



# Biomimicry

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Getting in touch with 3.8 billion years of wisdom

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# What is Biomimicry?

Innovation inspired by nature.

*The practice of adapting nature's best "ideas" to the invention of sustainable technologies for people*

We don't learn *about* nature; We **learn from nature.**



# Biomimicry is....

## ”..Conscious Emulation of Life’s Genius”

- **Conscious:** Being intentional
- **Emulation:** Learning from living things, then applying those insights to the challenges humans want to solve.
- **Life’s Genius:** Recognizing that life has arrived at well-adapted solutions that have stood the test of time, within the constraints of a planet with finite resources.





# ZERO

hours stuck in traffic

# 685,000,000

number of hours Los Angeles commuters were stuck in traffic in 2013



**BIOMIMICRY**  
INSTITUTE



**ZERO**

pigments and dyes used to create these brilliant colors

**750,000**

metric tons of textile dyes used annually to color our fabrics



**BIOMIMICRY**  
INSTITUTE

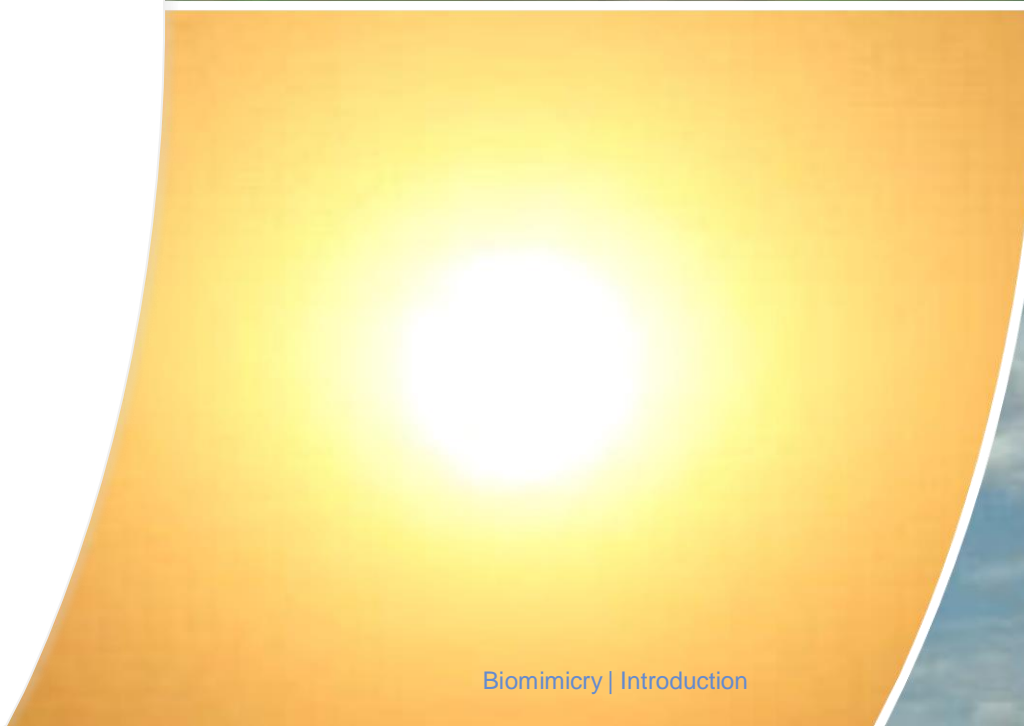


[Biomimicry - Energy Technologies](#)

