

Dematerializing Applied

Building Energy 2015

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Session Description

As a follow-up to “Dematerializing Buildings” at BE14, this session will explore how the dematerialization and lightweighting of buildings is being put into practice. Many of the technologies discussed in the March 2014 session are now being put into actual application while more new technologies are entering the pipeline at a rapid rate. Driven by energy and environmental concerns, some projects are now quantifying the material savings and embodied carbon reduction resulting from lightweighting strategies. This session will describe the progress of dematerialization and its real impact on design, engineering, and construction, including case studies of technologies that have gained market acceptance and projects that have actively embraced them.

Learning Objectives

Session attendees will be able to:

- Understand the theory and purpose of dematerialization;
- Collect a list of new materials and products facilitating dematerialization;
- Describe the risks and obstacles in using new products; and
- Propose strategies for overcoming resistance to new materials and technologies

The Sustainability Challenge

Is it possible to sustain continued economic growth to meet the needs of 7 billion people, and to adequately protect our natural environment at the same time?

The Sustainability Challenge

If so, how?

How will it affect the built environment?

Necessary but Not Sufficient



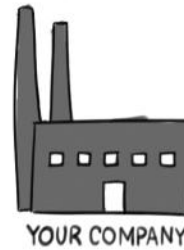
Can we build better with less?



