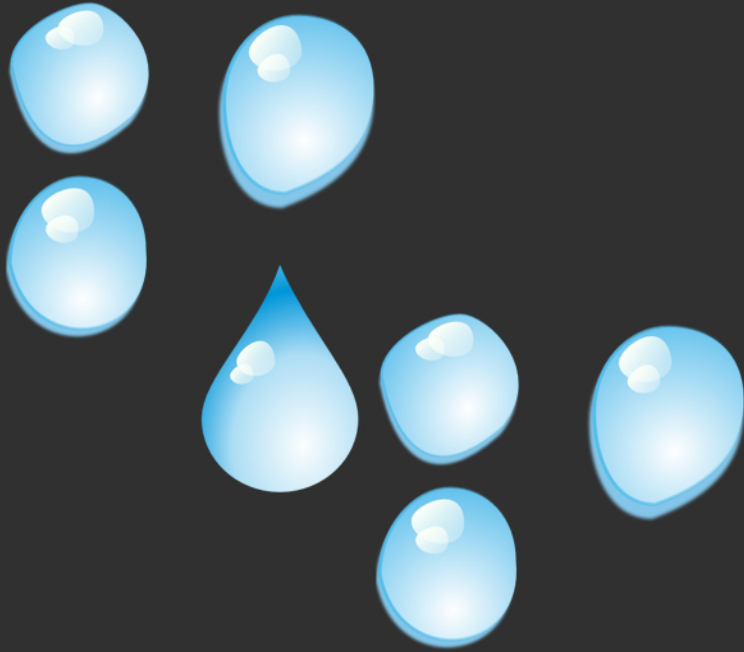


controlled sunlight



Plant-Inspired solar cells mimic photosynthesis to generate solar energy that can be transferred to power shading devices.

water collection

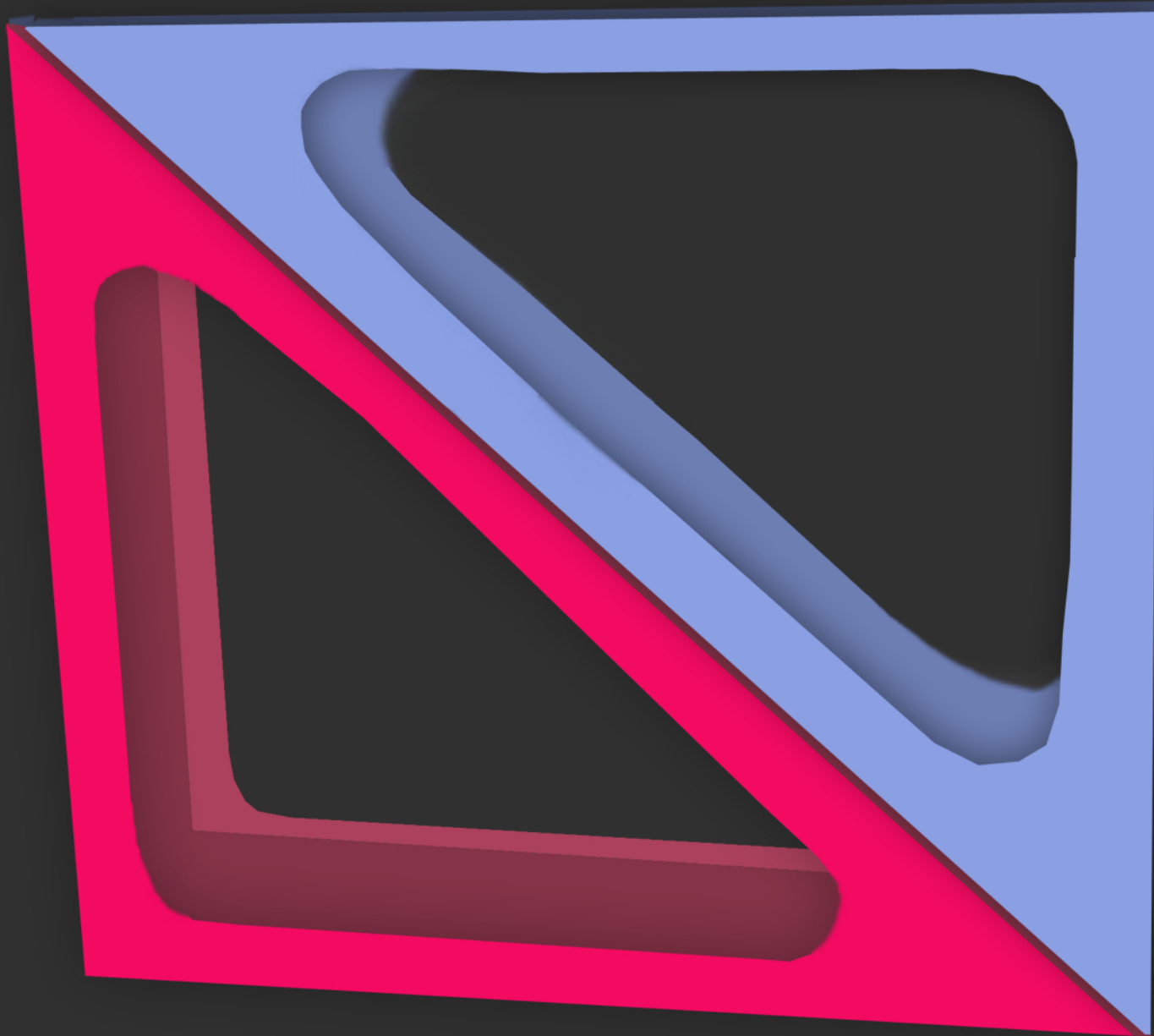


Stenocara beetles harvest enough water with their ingeniously textured surfaces to survive in their otherwise bone-dry setting.

Scientists Robert E. Cohen and Michael F. Rubner report that they have emulated the pattern of water-attracting and water-repelling back regions that enable the beetles to snatch moisture out of the air, collect it into drops, and then deliver mouthward

(Nano Lett. , published online May 2, [dx.doi.org/10.1021/n1060644q](https://doi.org/10.1021/n1060644q))

the component



manufacturers of
biomimetic ideas
will have the
opportunity to sell
their ideas as a
small scale
component

as the component
gains popularity
the material or
idea will gain
credibility to the
average
consumer

illumination



solar powered illumination

every space has
the ability to be
customized by the
inhabitant

illumination
ventilation
water collection
shade or sunlight
storage or
shelving
etc.

components may
be exchanged as
needed

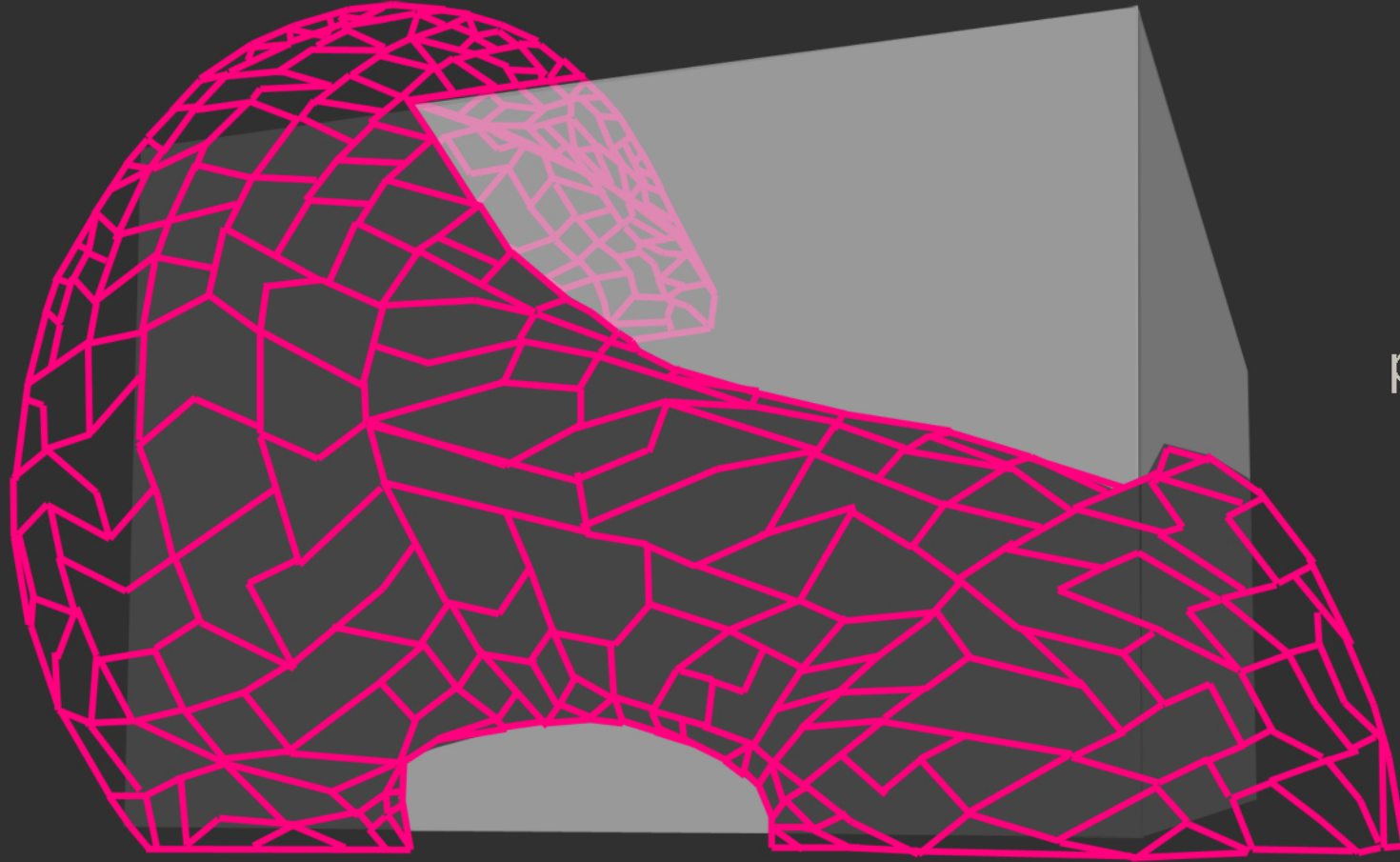
entertainment



solar powered
docking stations,
televisions, sound
systems, etc.
provide endless
opportunities for a
diverse range of
manufacturers to
help “bioneer”
these
components and
inhabitants to
customize their
space.