# Earth's Operating System

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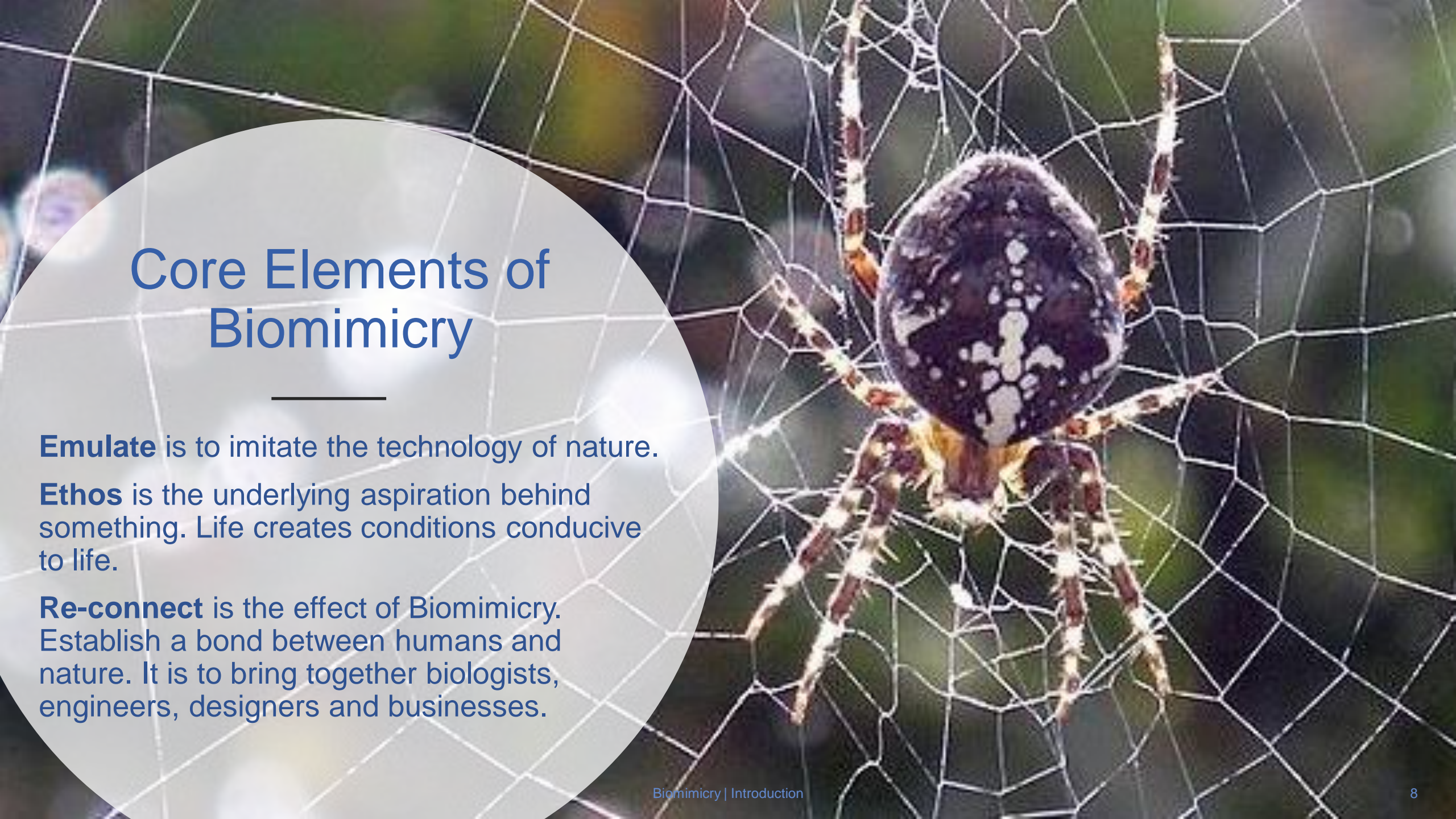
- Limited Water, Atmosphere and Sunlight
- Gravity, Cycles, Dynamic Change



# Why Biomimicry?

- We can develop new products, processes, and systems, or improve existing designs.
- Can help us to shift our perspective, see design problems and objectives differently, and uncover “new” solutions to difficult problems.
- Socio economic and ecological pressure
- Transformative innovation
- Save the earth
- Makes perfect business sense
- We need a mentor/teacher - A teacher with 3.8 billion years of wisdom!
- Do we have a choice?





# Core Elements of Biomimicry

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**Emulate** is to imitate the technology of nature.

**Ethos** is the underlying aspiration behind something. Life creates conditions conducive to life.

**Re-connect** is the effect of Biomimicry. Establish a bond between humans and nature. It is to bring together biologists, engineers, designers and businesses.