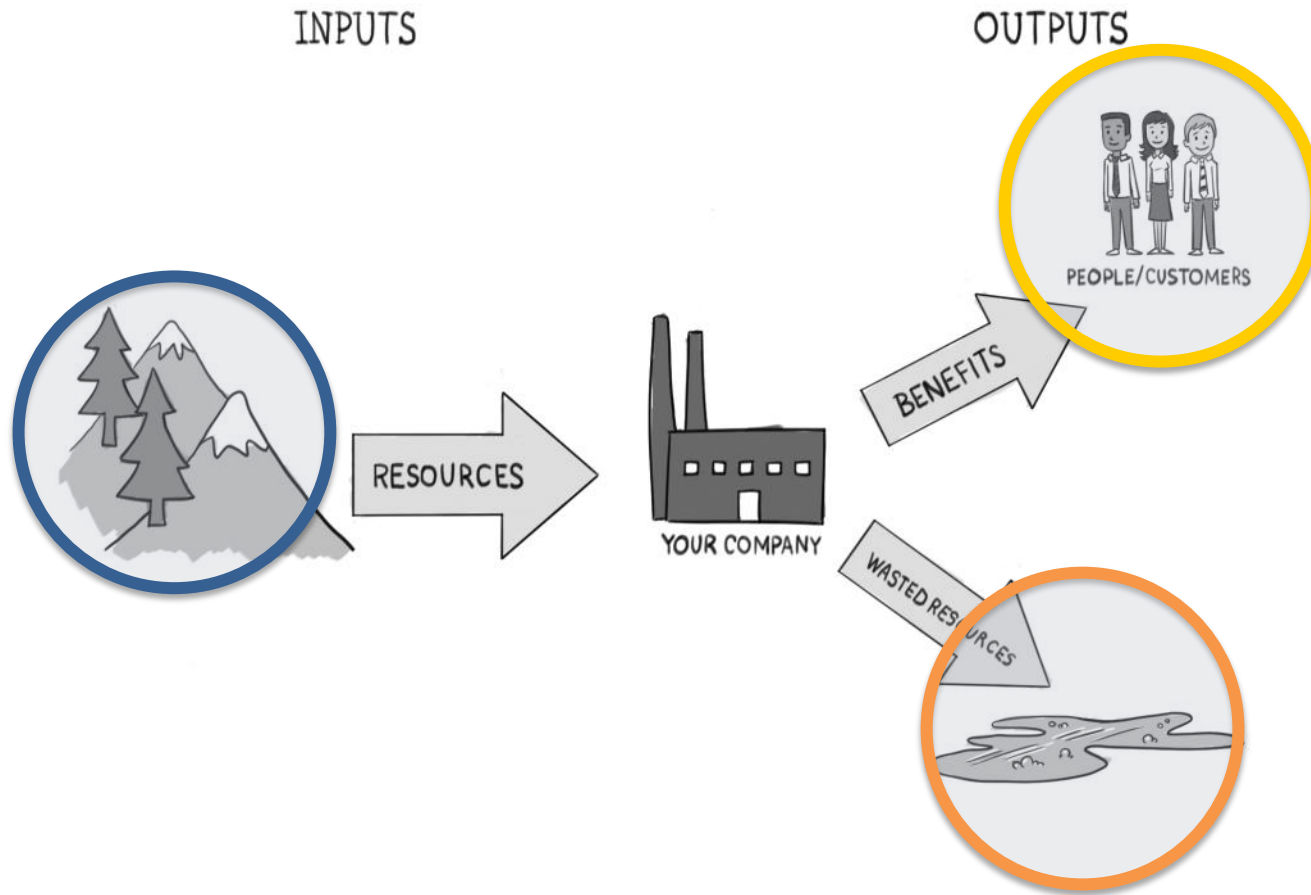
Resource Performance

INPUTS

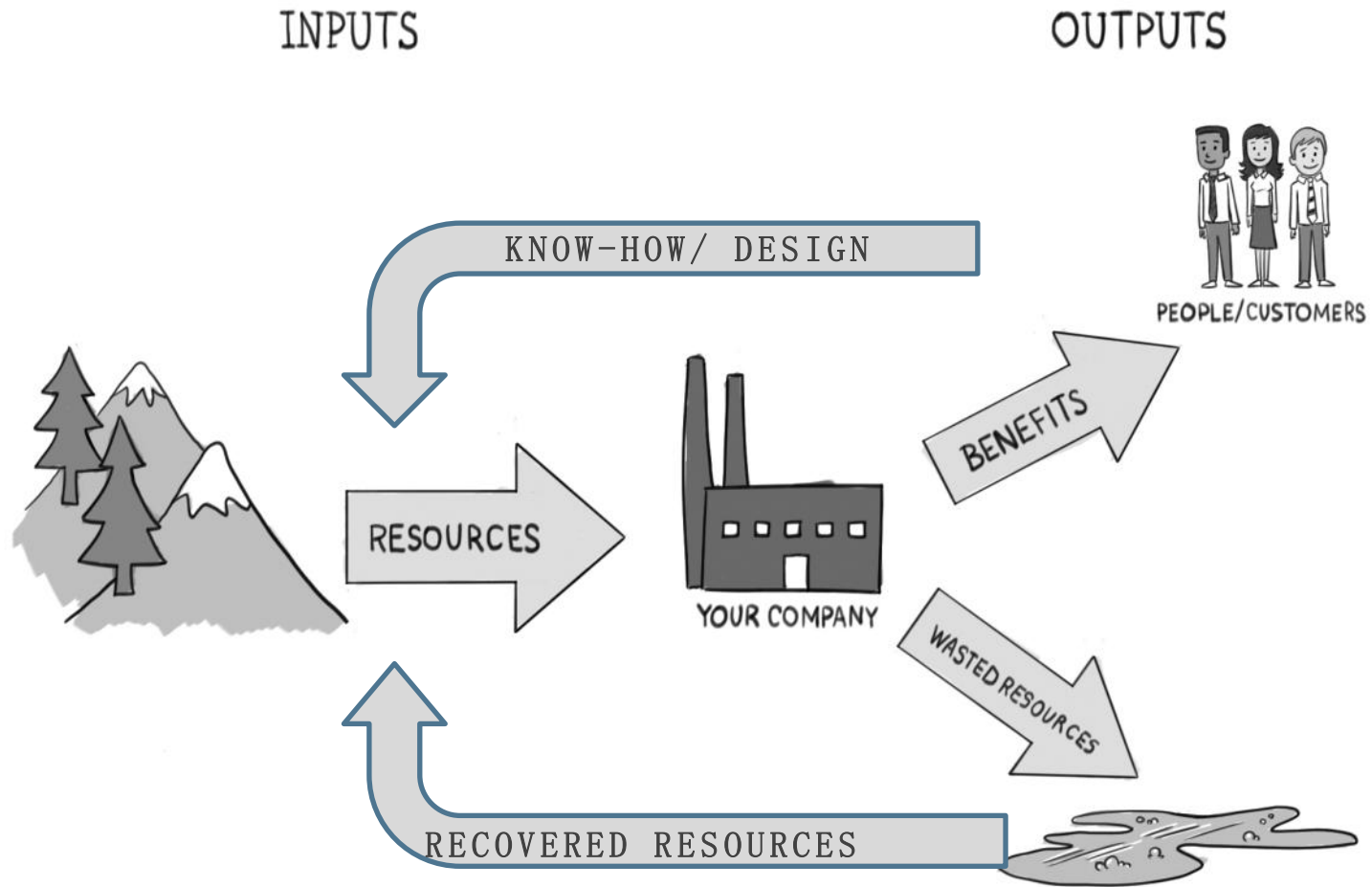
OUTPUTS



Resource Performance



Resource Performance



A Short Story

Getting to

NAKED VALUE

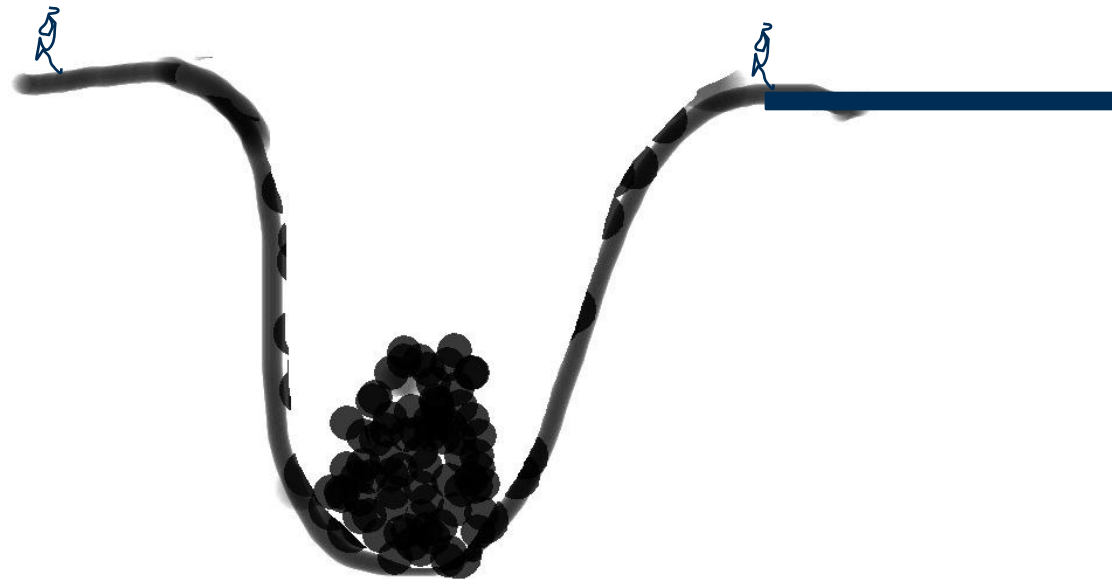
A Short Story



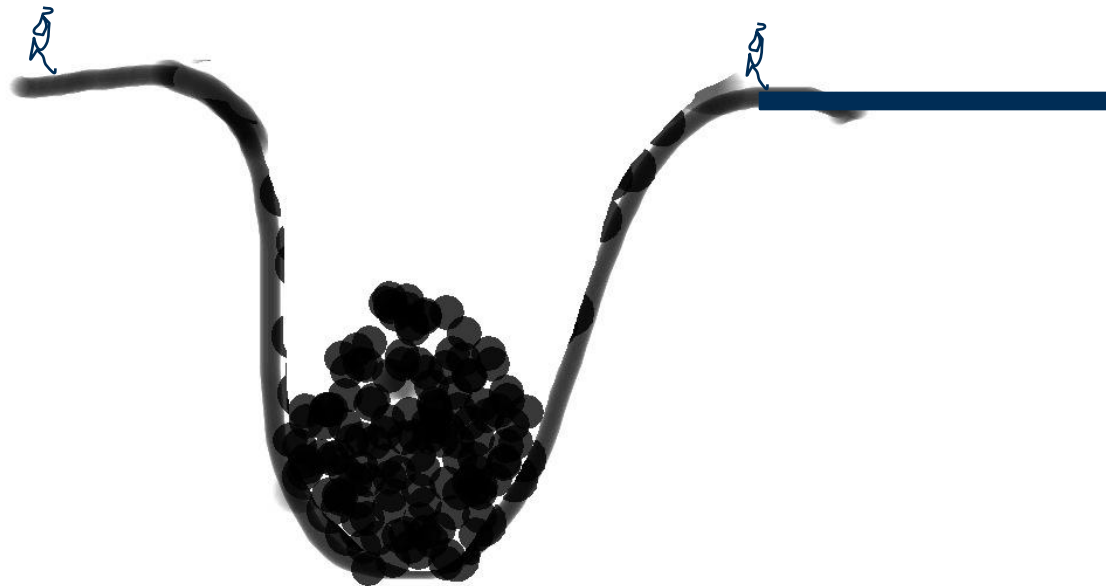
A Short Story



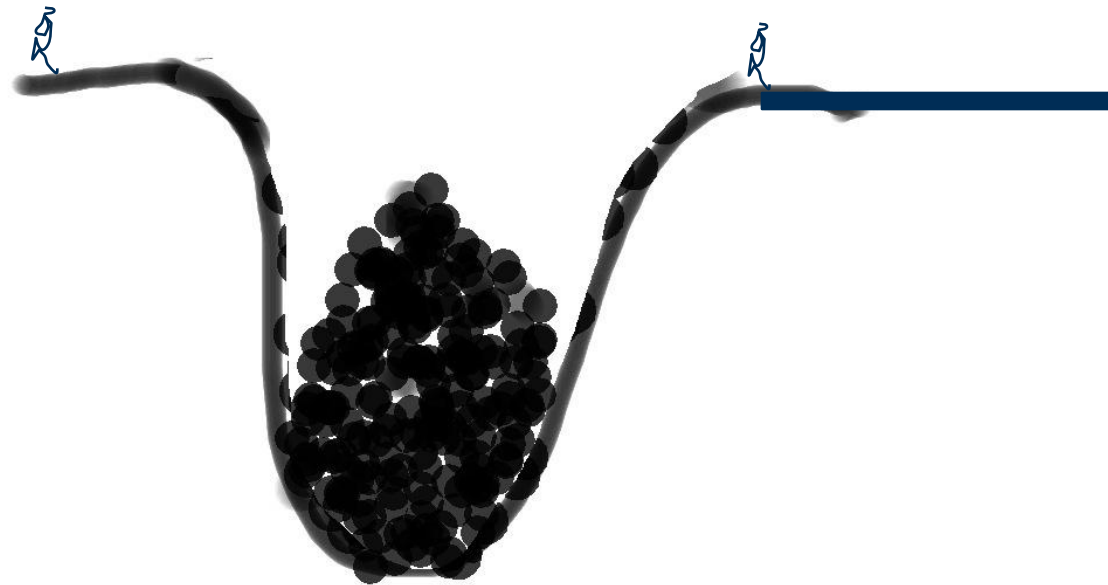
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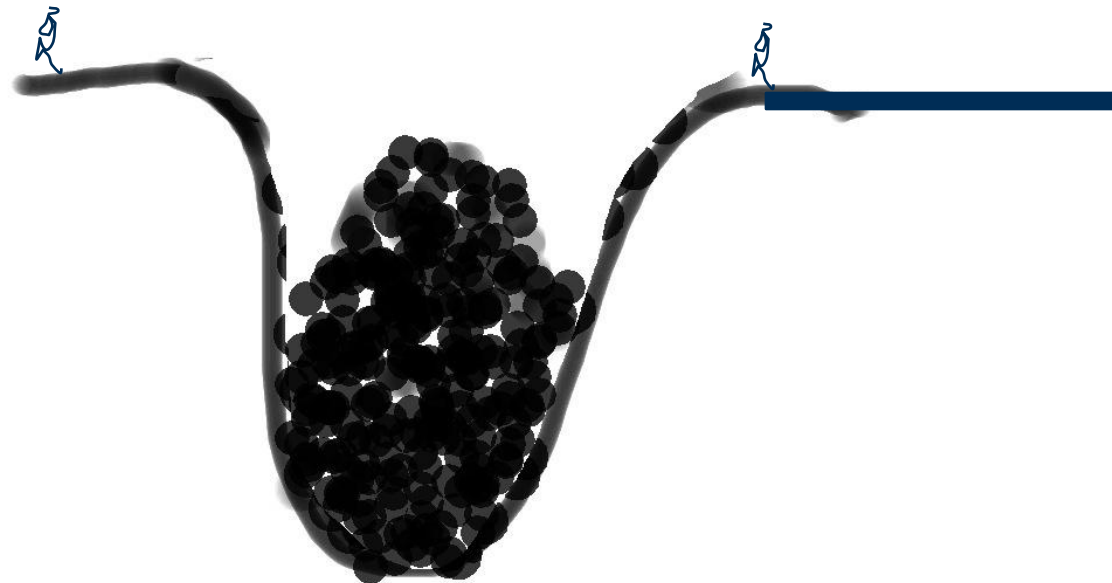
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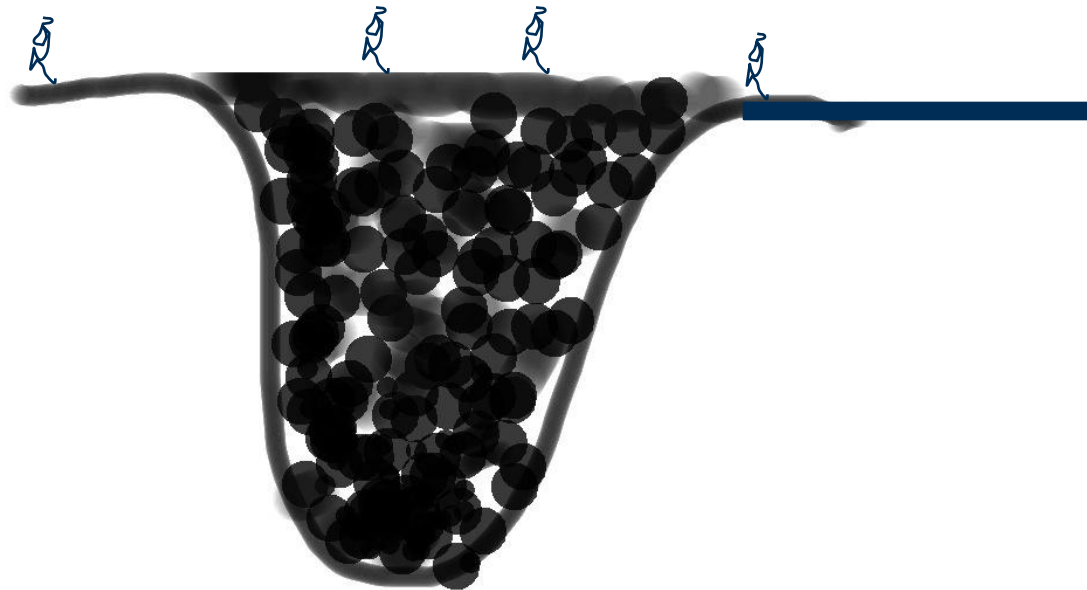
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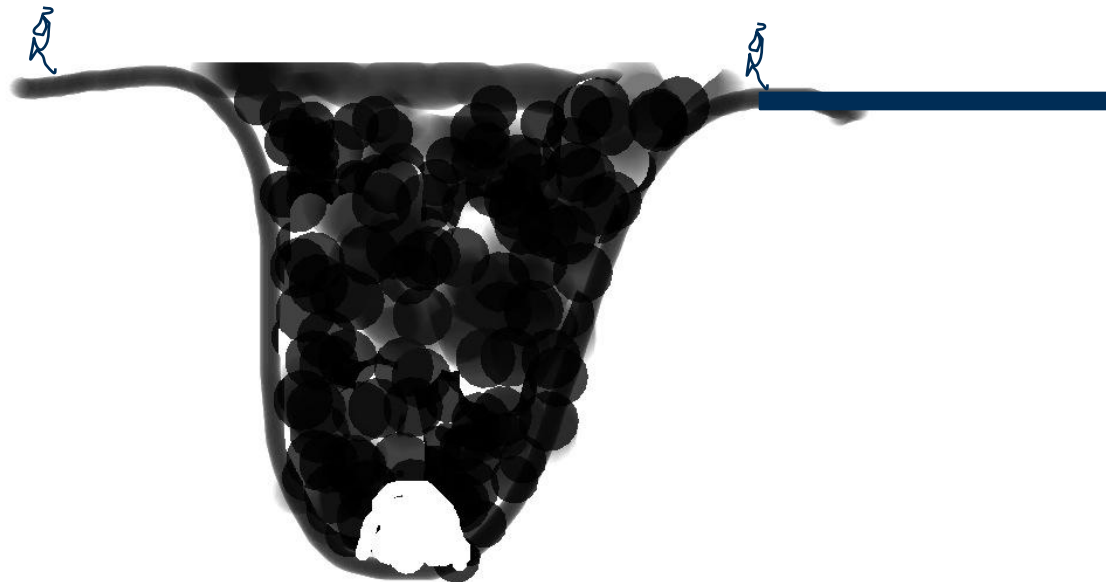
A Short Story