solar powered entertainment

the structure

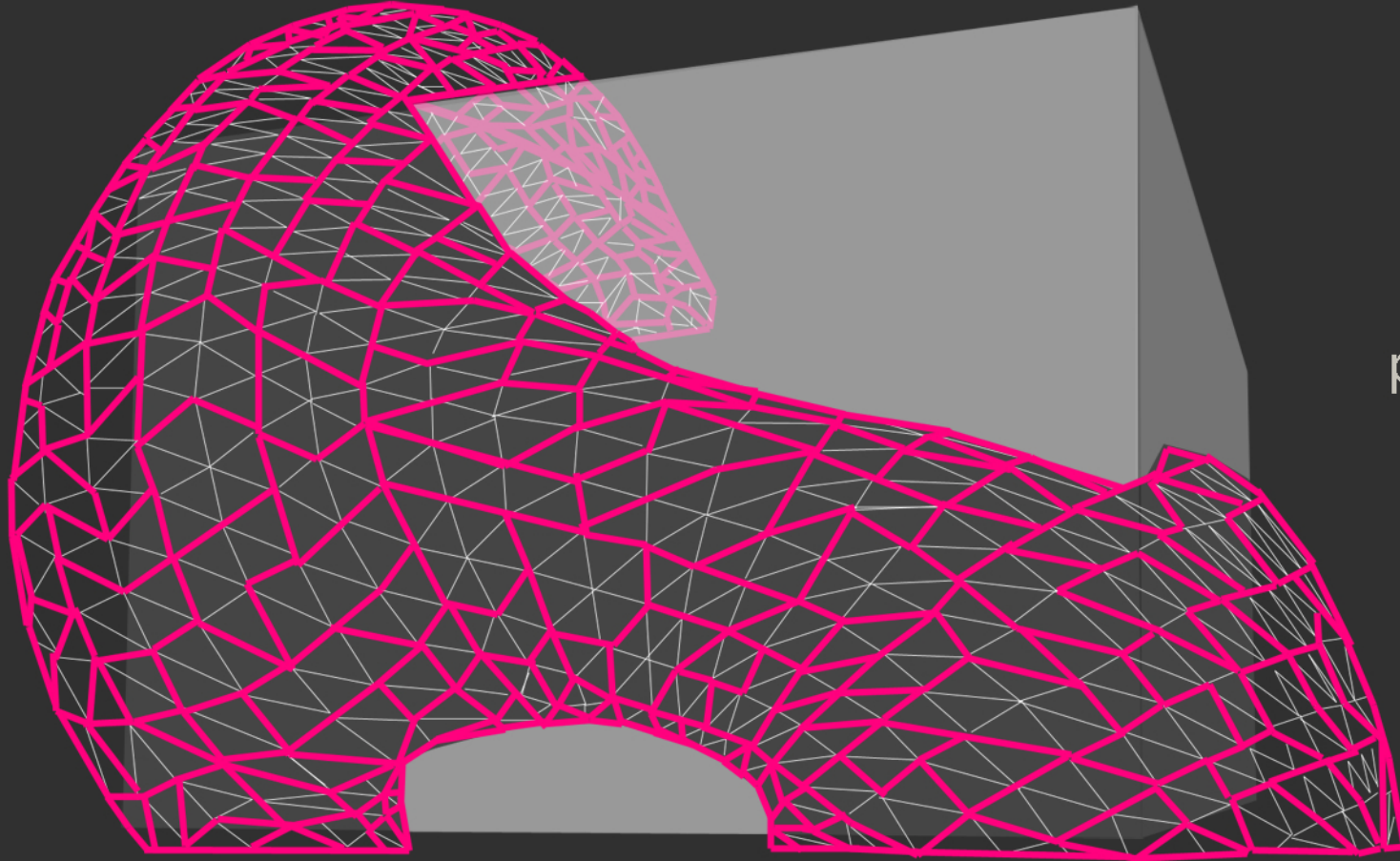


The steel structure uses a multiple of the component's nominal dimensions to create a panel system.

This allows the component to maintain it's proportion throughout the surface configuration.

The panel system also allows for the interchanging of components without disturbing the structure.