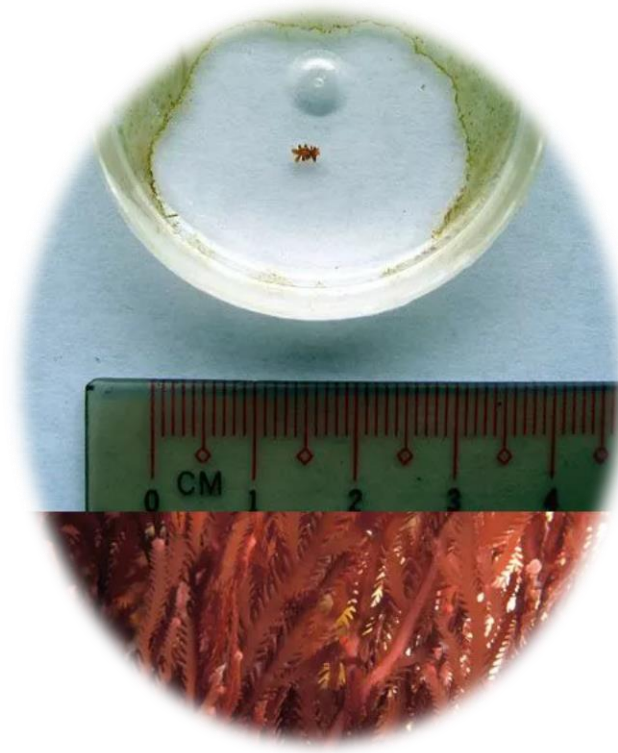


# What are we mimicking?



## FORM

Shape, surface or texture  
(macro or micro)



## PROCESS

Operations or behaviours



## SYSTEM

Many forms and processes  
interacting

# Biology to Design

*You look at nature and abstract the design principle and create a new design.*



**Discover** the part where you get to grips with the organism: What does it do? How does it do it?



**Explore** the part where you bridge biology and human design: What are the functions and context?



**Create** the part where you create a design based on the abstracted design principle.



**Evaluate** the part where you evaluate your design and improve on it. You can be inspired by other living organisms.

# Challenge to Design

*You work on a challenge and look to nature for help with the solution.*



Explore: You scope out the human challenge and identify functions, context and scale. What you want your design to do?



Integrate: Integrate the life principles in your design brief.



Discover: How does nature do what you are proposing to do. For this find natural models that match your challenge's requirements.



Next go outside, research, ask people to look for natural models.



Sort your findings into patterns that repeat or can be used with the taxonomy.



Always remember to consider context and scale.