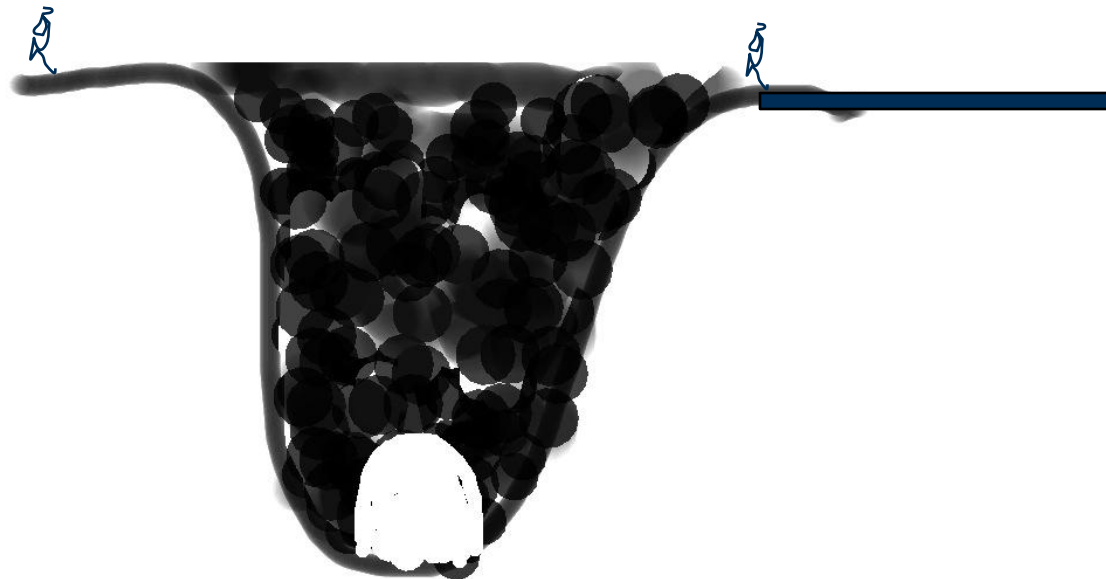
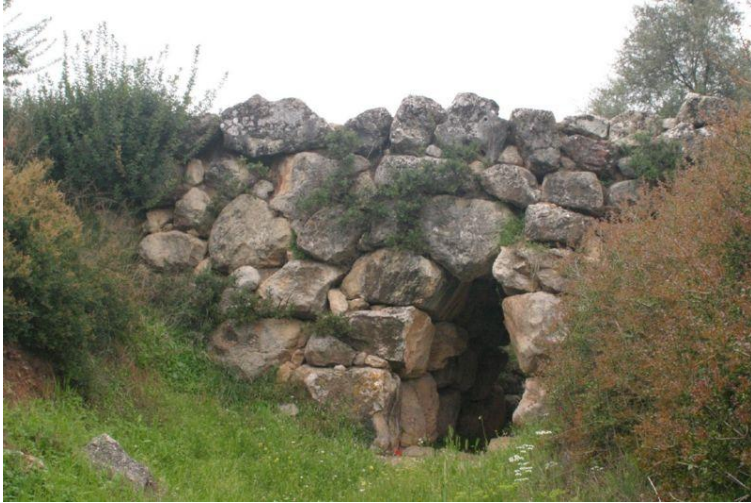
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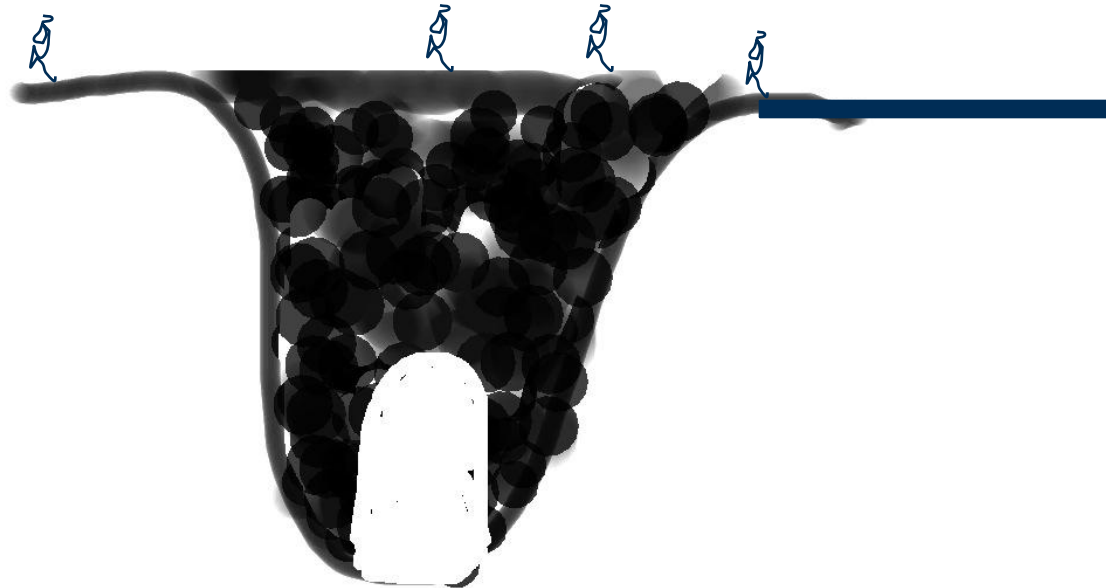
A Short Story