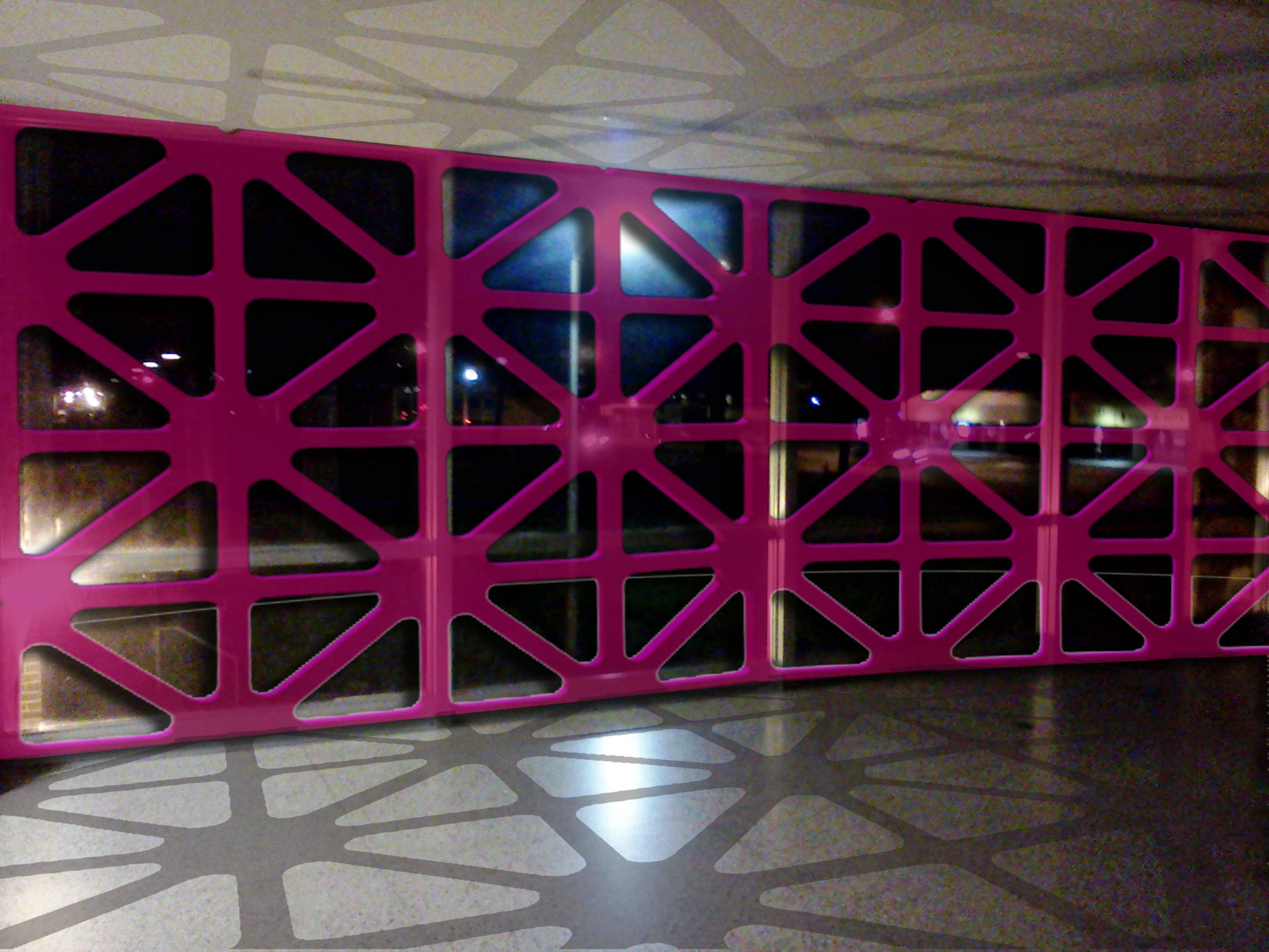
the structure

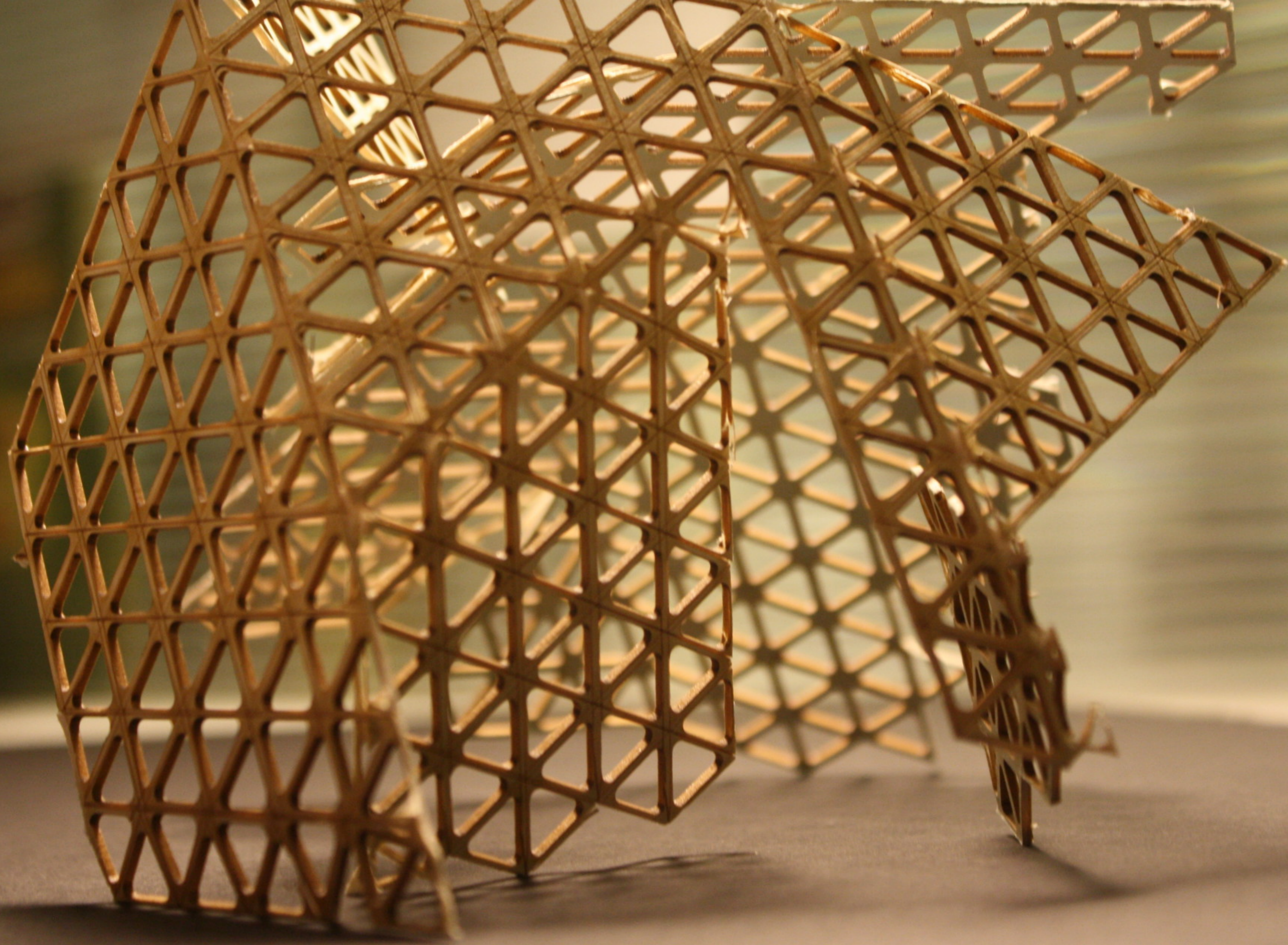


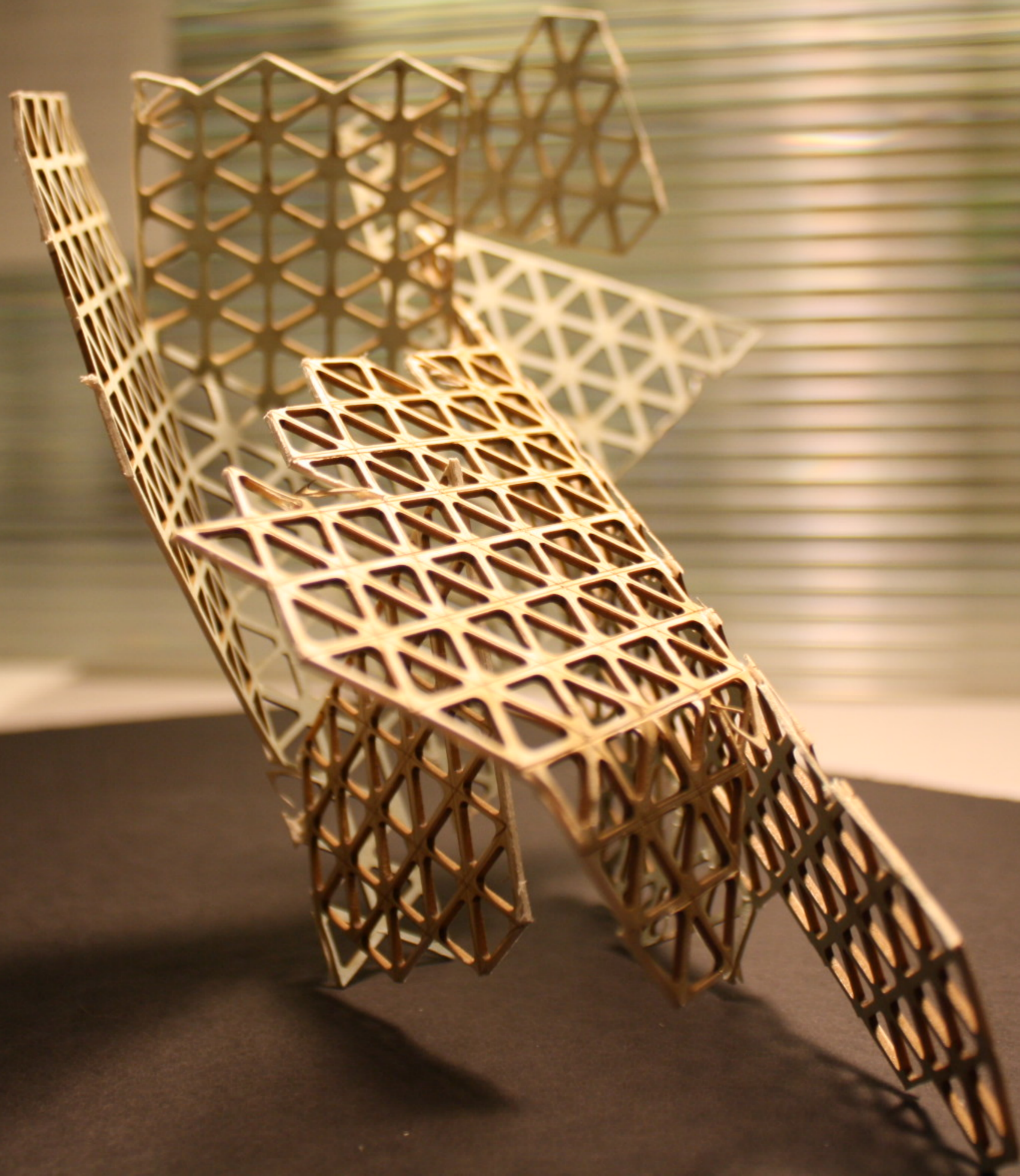
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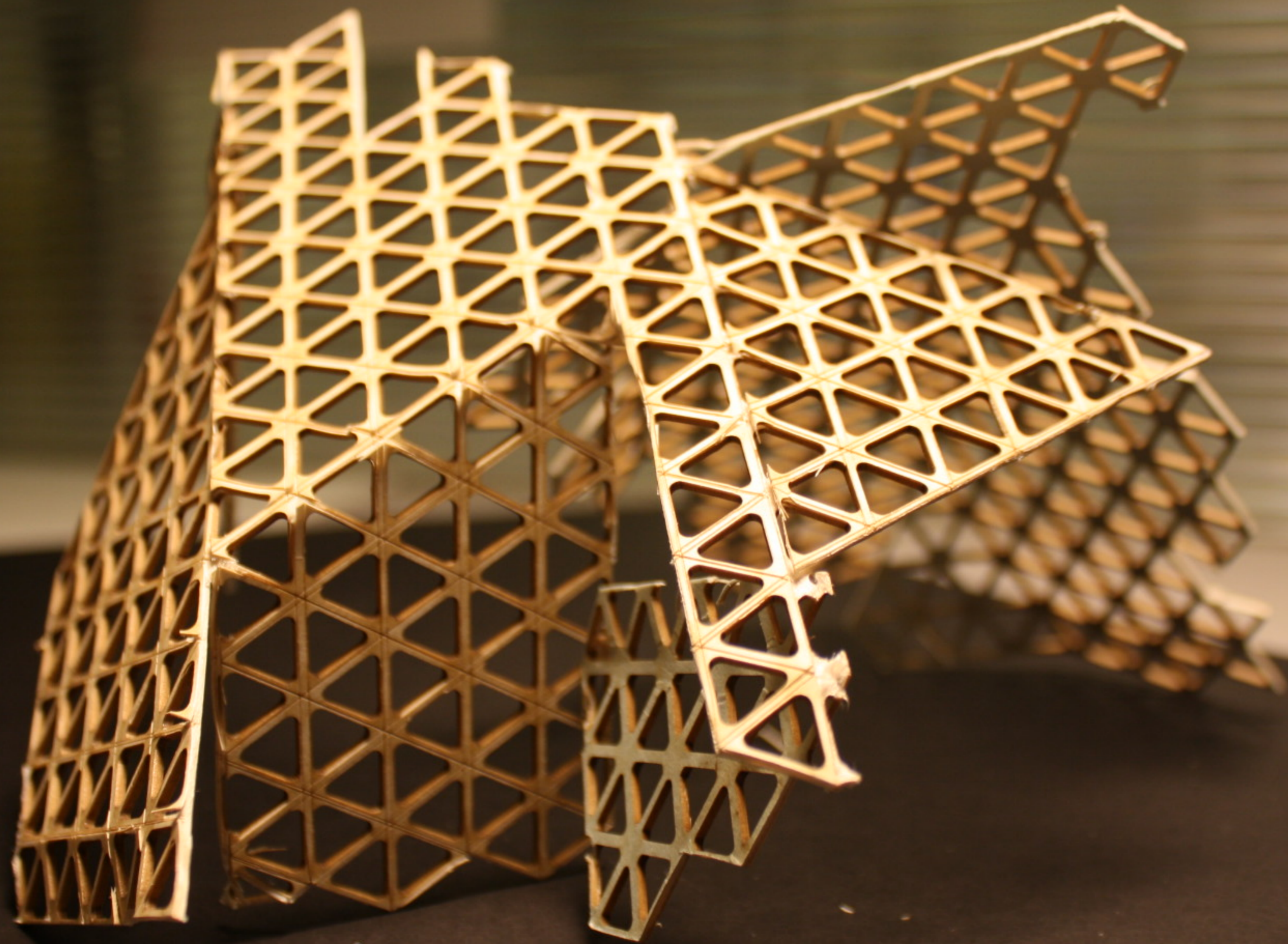