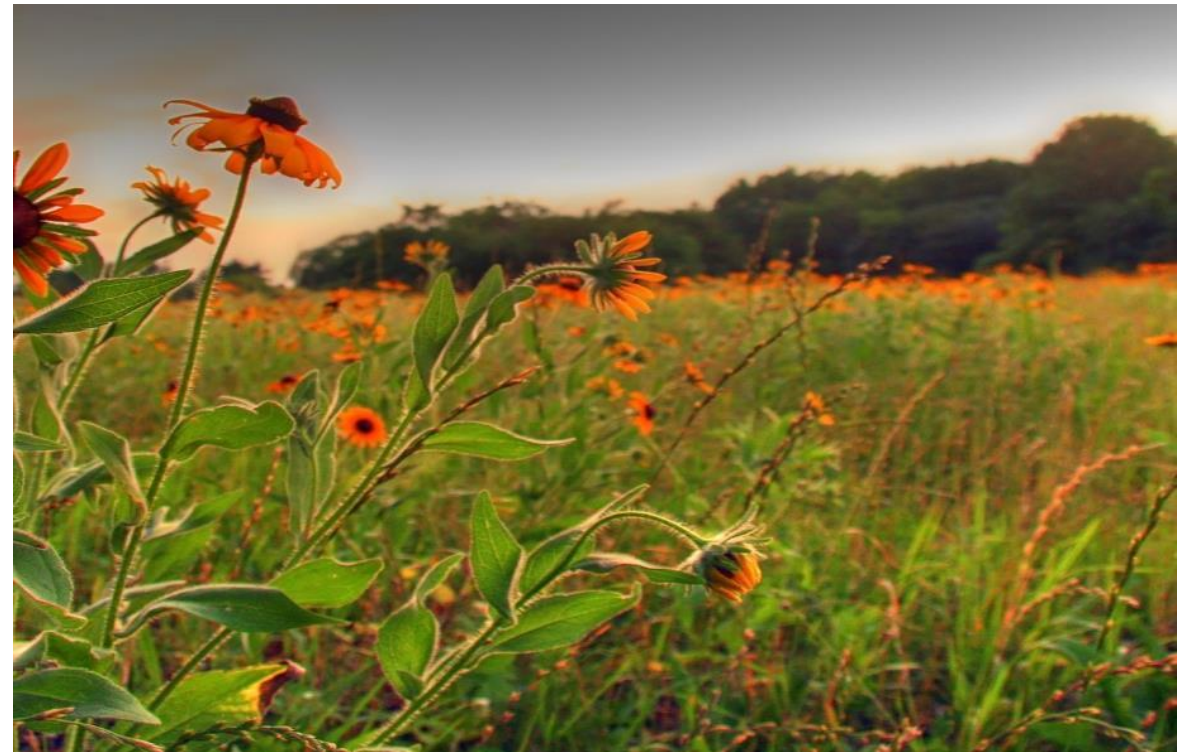
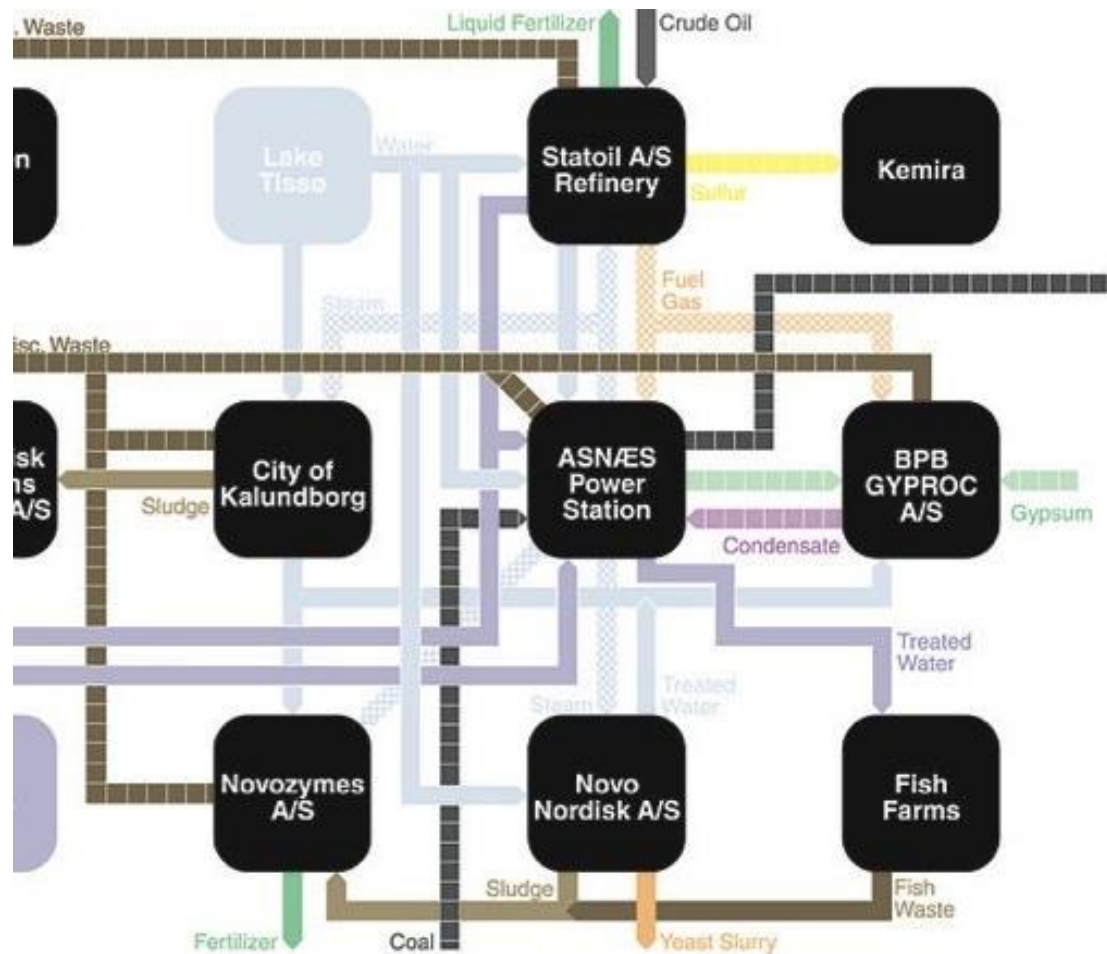
# Shinkansen Bullet Train