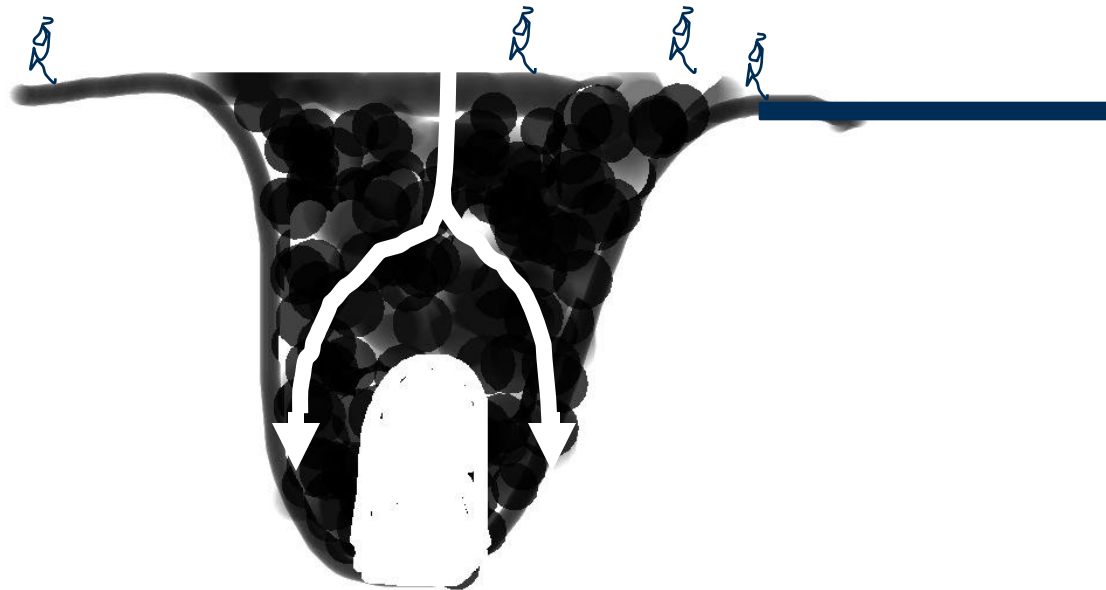
A Short Story



A Short Story



A Short Story



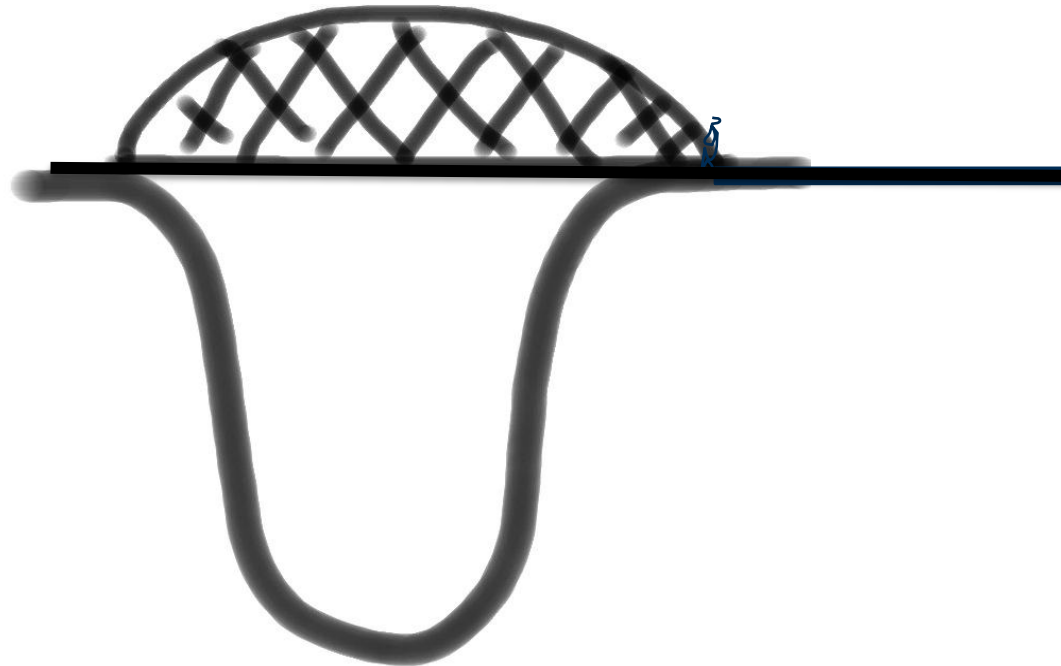
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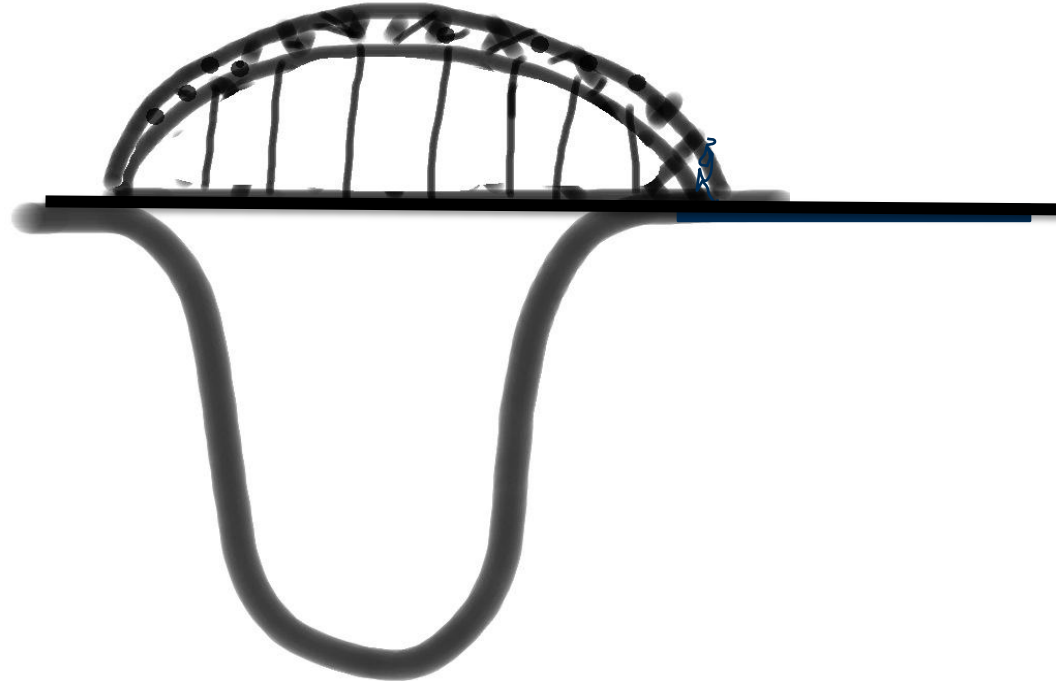
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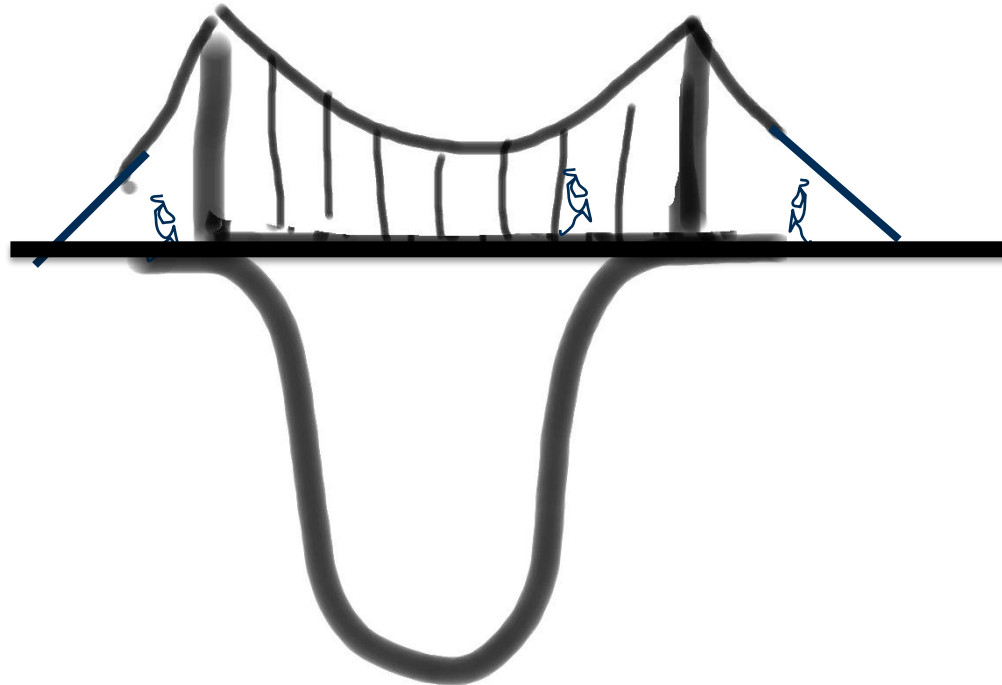
A Short Story