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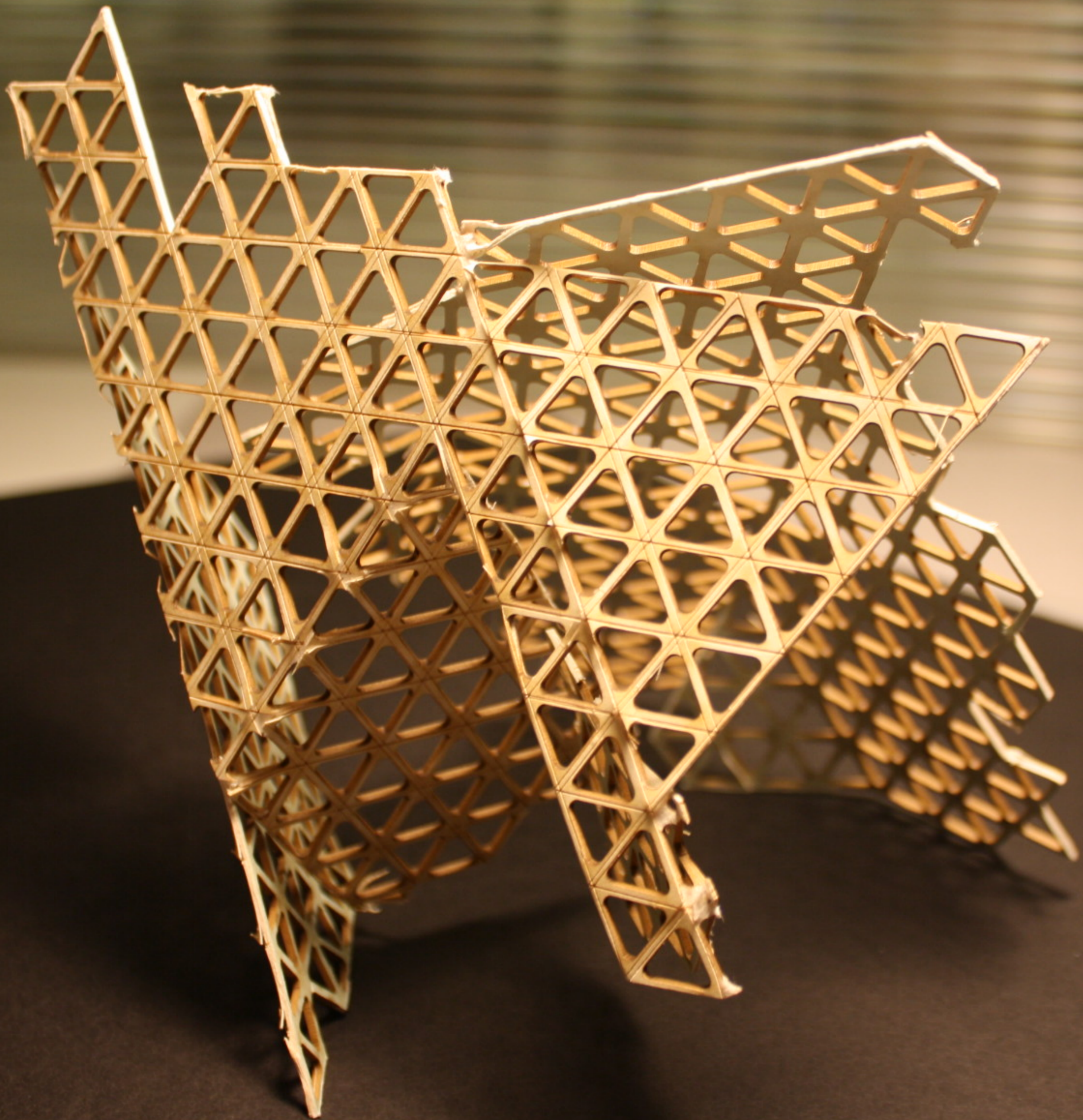
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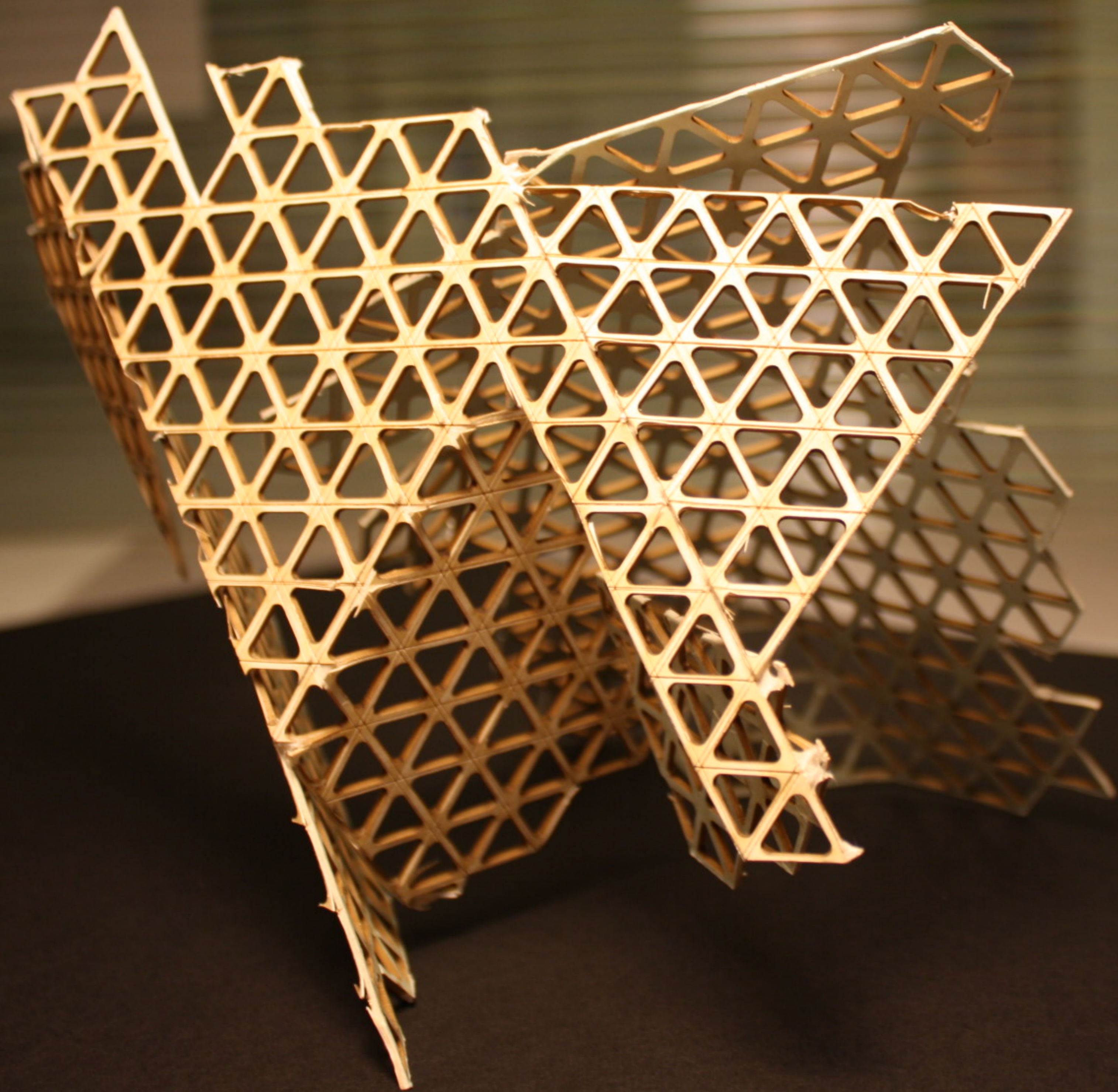


