



Biomimicry Emulating Nature's Genius

Nicole Isle, Biologist at the Design Table
nicole.isle@brightworks.net
 Jennifer Barnes, AIA
jennifer.barnes@brightworks.net
 Mary Hansel, Certified Biomimicry Professional
mary@biomimicry.net



Brightworks Sustainability Advisors

Built Environment



Enterprise Solutions



Education






Enterprise Sustainability



A Holistic Approach to System Transformation

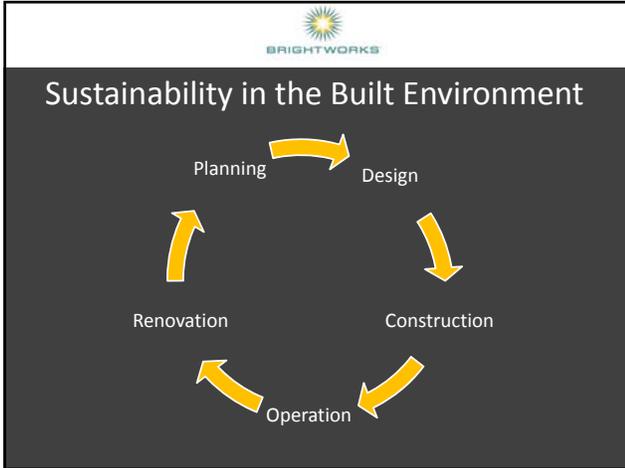




Sustainability Education

- Private Capacity Building
- Workforce Training Programs
- USGBC and AIA Continuing Education



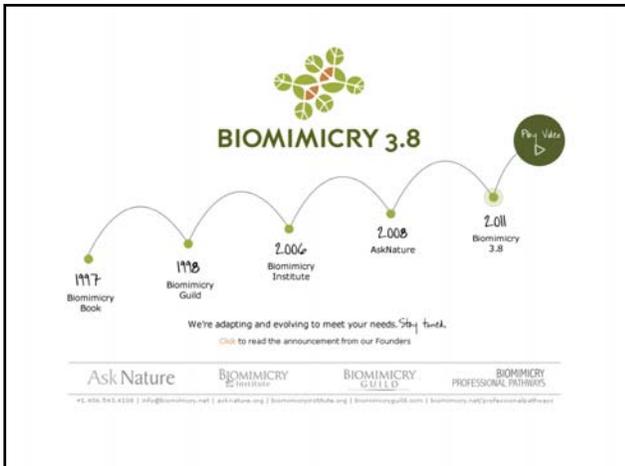


BRIGHTWORKS

Building Shell Performance | Daylight Optimization | Space Conditioning | Integrated Design

How can the natural world's 3.85 billion years of systematic refinement inform today's design challenges?

- Workshops
- Site analysis and planning
- Biologist at the Design Table Integration



Agenda

- 1 Biomimicry Basics
- 2 Project Application
- 3 Benchmarking Success: Life's Principles
- 4 Local Test Case

BRIGHTWORKS

Inspiring the World

BusinessWeek
World's Most Influential Designers

THE ECONOMIST
BHP in 100th issue on the cover

FINANCIAL TIMES

ASHOKA

TIME
Heroes of the Environment

CHAMPIONS OF THE EARTH

HBR LIST 2009

BRIGHTWORKS

What is Biomimicry?

Innovation

- Makes 'beyond sustainability' accessible
- Broadens the solution space

Sustainability

- Ecological literacy
- Environmentalist ideal – ecological imperative

BRIGHTWORKS

What is Biomimicry?

“the conscious emulation of life’s genius”

BIO Mimicry
Innovation Inspired by Nature
JANINE M. BENYUS

Bio = life, living things

Mimic = simulate, emulate

- Forethought, intention
- Not a slavish re-creation, understand context

Images courtesy of the Biomimicry Institute

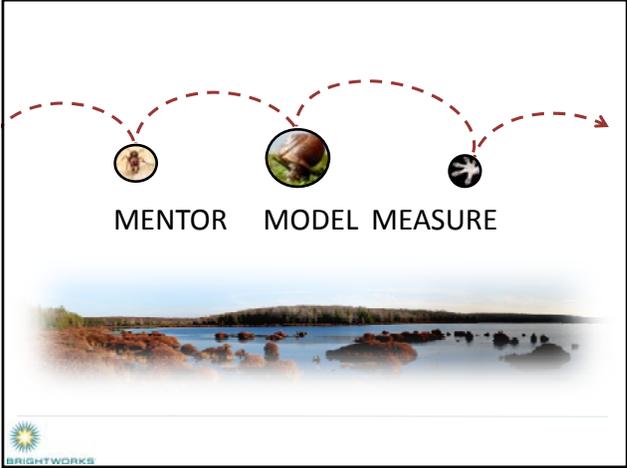
BRIGHTWORKS

The survivors know what works

“... After 3.8 billion years of research and development, failures are fossils, and what surrounds us is the secret to survival.”