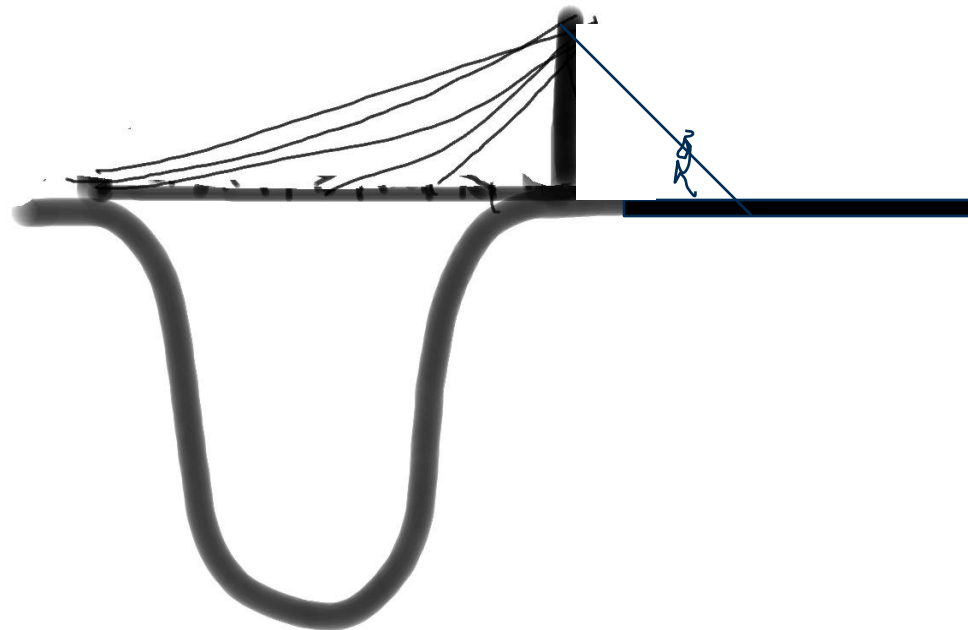
A Short Story



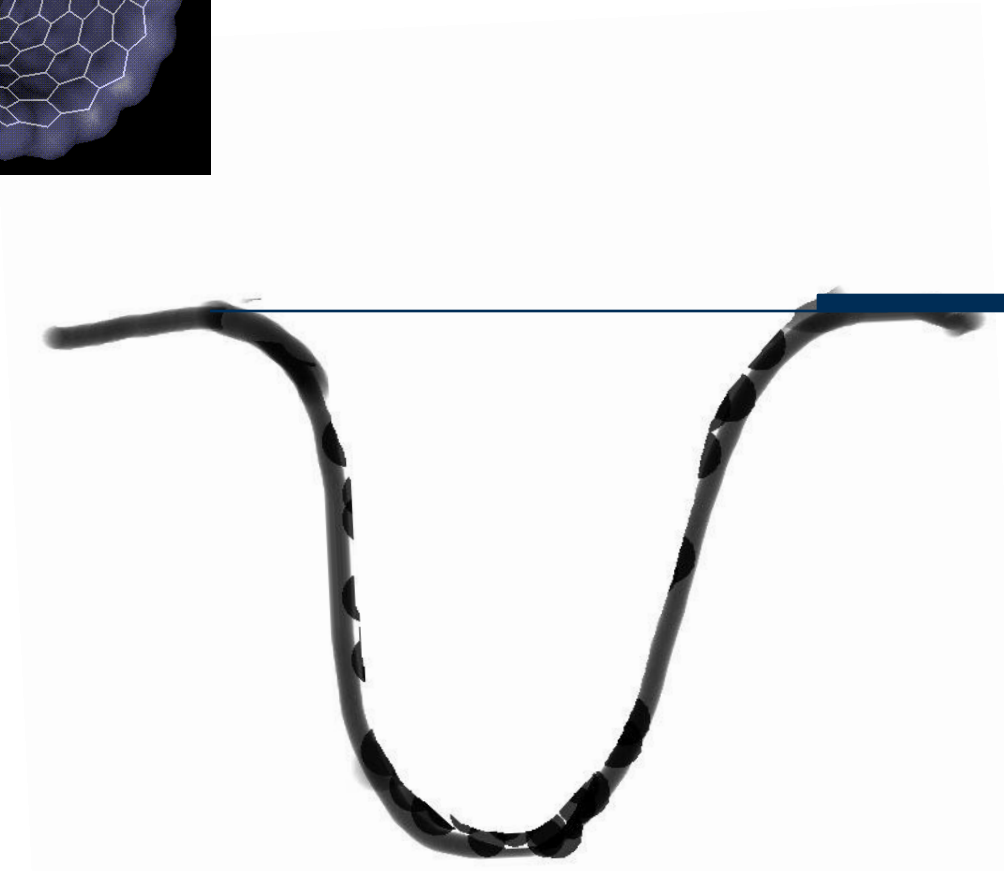
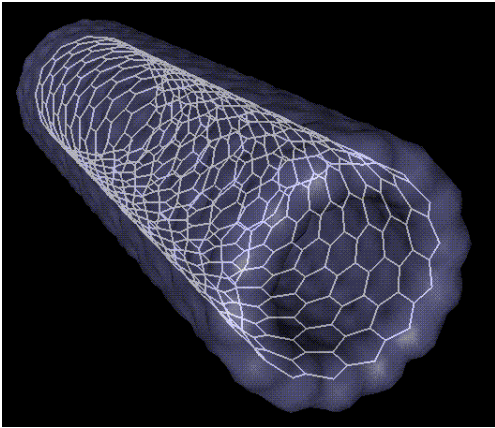
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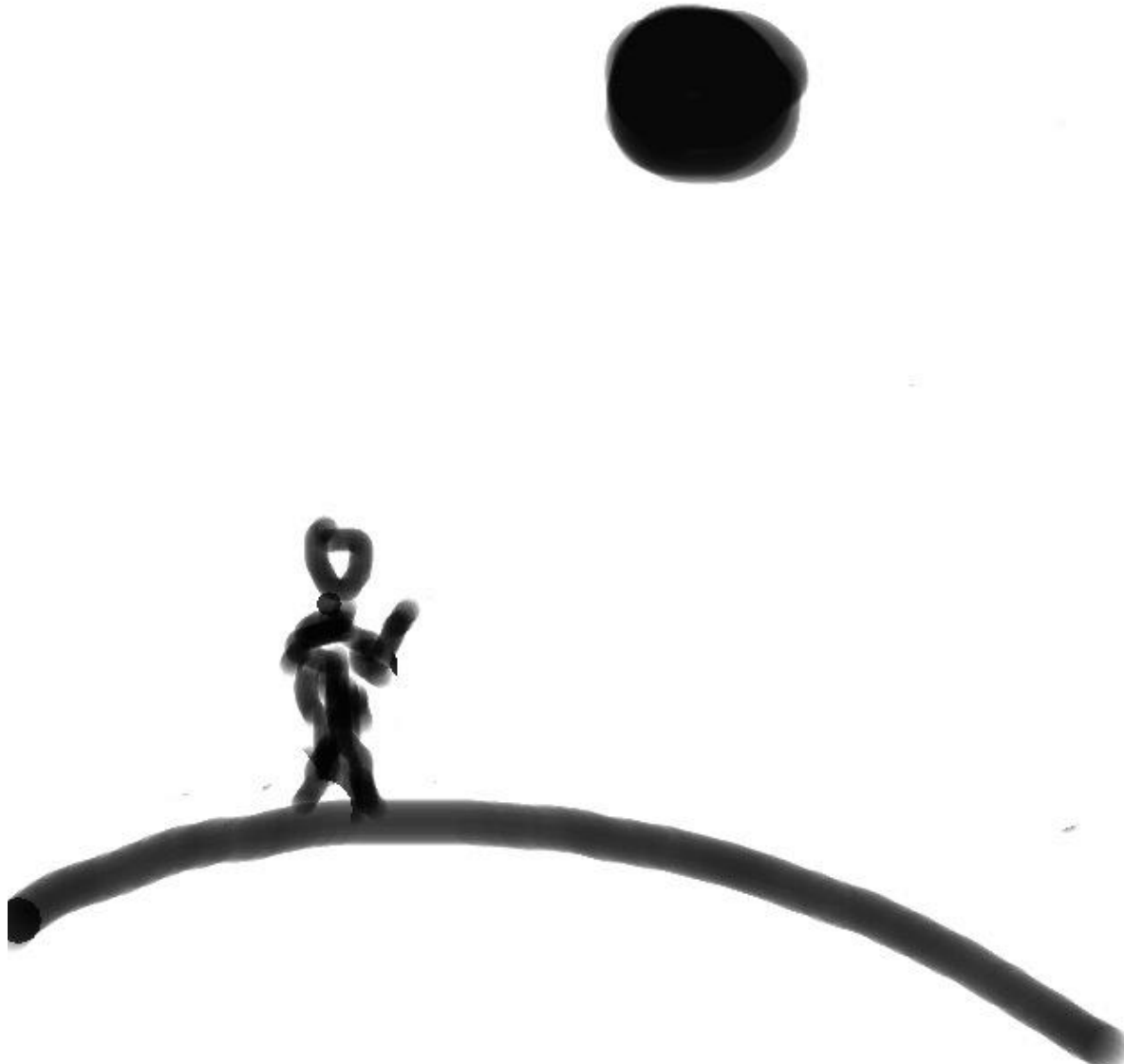
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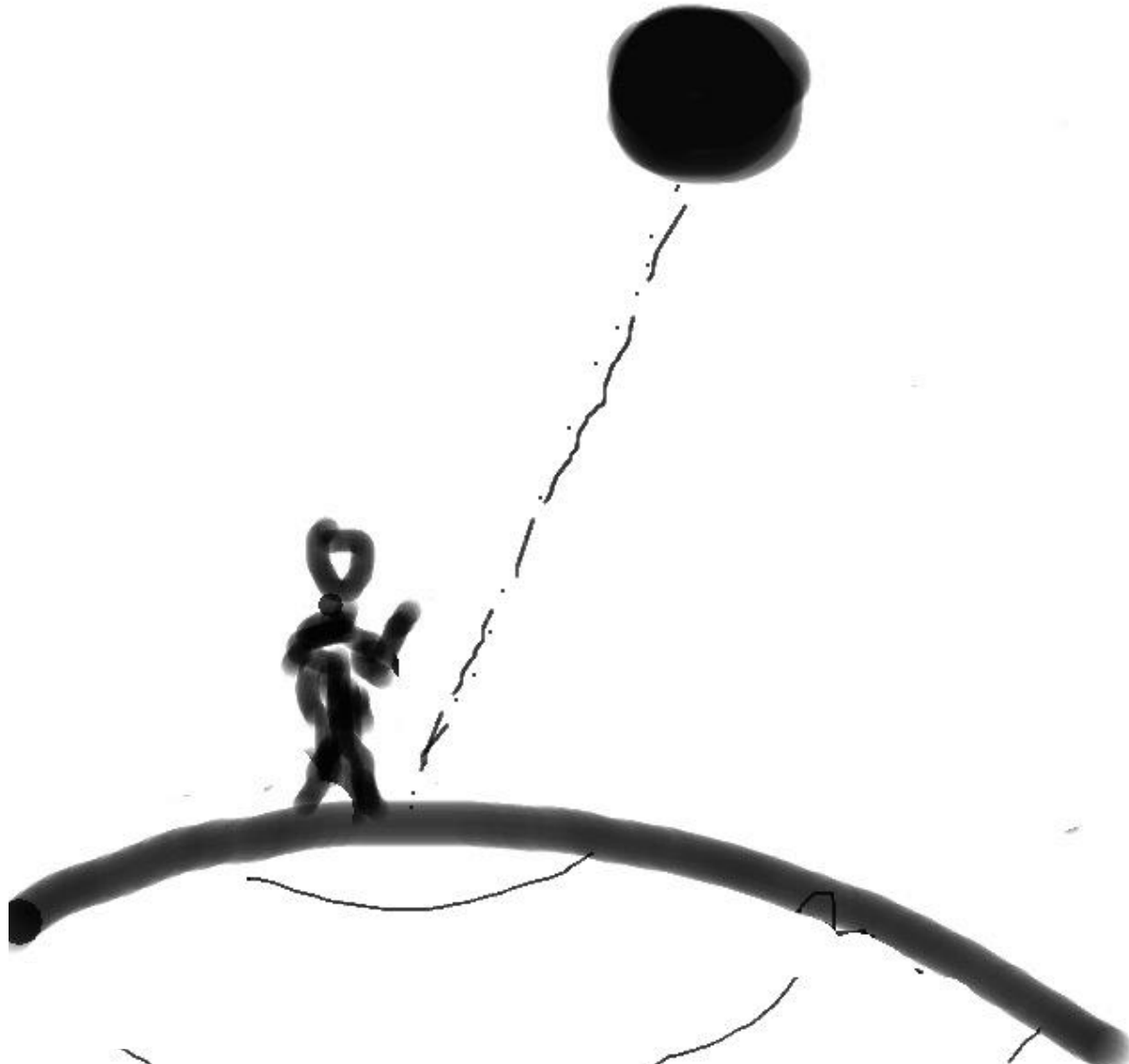
A Short Story



A Short Story



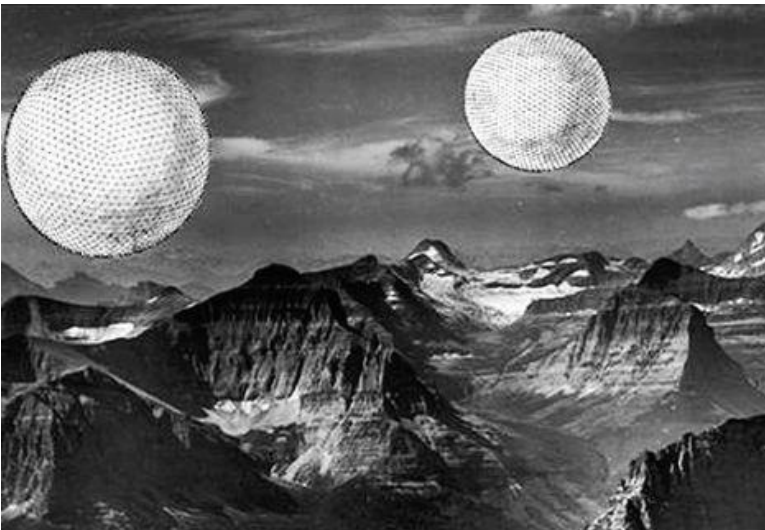
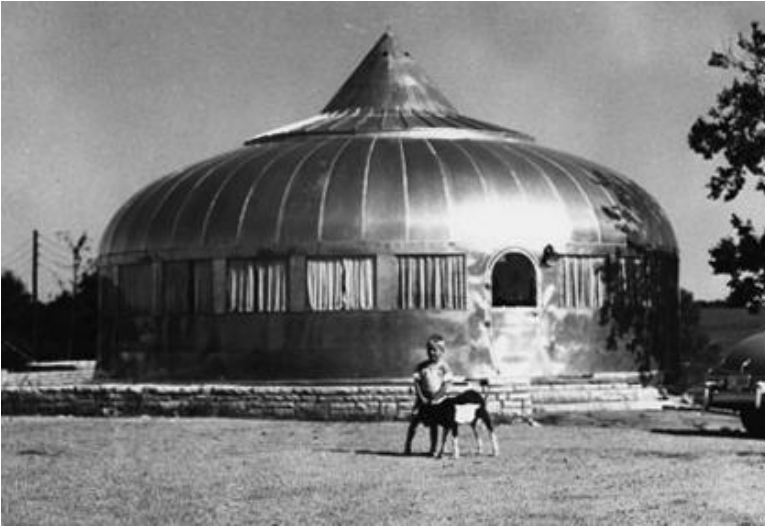
A Short Story



A Short Story

NAKED VALUE

Can we build better with less?