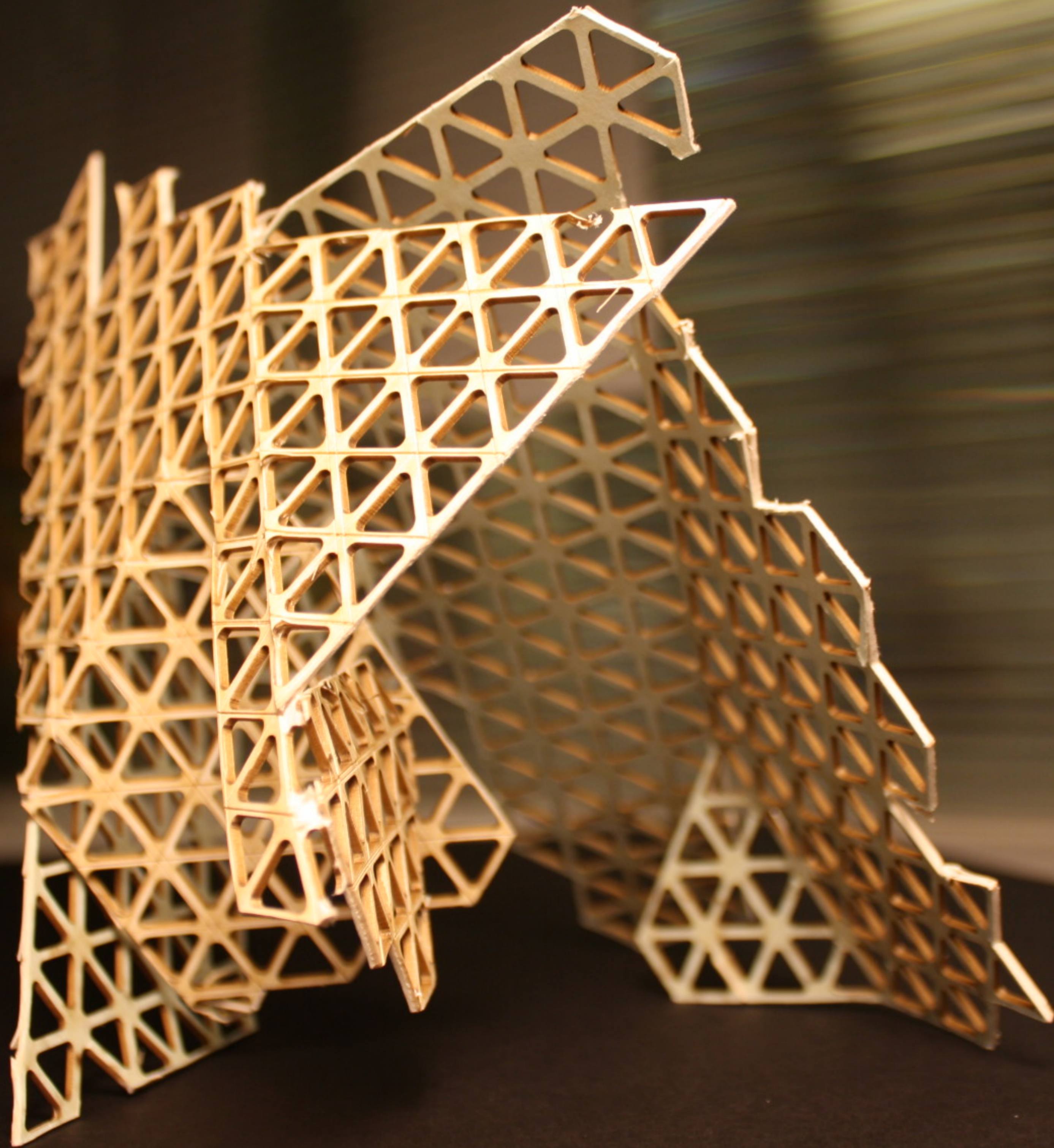


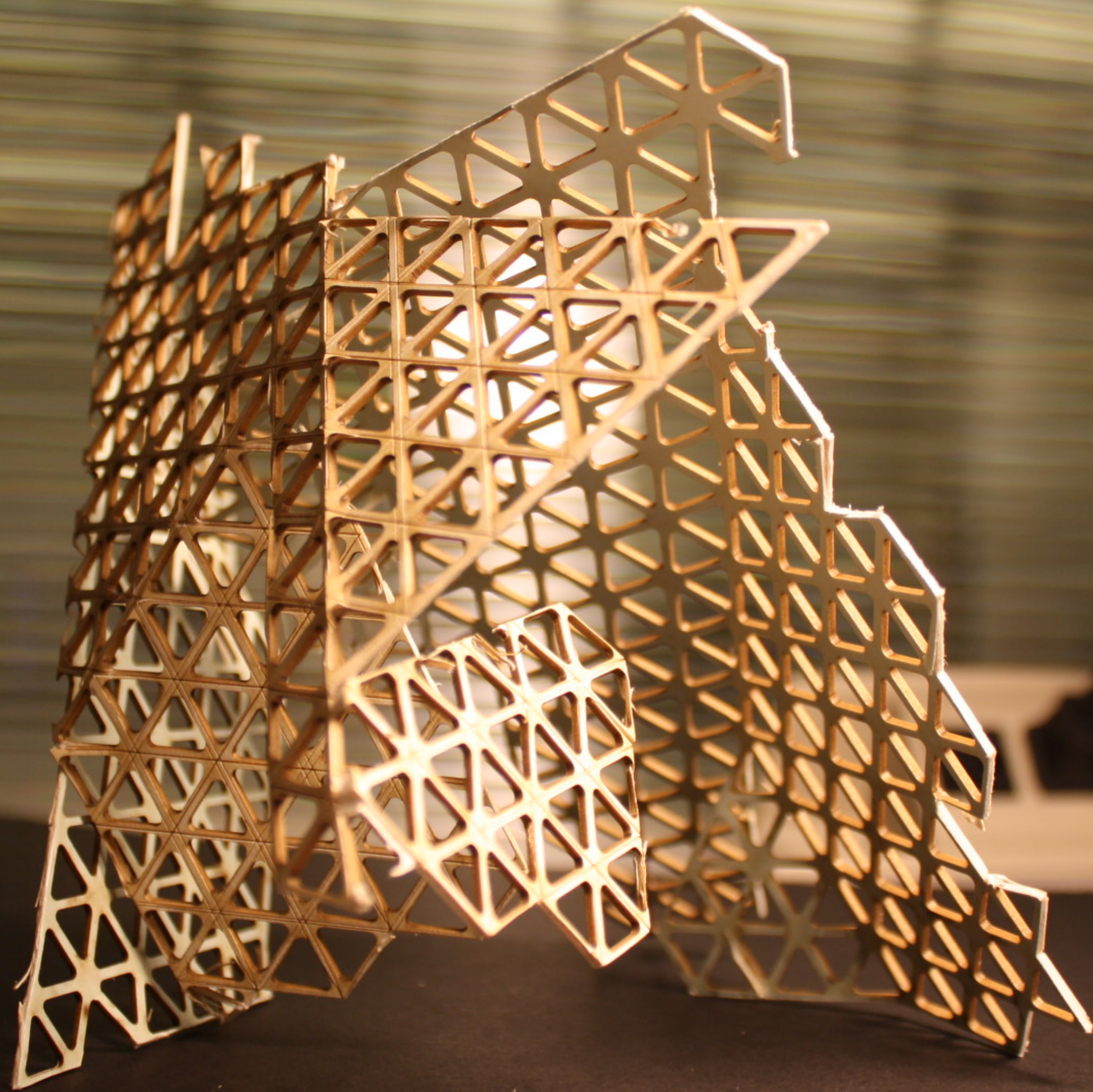


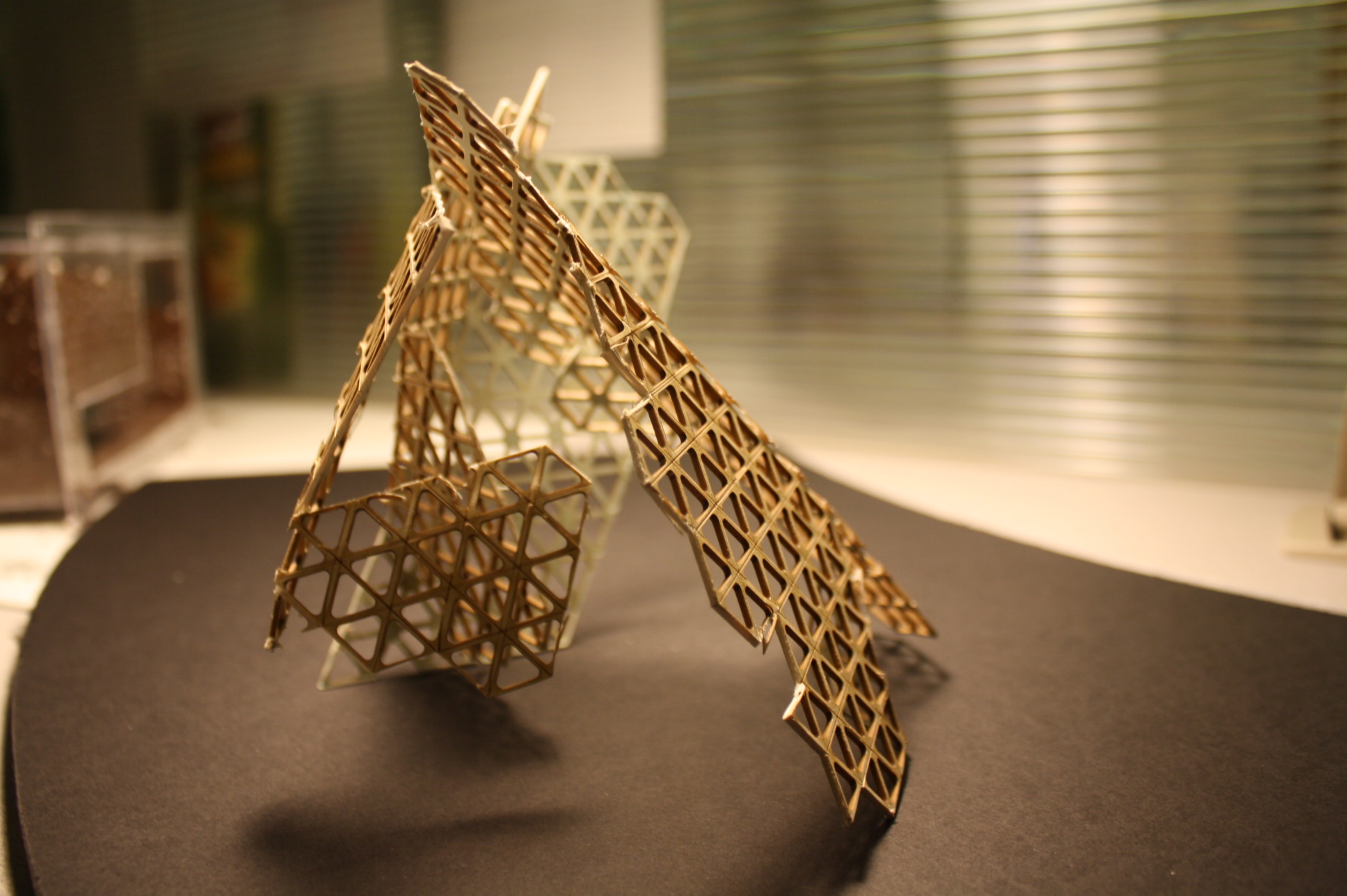






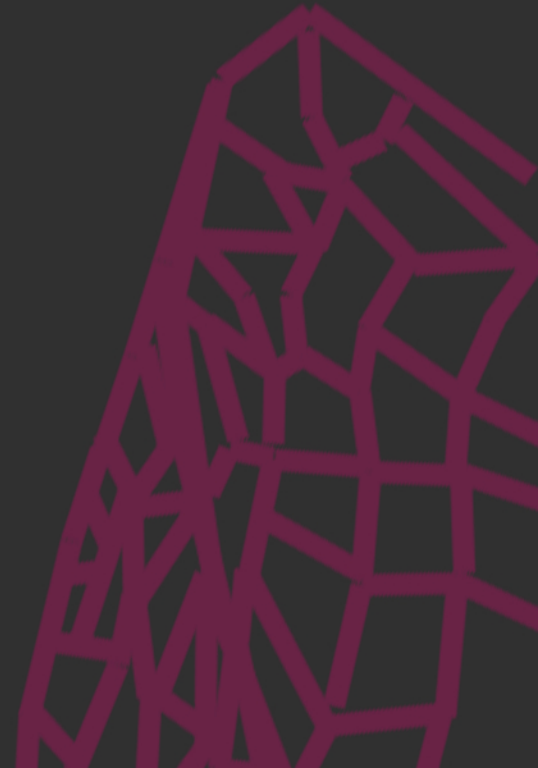






customization process

- 1 regional parametrics
- 2 design customization
- 3 inhabitant adaptation



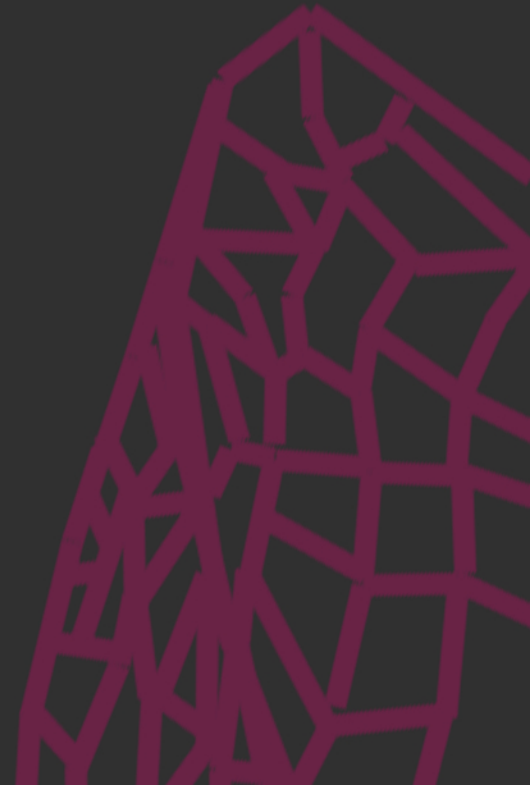
regional parametrics

1 regional parametrics

Initial components will be calculated based on a site specific region

While the structure of the building must be responsive to varying seismic risks, wind loads, and snow loads...

the components are responsive to variances in sunlight, temperature, rainfall, and humidity.



regional parametrics



Tampa, FL is in a hot-humid climate

It receives more than 20 inches of annual precipitation and where one or both of the following occur:

- a 67 F or higher wet bulb temperature for 3,000 or more hours during the warmest six consecutive months of the year;

or

- a 73 F or higher wet bulb temperature for 1,500 or more hours during the warmest six consecutive months of the year

Optimal Components:

Sunlight Control

Solar Power

Ventilation

Humidity Control

regional parametrics



- Subartic/Arctic
- Very Cold
- Cold
- Mixed-Humid
- Hot-Humid
- Hot-Dry
- Mixed-Dry
- Marine

Each region will have a suggested parametric value based on optimal components.

Component Parametrics for Hot-Humid Climate:

20% Sunlight Control

20% Solar Power

15% Humidity

10% Ventilation

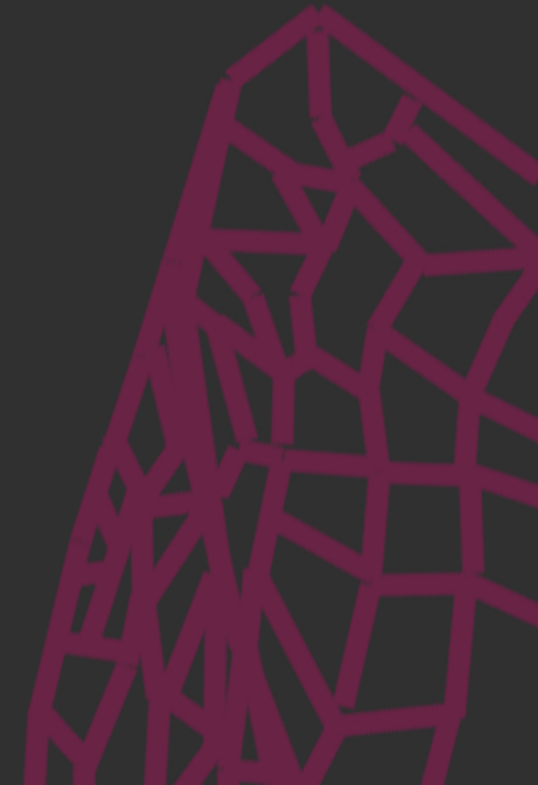
10% Wind Power

25% Transparency - Views (remains constant and may overlap with other components)