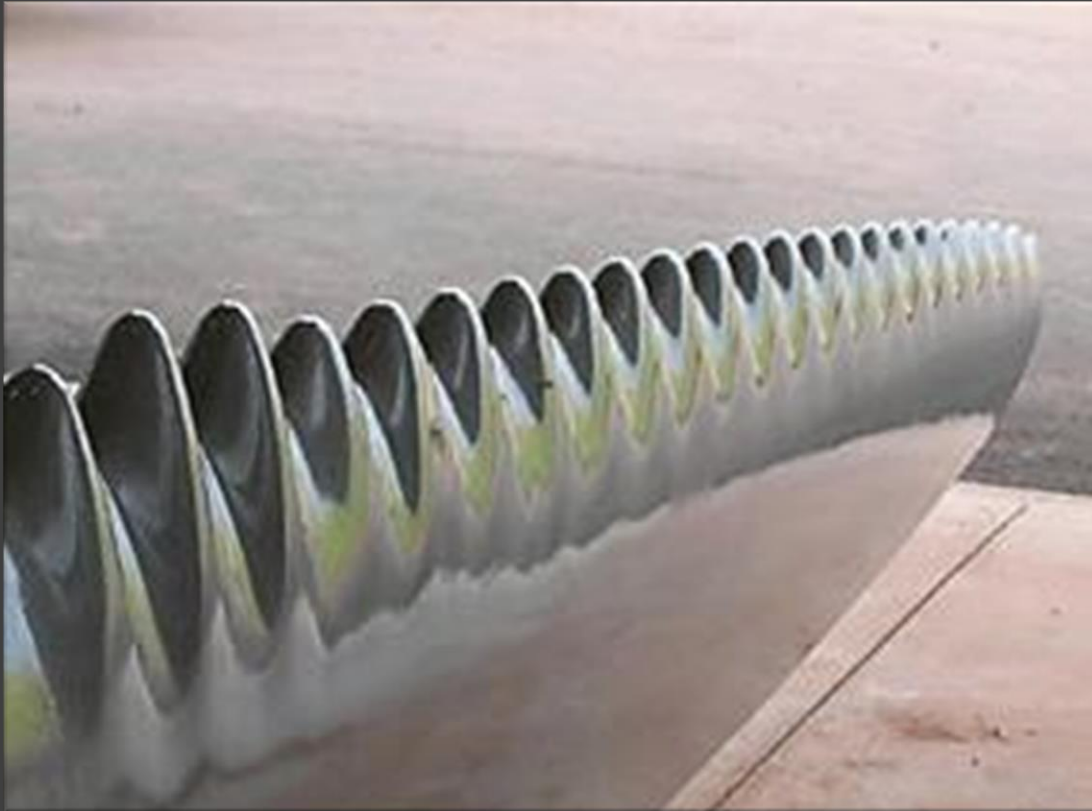




Eastgate Centre,  
*Harare (Zimbabwe)*

# Kalundborg, Denmark – Industrial Symbiosis



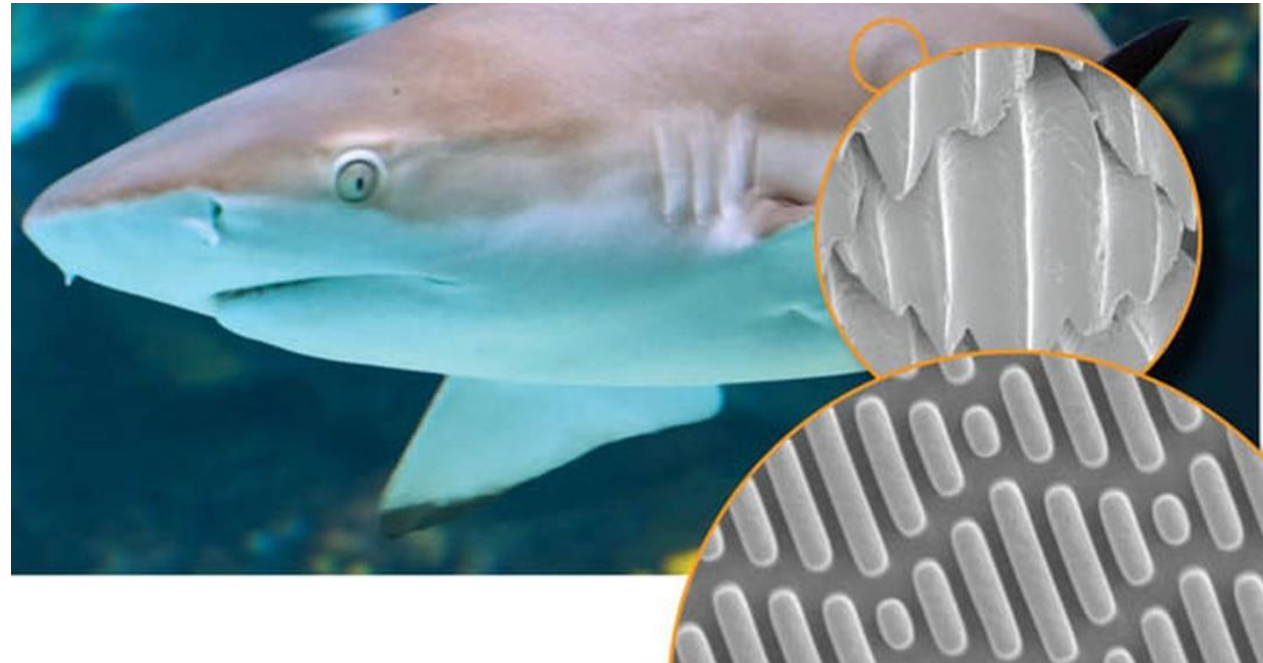


# WhalePower - Tubercle Technology

## Can Namib Desert Beetles Help Us Solve Our Drought Problems?



## Using Shark Skin To Fight Against Bacteria





# Nature's Unifying Patterns - 1

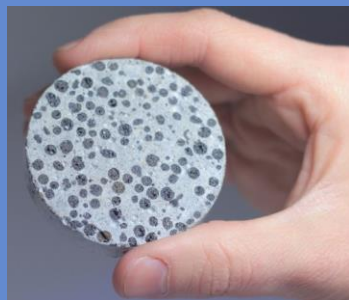


Nature uses only the energy it needs and relies on freely available energy