Floating homes



Tiny homes



Assembled buildings



Printed buildings



Passive buildings



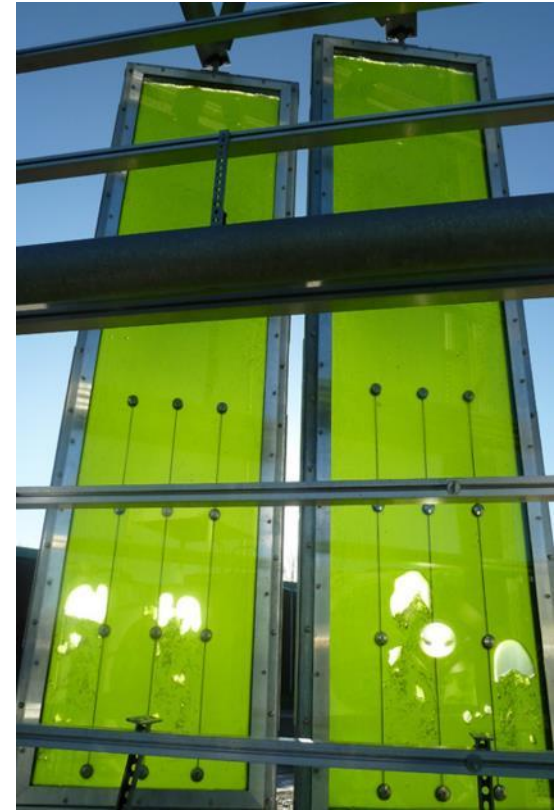
Timber buildings



Net zero buildings



Chlorophyllic buildings



Gardens by the Bay

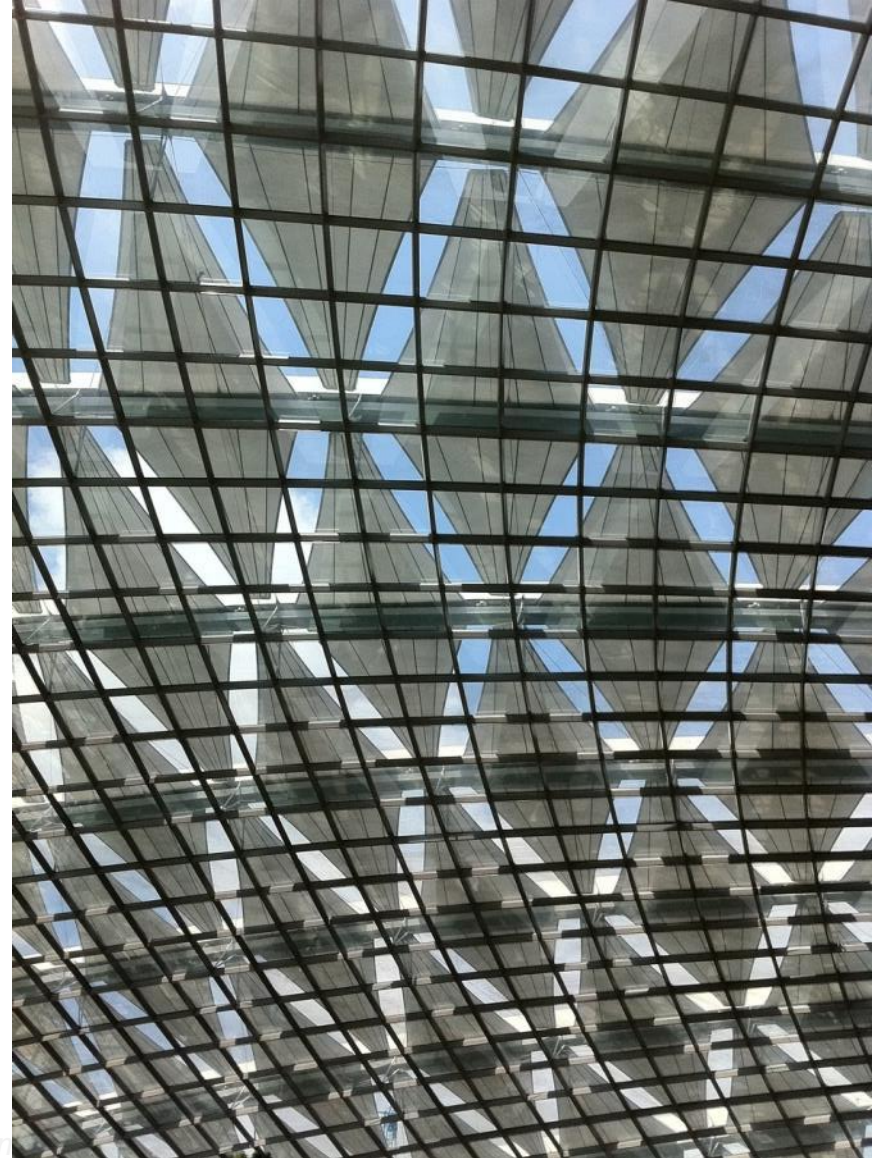
Wilkinson Ayre



Gardens by the Bay



Gardens by the Bay



Gardens by the Bay

Precedents



THE PALM HOUSE AT KEW
DECIMUS BURTON 1848



THE TEMPERATE HOUSE AT KEW
DECIMUS BURTON 1863



THE CLIMATRON
ST LOUIS MURPHY + MACKAY WITH R. BUCKMINSTER FULLER (1960)s



THE ALPINE HOUSE AT KEW
WILKINSON EYRE C 2006



THE BIOMES AT EDEN
GRIMSHAW 2000

Naked Value:

A New Perspective

- ✓ Most products (& structures) are mostly waste
- ✓ Innovation has direction
- ✓ People buy benefits not products
- ✓ Benefits are weightless
- ✓ All pollution is wasted resources