2 design customization

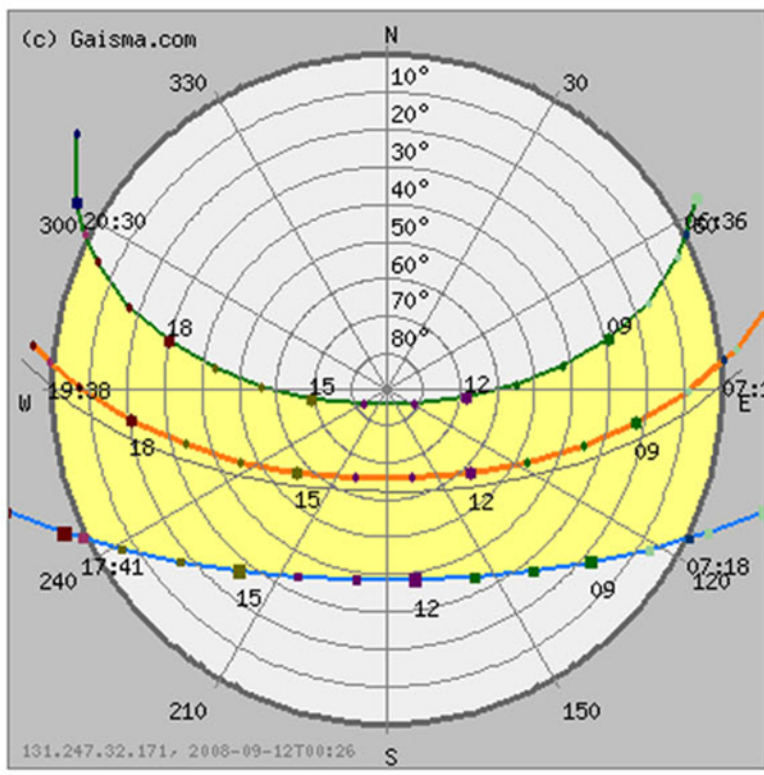
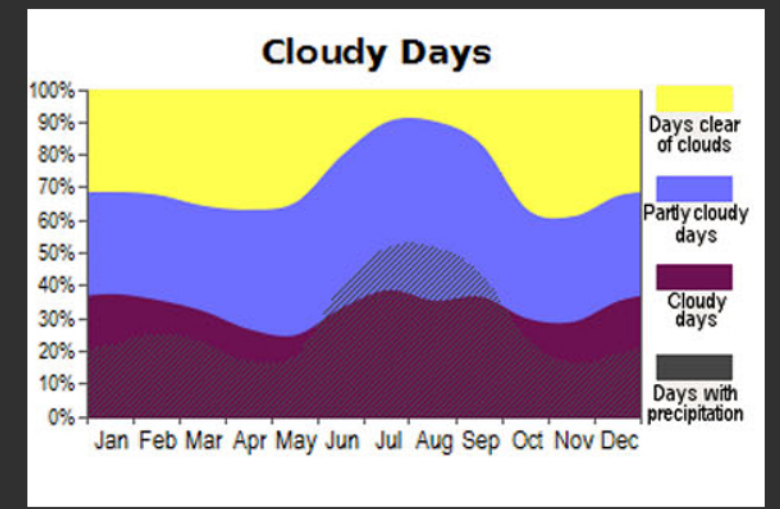
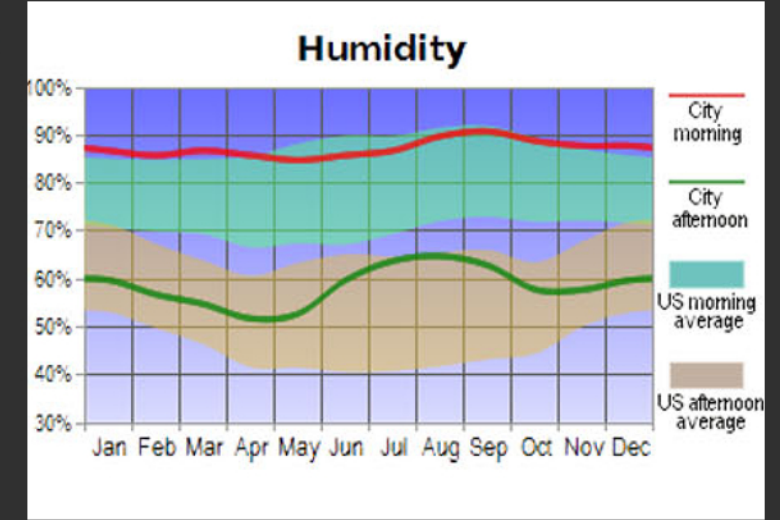
After the optimal components are calculated for regional relevance, the designer takes over.

Each facade can be 'tuned' to its location, based on views, alignments, existing site conditions, topography, as well as environmental concerns.



Stats based on observations taken between 10/2006 - 8/2008 daily from 7am to 7pm local time.

Month of year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
	01	02	03	04	05	06	07	08	09	10	11	12	1-12
Dominant Wind Dir.	↖	↙	↖	↙	↙	↗	↗	↖	↖	↖	↙	↖	↖
Wind probability > = 4 Beaufort (%)	33	37	34	33	33	19	17	22	18	21	22	19	25
Average Wind Speed (kts)	9	10	10	9	9	8	8	8	8	8	8	8	8
Average Airtemp. (°C)	19	20	22	24	27	29	29	30	29	26	21	22	24



Sun path

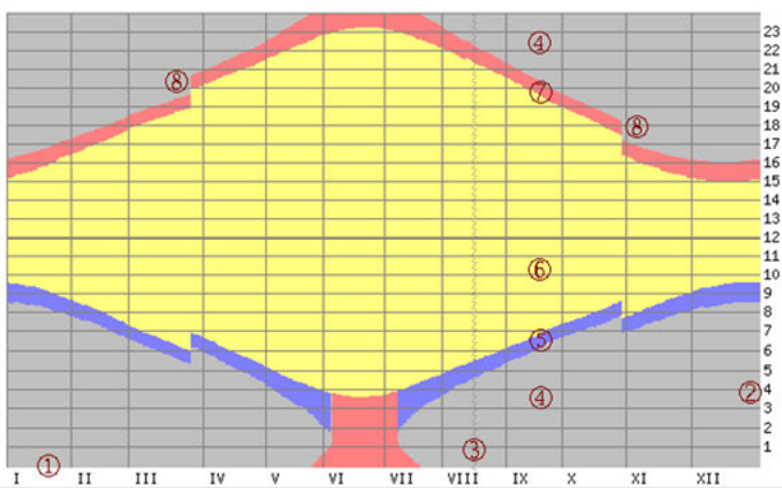
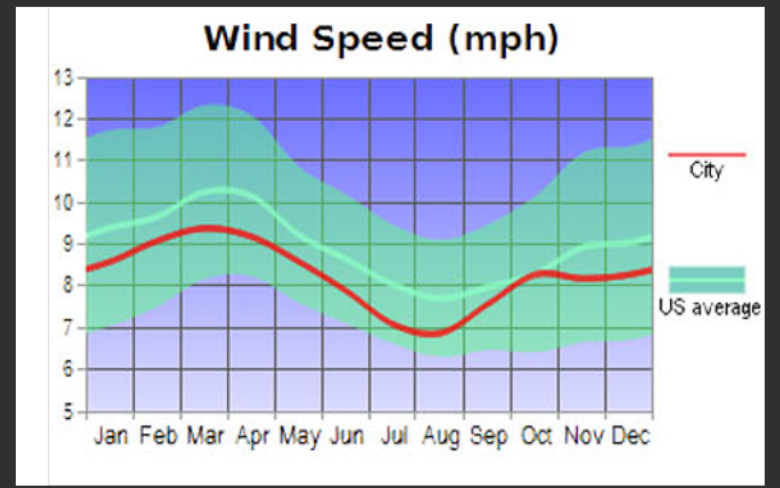
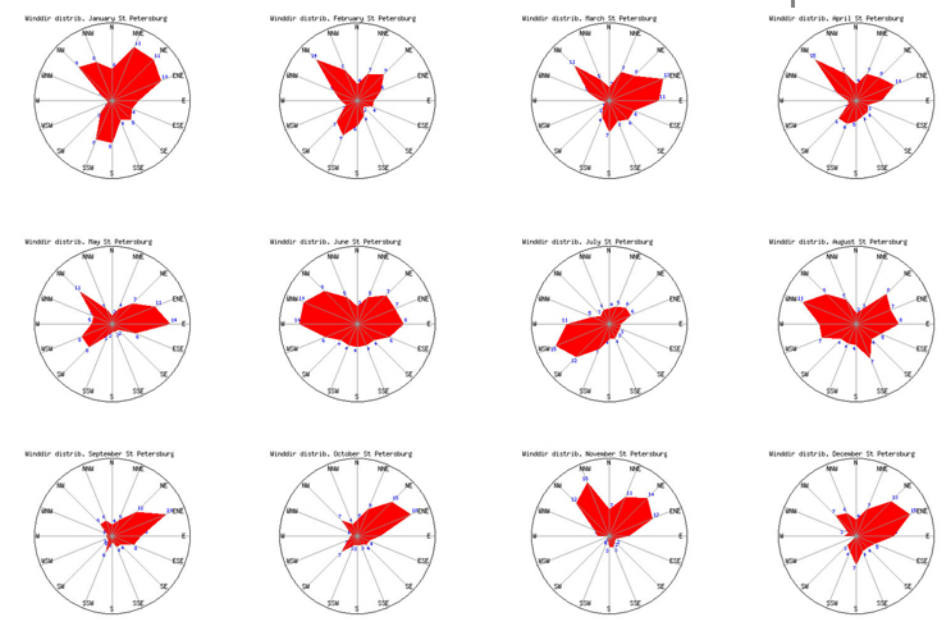
- Today
- June 21
- December 21
- Annual variation
- Equinox (March and September)