BRIGHTWORKS

Project Application
Case Examples



Nature as MENTOR

Images courtesy of the Biomimicry Institute

quiet
your
cleverness

BRIGHTWORKS

Nature as MODEL

FORM
PROCESS
SYSTEM

BRIGHTWORKS

Nature as Model: Form



WhalePower

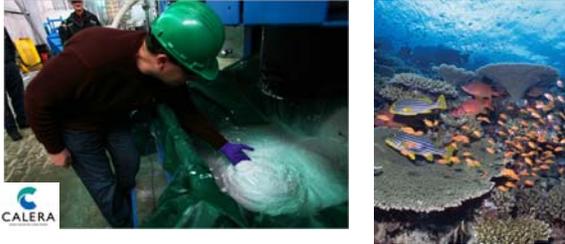
WhalePower wind turbine blade design gains productivity by reducing drag.

- 32% less drag
- 20% production increase

Images courtesy of the Biomimicry Institute

BRIGHTWORKS

Nature as Model: Process



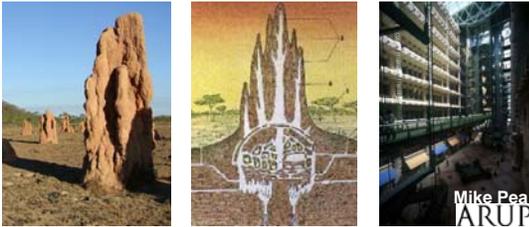
CALERA

Calera is using waste carbon dioxide from flue gas to produce cement in a process similar to coral growth.

- Sequesters CO2 instead of emitting it
- Implications are huge: Construction industry uses more concrete than any other building material

BRIGHTWORKS

Nature as Model: Process



Mike Pearce
ARUP

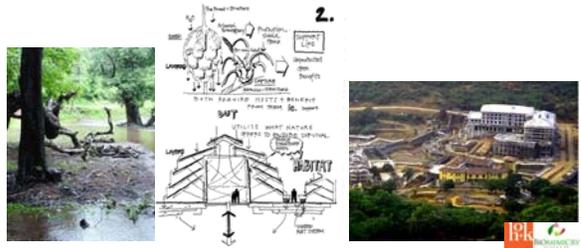
The Eastgate Centre in Harare Zimbabwe uses a natural cooling system that pre-tempers and exhausts air through chimneys the same way termites do.

- 90% energy reduction for cooling loads

Images courtesy of the Biomimicry Institute

BRIGHTWORKS

Nature as Model: System



Lavasa Hill Station near Pune, India in the Western Ghats uses a site design that mimics how the surrounding forest manages water and controls erosion.

- Inspiration: Tree canopies, root systems and water storage

BRIGHTWORKS

Nature as Model: System



Goyang New Town is a 7,000-acre concept plan near Seoul, South Korea that mimics stream network functions across the site's active floodplain.

- Inspiration: Stream types, floodplain functions, wetlands

ac martin BRIGHTWORKS

BRIGHTWORKS

Biomimicry Resources



How would a butterfly inspire your next design?

www.asknature.org

BRIGHTWORKS

Applying Biomimicry

Planners can use biomimicry to:

Community Development

- Develop a new community vision for sustainability
- Build stewardship among the community
- Create youth programs

Building and Infrastructure Development

- Assess a site during pre-development due diligence
- Establish ecological performance measures to inform development programming
- Approach project workshops
- Gain inspiration for sustainable strategies

BRIGHTWORKS



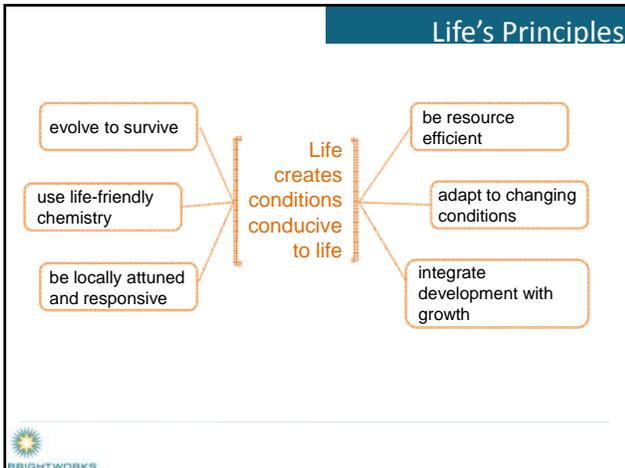
Nature as Measure Life's Principles

earth's operating conditions

- sunlight, water, gravity
- limits & boundaries
- cyclic processes
- dynamic equilibrium