Nature tends to optimize rather than maximize

Nature recycles all materials



Nature is resilient to disturbances



Nature provides mutual benefits



[Sloth in forest](#)

# Nature's Unifying Patterns - 2



Nature runs on information



Nature uses chemistry and materials that are safe for living beings

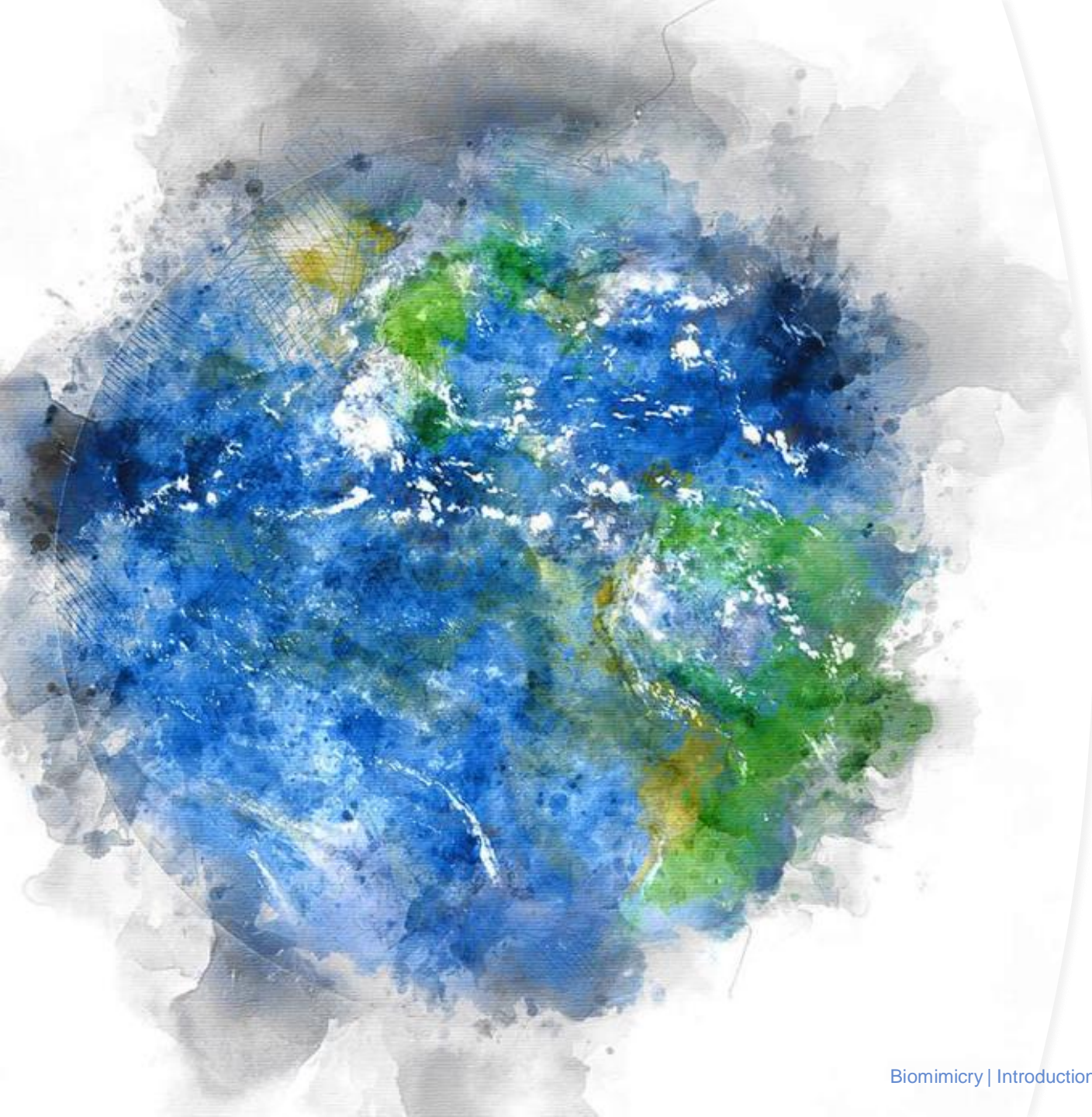
Nature builds using abundant resources, incorporating rare resources only sparingly