Lightweight Bricks



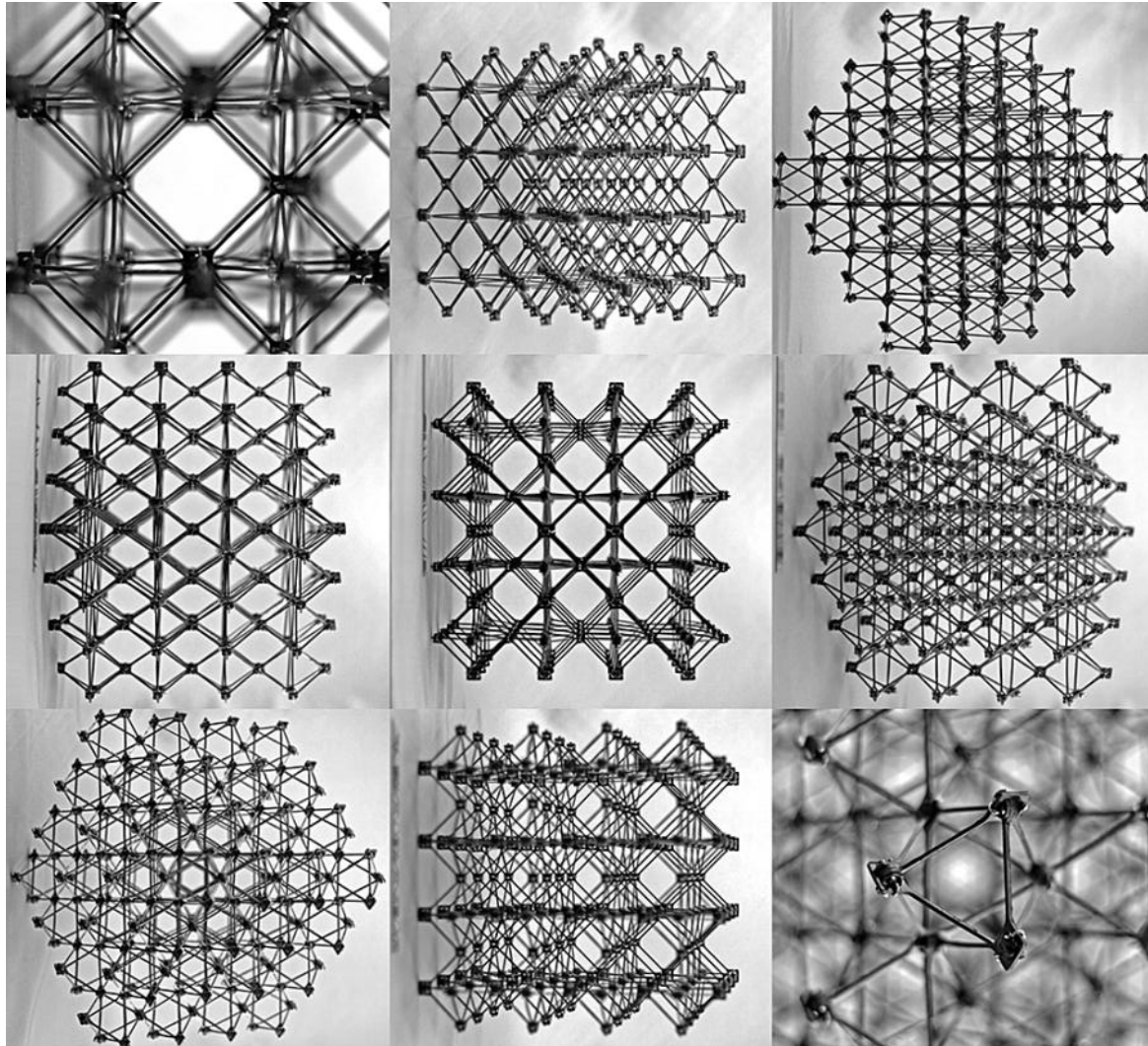
Bio Bricks



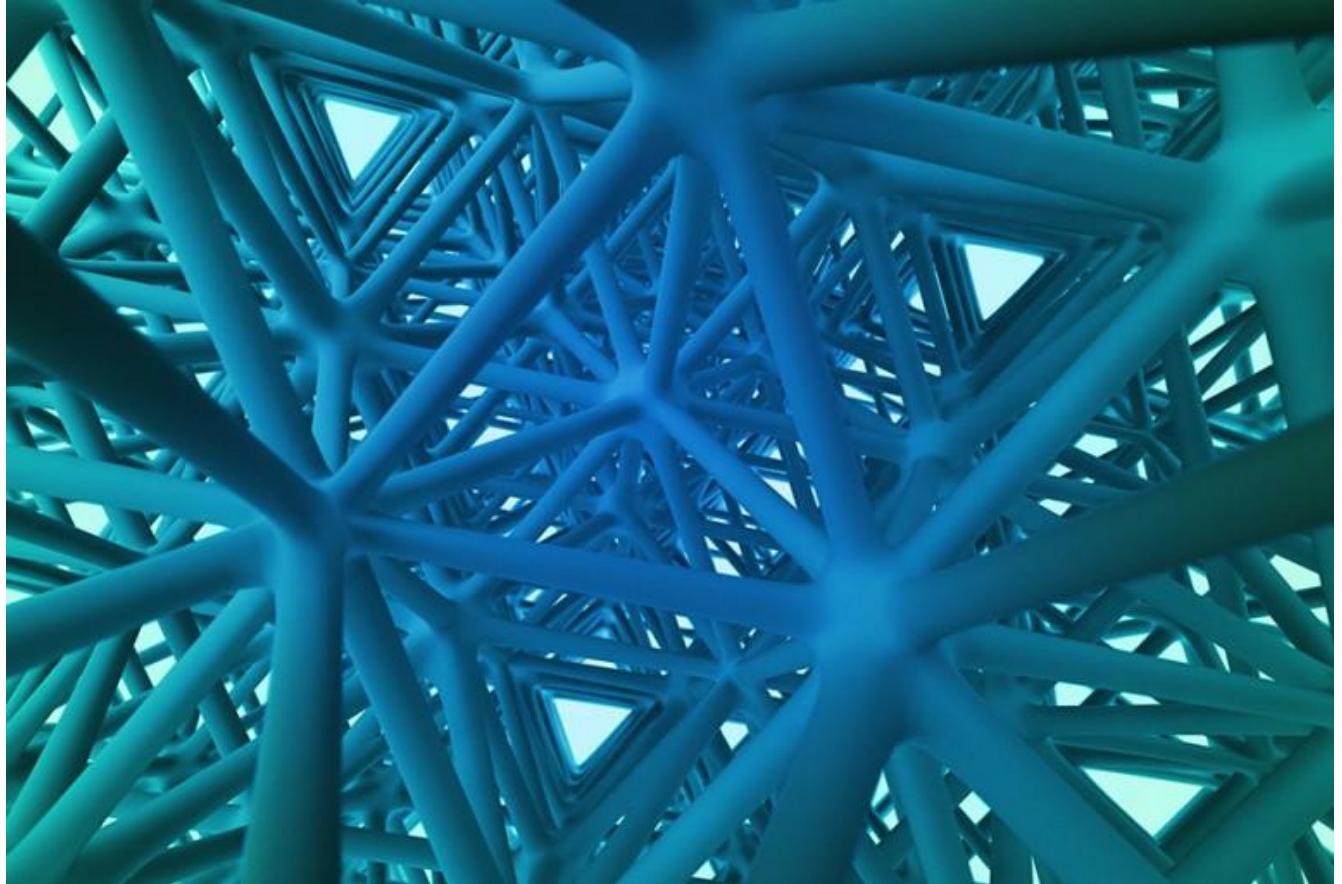
Mushrooming Buildings



Lightweight Structure



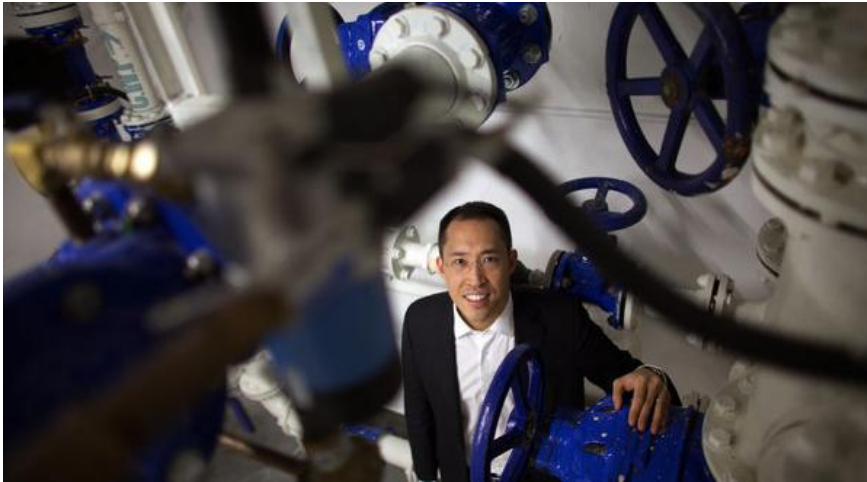
Lightweight Structure



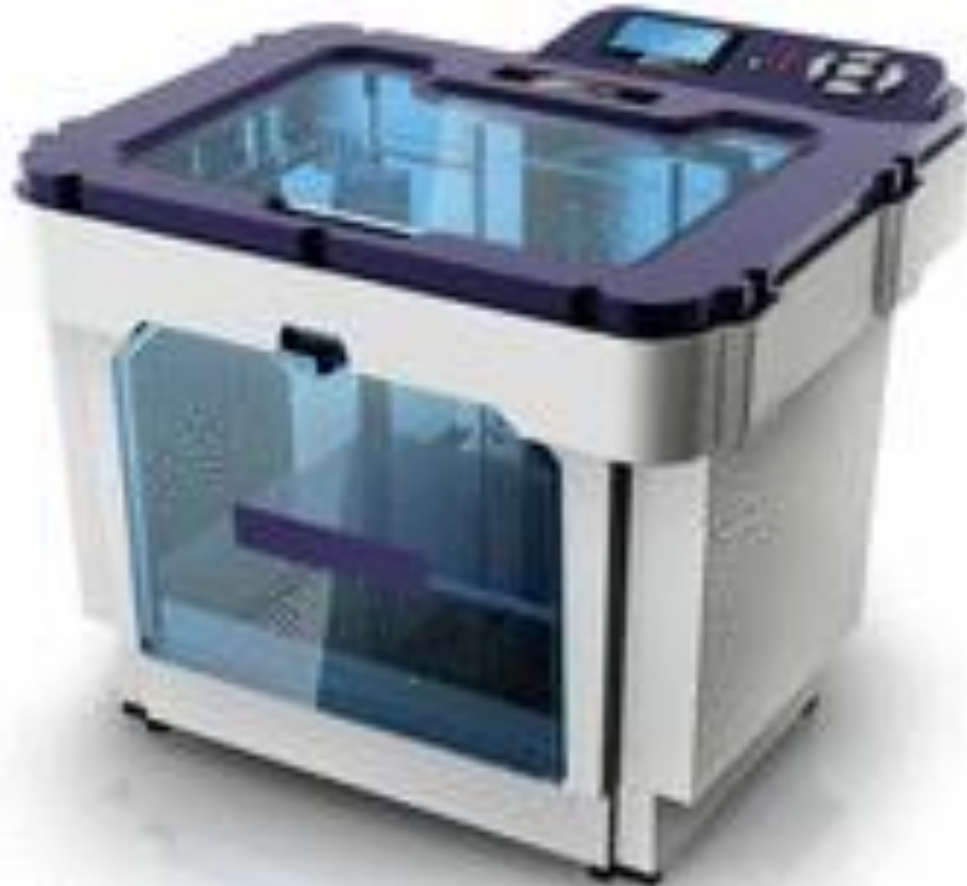
Concrete Cloth



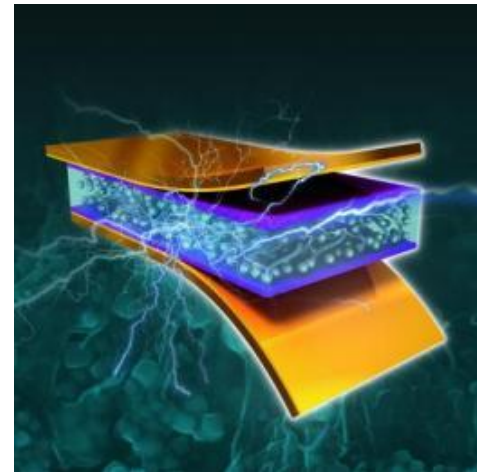
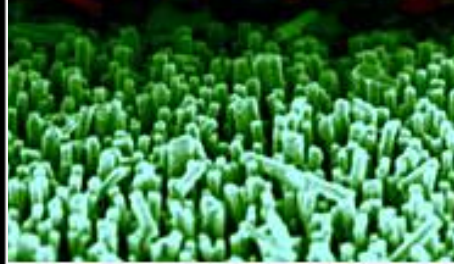
Building Integrated Hydro