“Each species is a masterpiece...”
E.O. Wilson



BIOMIMICRY
Nature as Measure: Life's Principles

Assessing success using Life's Principles as the performance benchmark

Life Creates Conditions Conducive to Life

	Biological	Human Cultural
Be resource (material and energy) efficient		A community tool shed
Use multi-functional design		Woonerf Shared spaces

Life's Principles

Life creates conditions conducive to life

be resource efficient

- use low-energy processes
- use multi-functional design
- fit form to function
- recycle all materials

©Brian L. Currie

Life's Principles

Life creates conditions conducive to life

adapt to changing conditions

- Incorporate diversity
- Embody resilience through variation, redundancy, and decentralization
- Maintain integrity through self-renewal

BRIGHTWORKS

Life's Principles

Life creates conditions conducive to life

Integrate development with growth

- self organizing
- build from the bottom up
- combine modular and nested components

BRIGHTWORKS

Life's Principles

Life creates conditions conducive to life

evolve to survive

- replicate strategies that work
- integrate the unexpected
- reshuffle information

Life's Principles

Life creates conditions conducive to life

use life-friendly chemistry

- build selectively with a small subset of elements
- break down products into benign constituents
- do chemistry in water

BRIGHTWORKS

Life's Principles

Life creates conditions conducive to life

be locally attuned and responsive

- use feedback loops
- leverage cyclic processes
- cultivate cooperative relationships
- use readily available materials and energy

BRIGHTWORKS

Group Discussion

The Seattle Waterfront





Local Resources



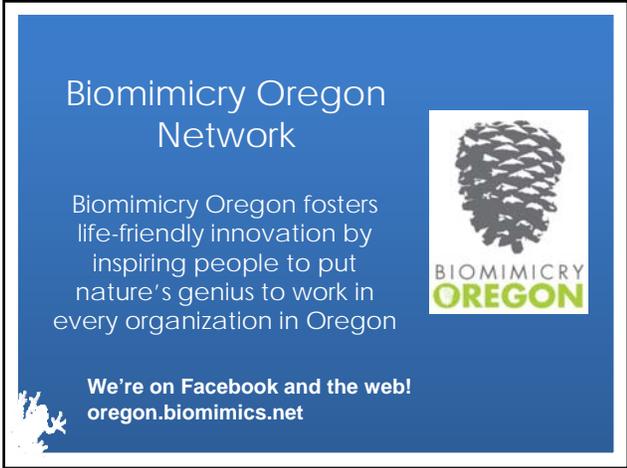
Backyard Biomimicry Workshop
Portland, OR October 28, 2011
Learn about biomimicry in your own "backyard."
Led by local leaders in the field.
Register Online: Portland EcoDistricts Summit

BIOMIMICRY PROFESSIONAL PATHWAYS

The EcoDistricts Summit
October 26-28, 2011
Portland, Oregon

Biomimicry Professional Certificate Program
Pre-apply for 2012 Cohort!

BSpecialty Certificate Program – Apply for 2012 now!
Register Online: Biomimicry Professional Pathways Program – www.biomimicry.net

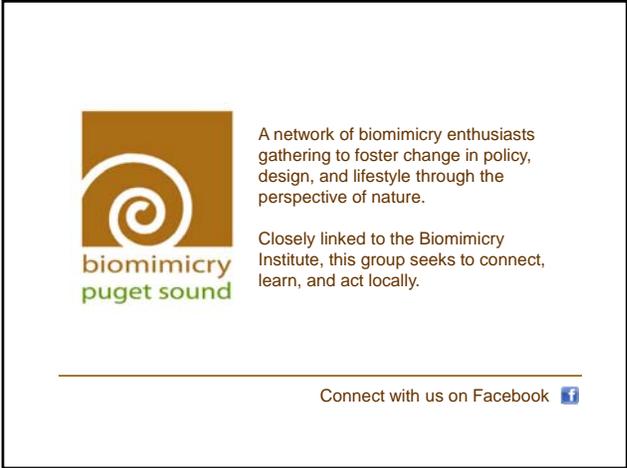


Biomimicry Oregon Network

Biomimicry Oregon fosters life-friendly innovation by inspiring people to put nature's genius to work in every organization in Oregon



We're on Facebook and the web!
oregon.biomimics.net




A network of biomimicry enthusiasts gathering to foster change in policy, design, and lifestyle through the perspective of nature.

Closely linked to the Biomimicry Institute, this group seeks to connect, learn, and act locally.

Connect with us on Facebook 