Nature is locally attuned and responsive

Nature uses shape to determine functionality





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## Biomimicry Initiatives

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- Biomimicry for Entrepreneurs
- Biomimicry for Schools
- Biomimicry for Colleges
- Biomimicry ‘Train the Trainer’
- Biomimicry Virtual Museum
- Biomimicry in Government policy
- Biomimicry Challenge
- Research into Biomimicry

BIOMIMICRY INSTITUTE YDC Home Challenge Details Judges Gallery Educator Resources Donate LOGIN

# YOUTH DESIGN CHALLENGE 2020

MID AUGUST 2020\* REGISTRATION OPENS

MARCH 1, 2021\* REGISTRATION DEADLINE

APRIL 1, 2021\* SUBMISSIONS DEADLINE

MAY 2021\* AWARDS

\*Dates are tentatively scheduled.

Teach STEM concepts while connecting your students to nature through the Biomimicry Youth Design Challenge.

The Youth Design Challenge (YDC) is a free, hands-on, project-based learning experience that provides classroom and informal educators with a new framework to introduce biomimicry and an interdisciplinary approach to science and environmental literacy. Working in teams with an adult coach, students explore the wonders of the natural world and apply what they learn to create innovations that support a healthier planet. Learn more about the YDC and how to participate below.

DETAILS **Details**

GETTING STARTED

Timeline

BIOMIMICRY INSTITUTE Home About Challenge Details Resources Gallery Donate REGISTER / LOGIN

# GLOBAL DESIGN CHALLENGE 2020

JANUARY 8, 2020 REGISTRATION OPENS

JUNE 1, 2020 SUBMISSIONS DUE

JUNE - JULY 2020 JUDGING PERIOD

END OF JULY 2020 FINALISTS SELECTED

SEPTEMBER 2020 LAUNCHPAD BEGINS

Think you have what it takes to create a winning biomimetic design? We're looking for nature-based solutions to solve some of the grandest challenges of our time. By entering the Biomimicry Global Design Challenge, you will be able to hone your biomimicry skills and use creative problem solving inspired by nature's genius. Rally your team and register today to gain access to tools, free trainings and mentor support.

DFESIGN BRIEF **Design Brief**

GETTING STARTED

RULES AND FAQs

Youth Design Challenge: <https://youthchallenge.biomimicry.org/>

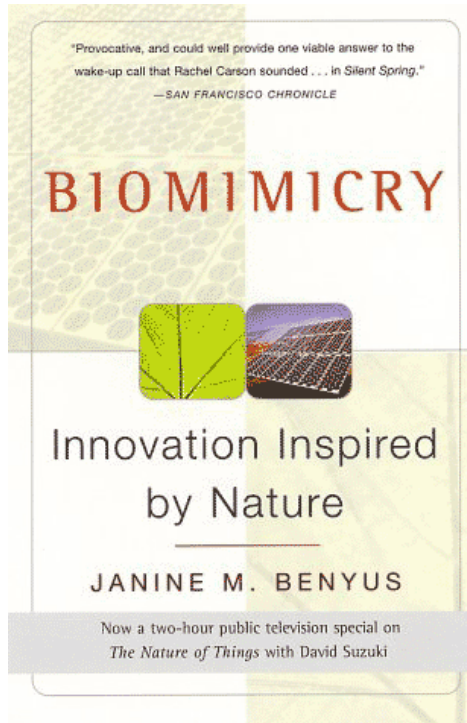
Global Design Challenge: <https://challenge.biomimicry.org/>