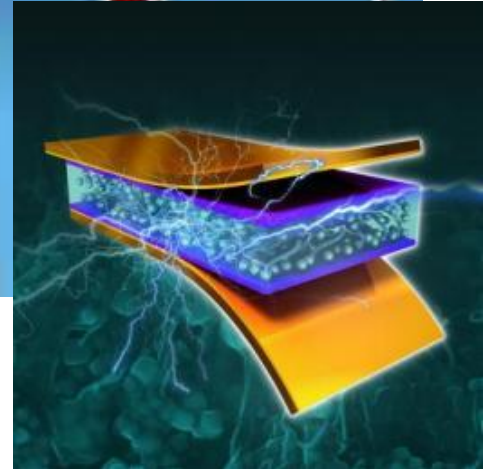
3D Printing



Fabric Power



Stretch Power



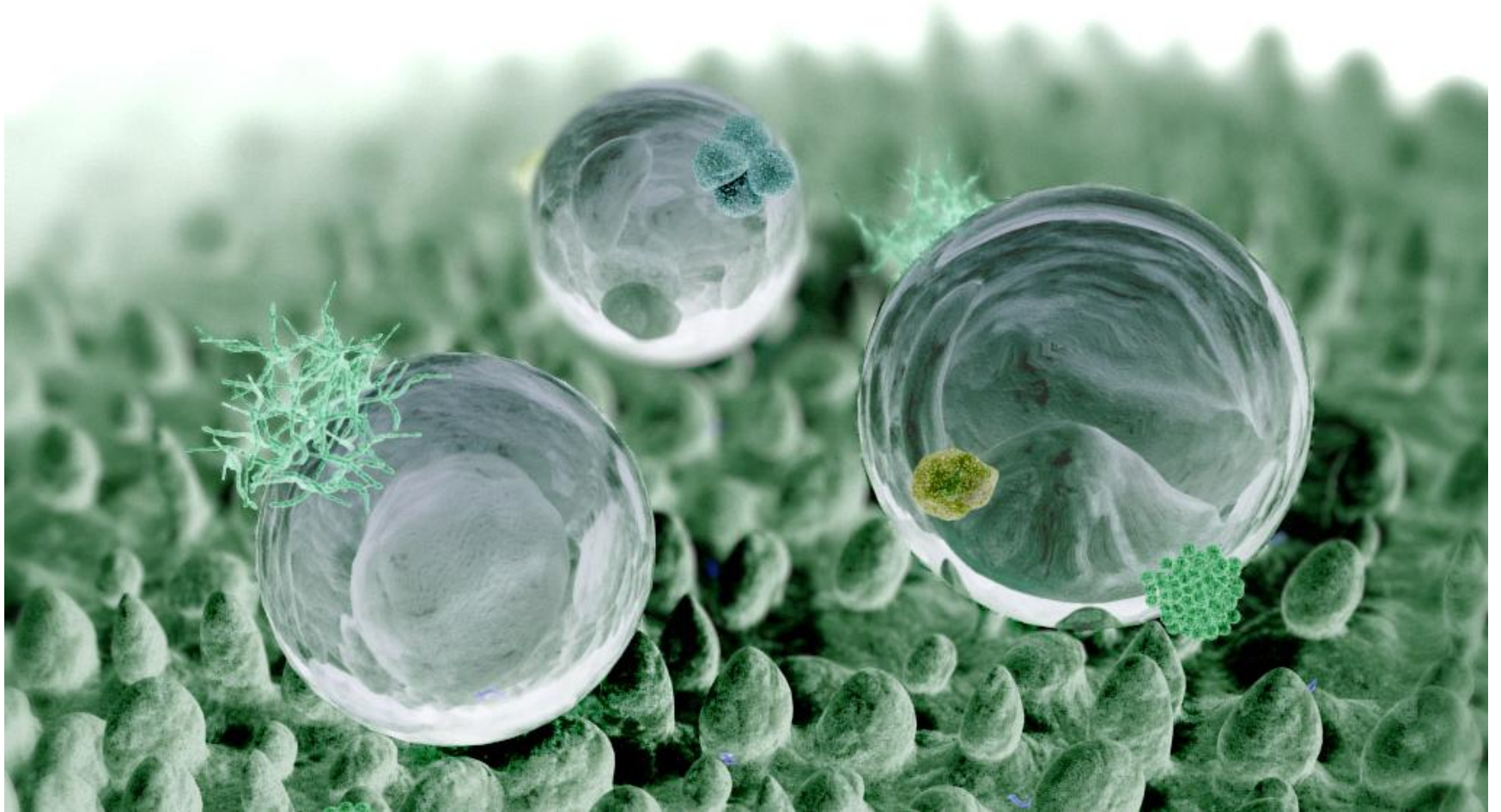
Anti-bacterial Surfaces



Anti-bacterial Surfaces

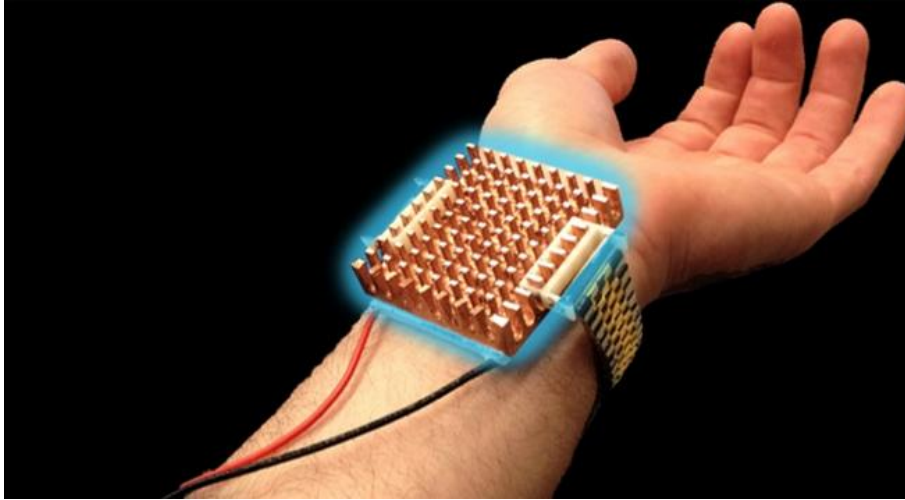


Hydrophobic Surfaces

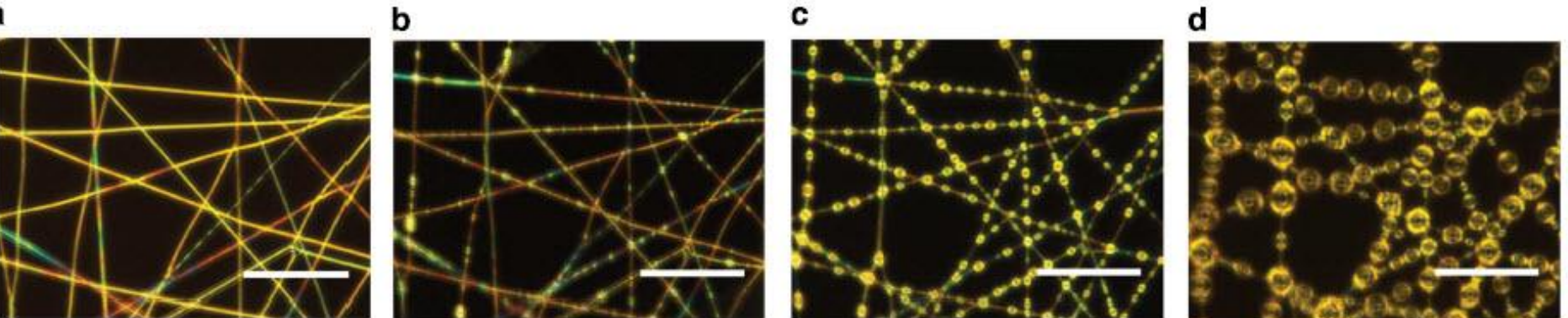
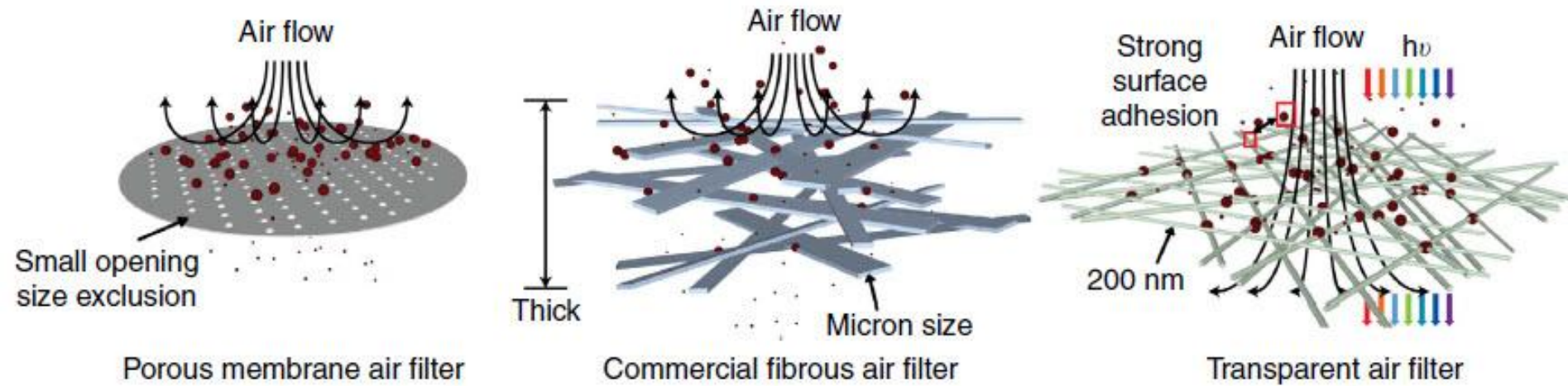


Biomimicry

Personal Cooling



Passive Air Filtration



Lightweight lighting



Flexible form



OLED



Low voltage lighting



Wireless Control



Main Repeater

Keypads



Master Control

Dimmers & Switches



AuroRa Dimmer

Remote Controls



Car Visor Control

Design to Dematerialize

- ✓ Providing most value with the least resources
- ✓ Taking the initiative
- ✓ Improving the quality of human experience



Emulating Nature



The Sustainability Challenge

If so, how?

How will it affect the built environment?

How can you accelerate change?

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