Sunrise/sunset

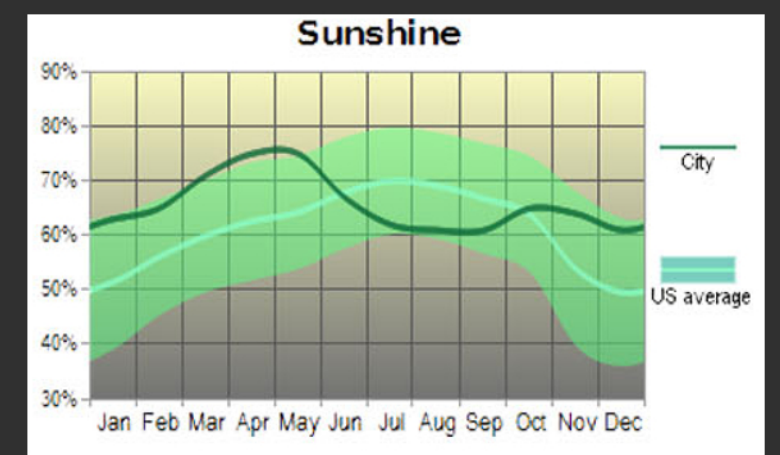
- Sunrise
- Sunset

Time

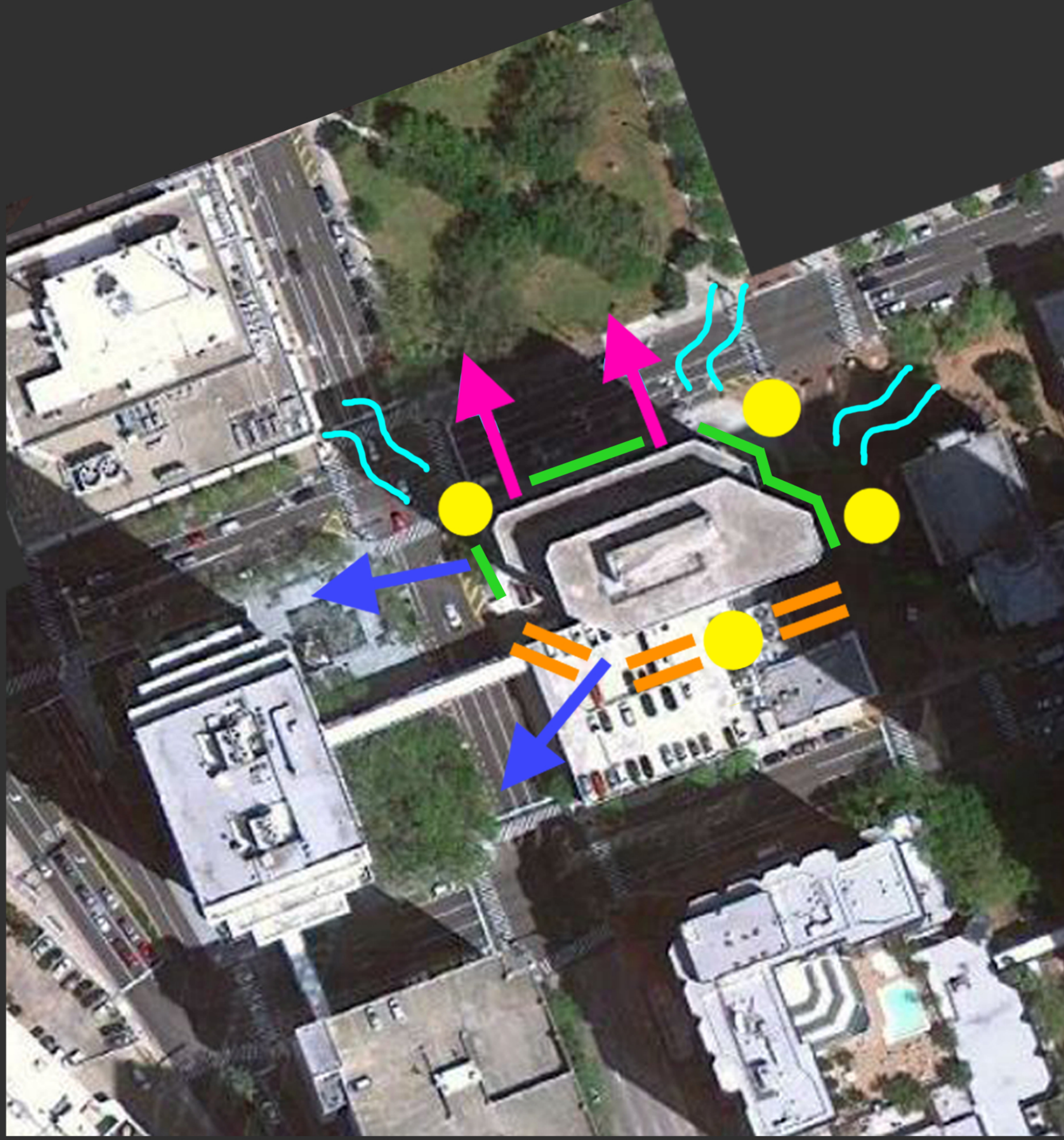
- 00-02
- 03-05
- 06-08
- 09-11
- 12-14
- 15-17
- 18-20
- 21-23



1. Months (notation can be changed in preferences)
2. Time (24-hour clock, e.g. 7 = 7:00 am, 12 = 12:00 noon, 17 = 5:00 pm)
3. "Today"
4. Darkness
5. Dawn
6. Sunshine
7. Dusk
8. Possible Daylight Saving Time starts/ends