# Innovation using Biomimicry

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- **Sustaining innovation:** Improves efficiency and prolongs the life of existing systems
- **Disruptive innovation:** Shakes things up or subverts those systems
- **Transformative innovation:** With a longer term aspiration it is possible to disrupt with a purpose. Shifting the whole system over time to a new viable pattern fit for the future.

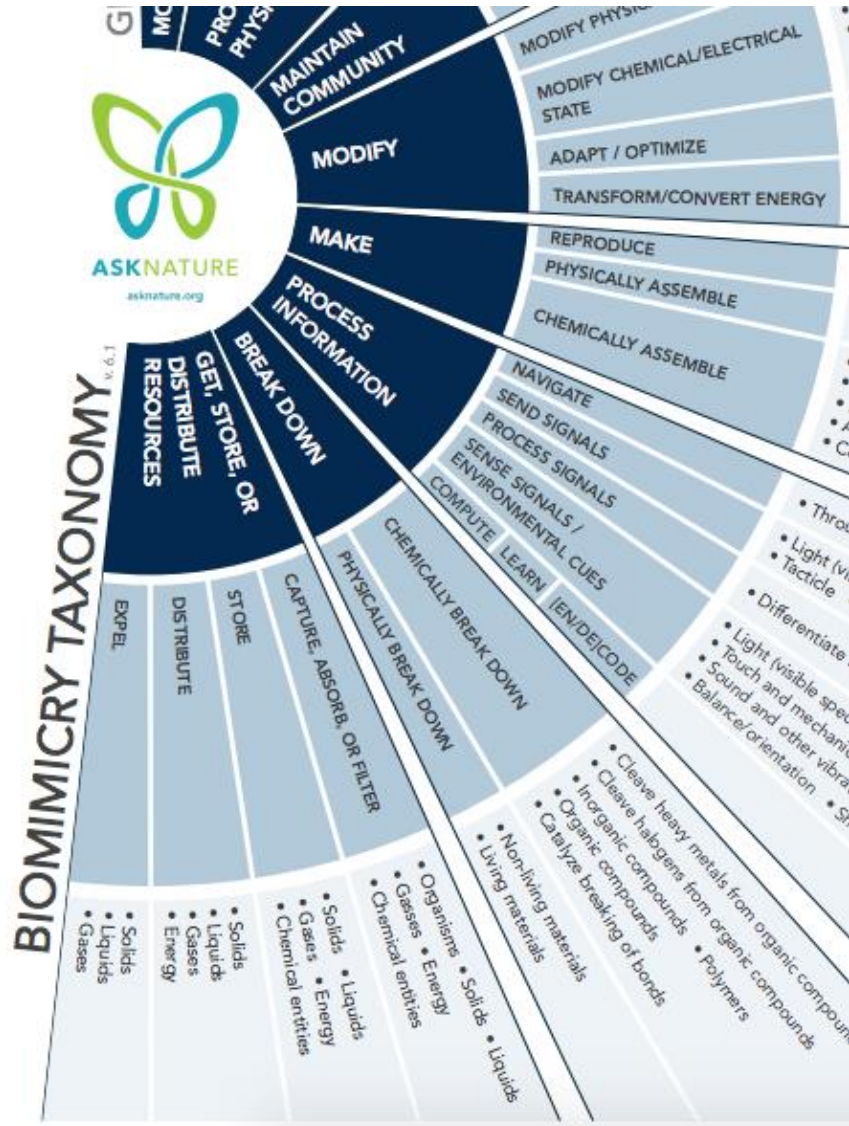




## Janine Benyus

“The core idea is that nature, imaginative by necessity, has already solved many of the problems we are grappling with. Animals, plants, and microbes are the consummate engineers. They have found what works, what is appropriate, and most important, what lasts here on Earth...”

# Resources & Reference



- Biomimicry Institute: <https://biomimicry.org/>
- AskNature: <https://asknature.org/>



Thank you

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- SlidesCarnival