design customization



Fifth/Third Bank
Tampa, Florida

Hot-Humid Climate

Wind power

Ventilation

Optimal Views for
adjacent park

Humidity

Solar powered
louvers

Optimal Views
toward water

design customization



Fifth/Third Bank
Tampa, Florida

Hot-Humid Climate

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Ventilation

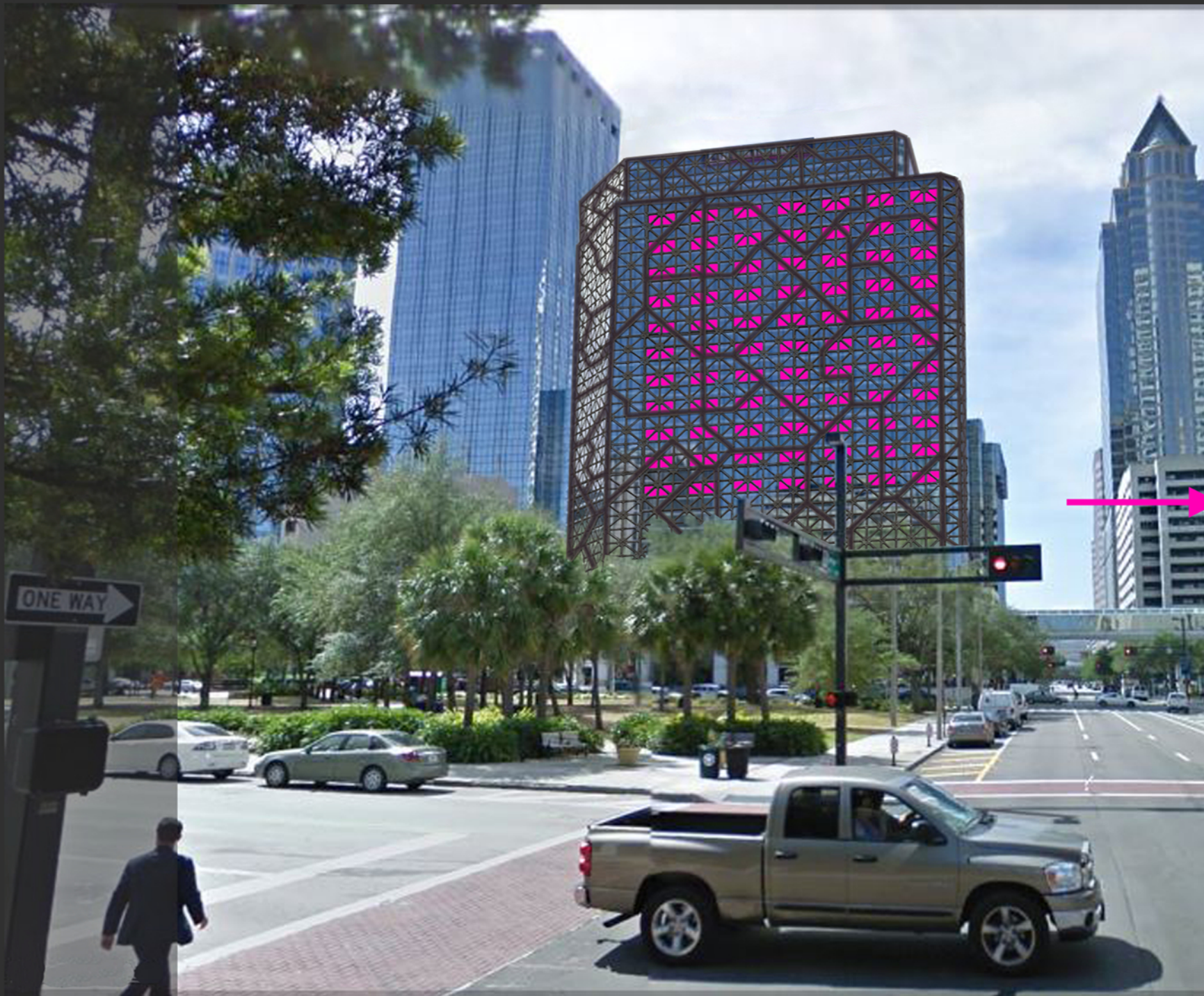
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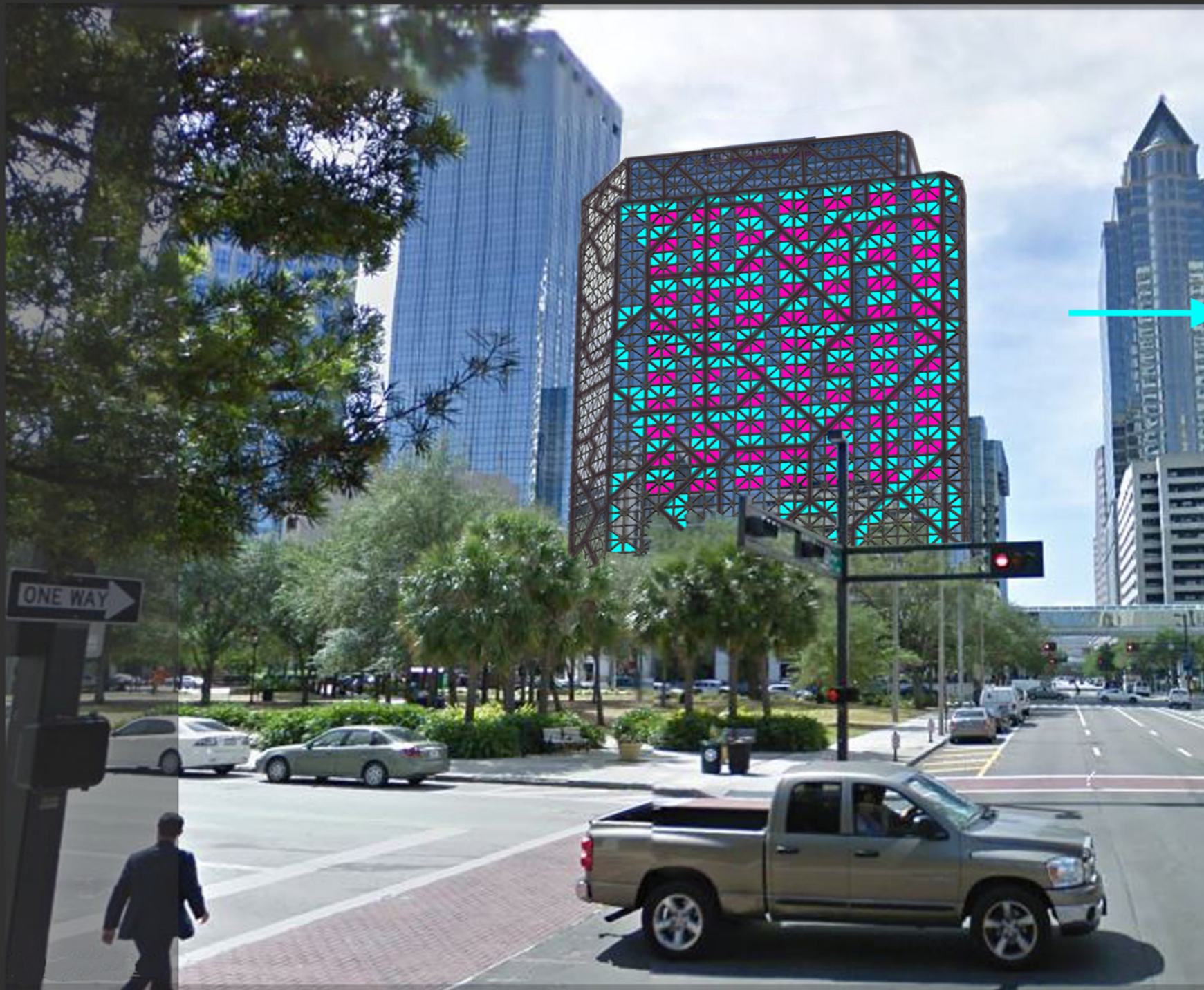
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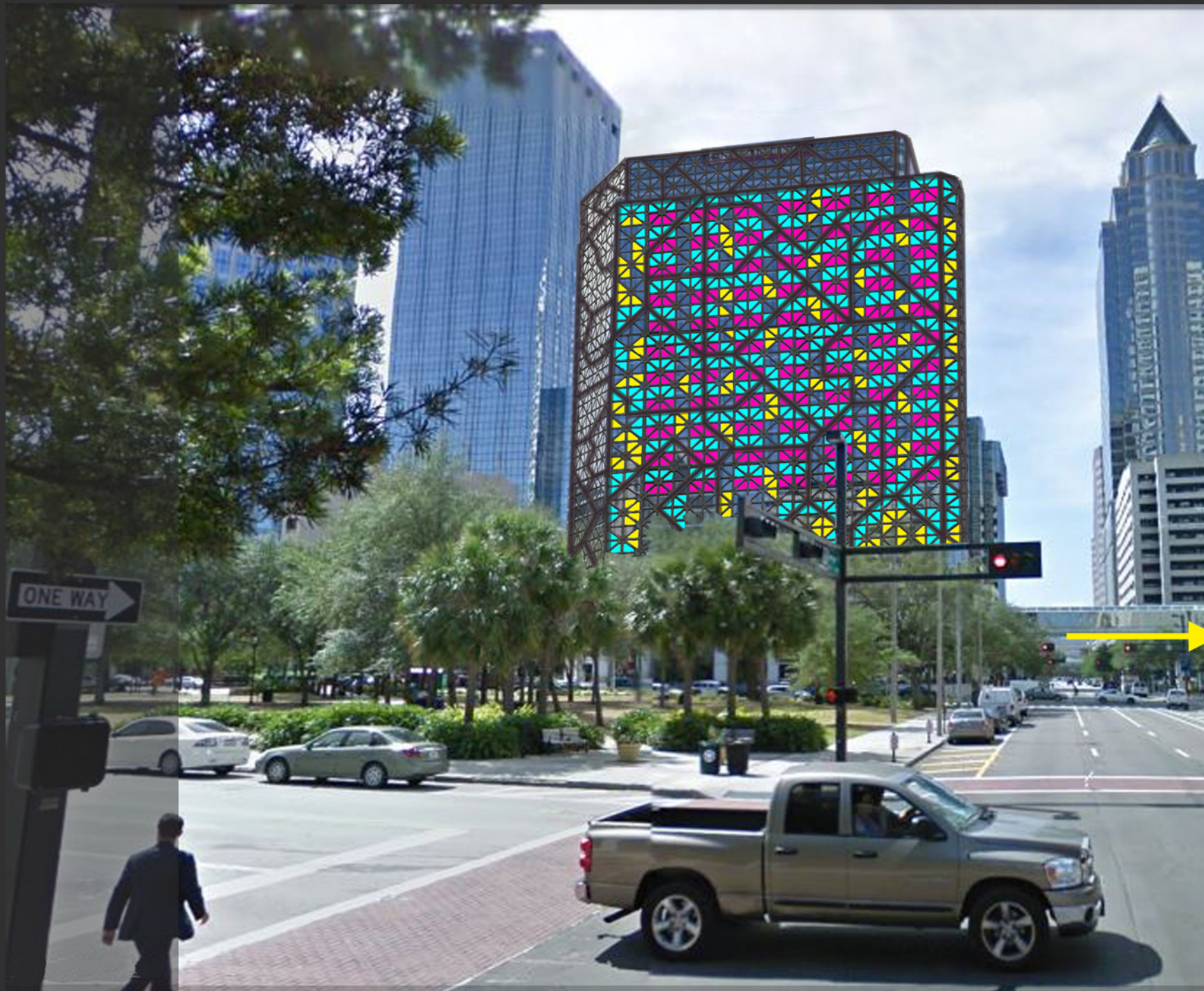
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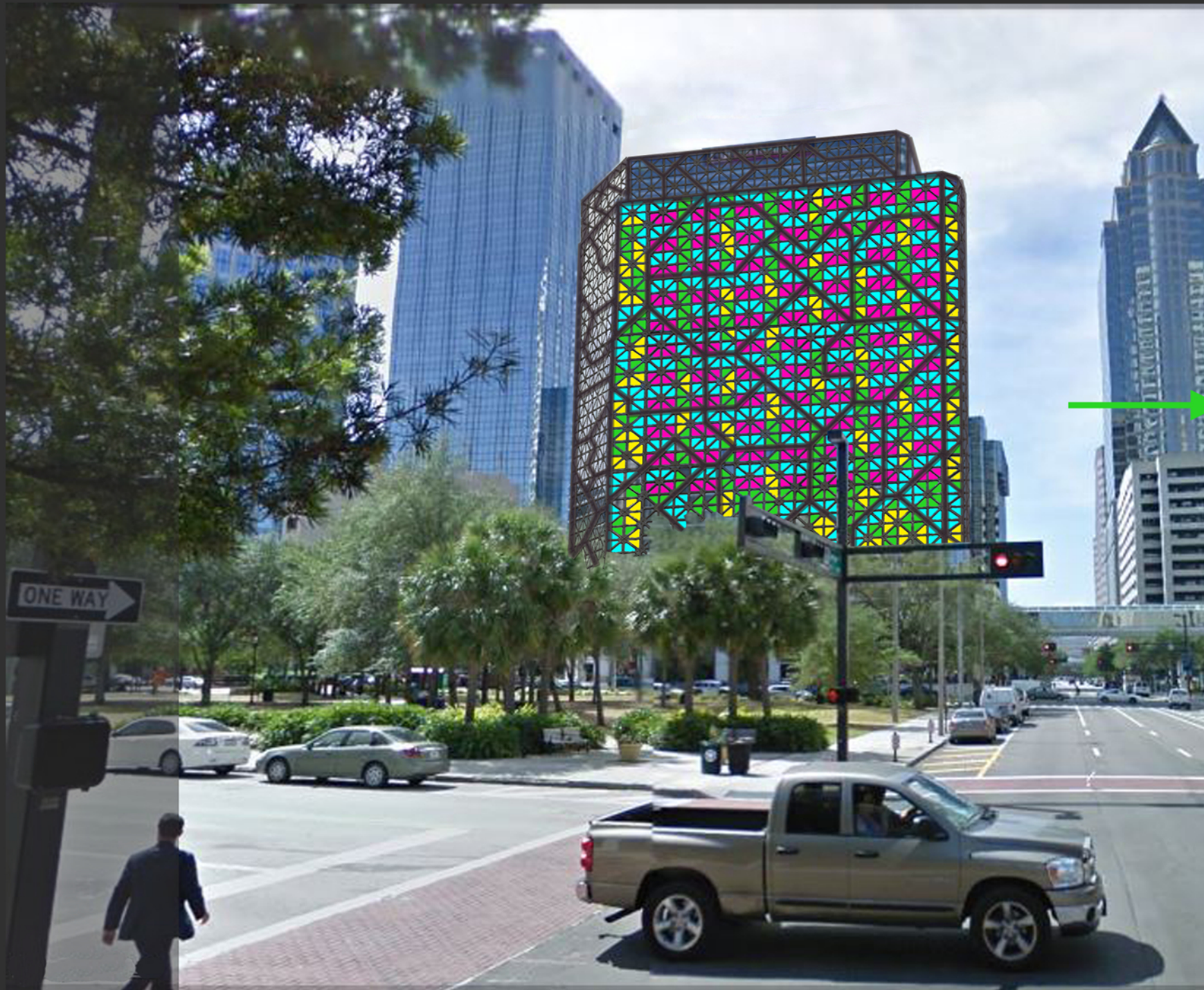
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toward water



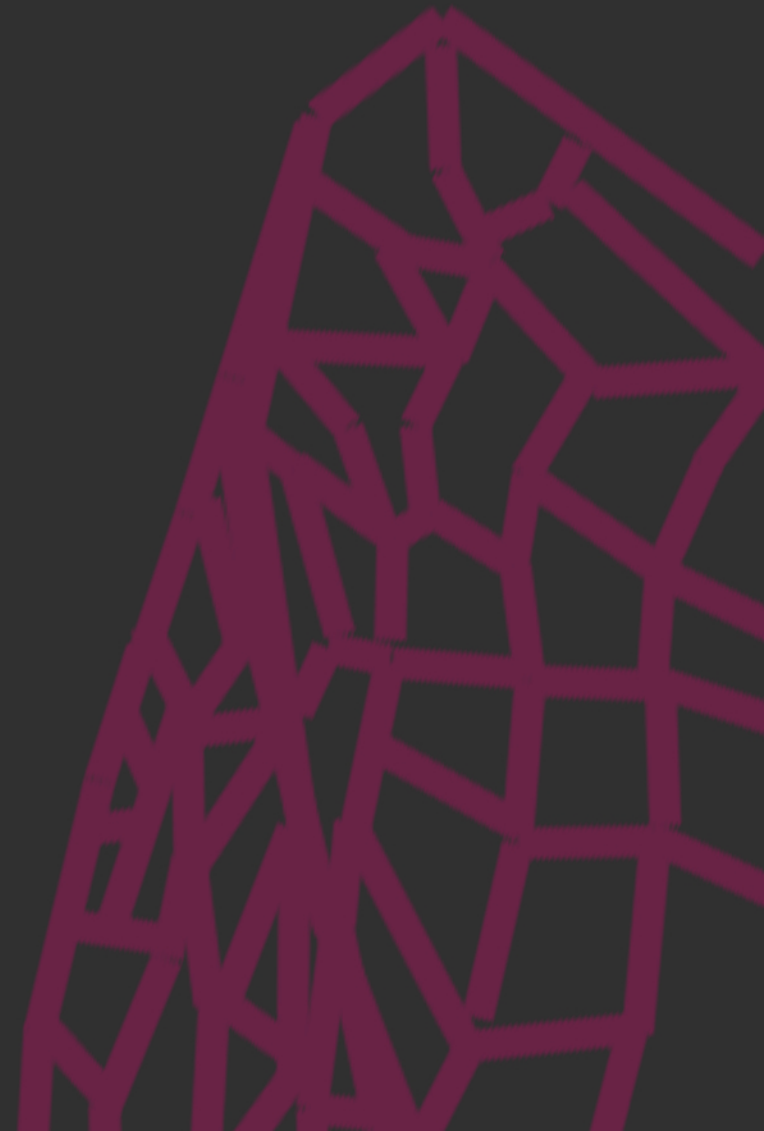
inhabitant adaptation

3

inhabitant adaptation

the owner has the final say...

the steel panels that account for most of the structure allow for the components to be interchanged as the inhabitant adapts or the building evolves...



design customization

