


## Biomimicry Emulating Nature's Genius

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## Brightworks Sustainability Advisors

Built Environment


Education

### Enterprise Solutions






## Enterprise Sustainability




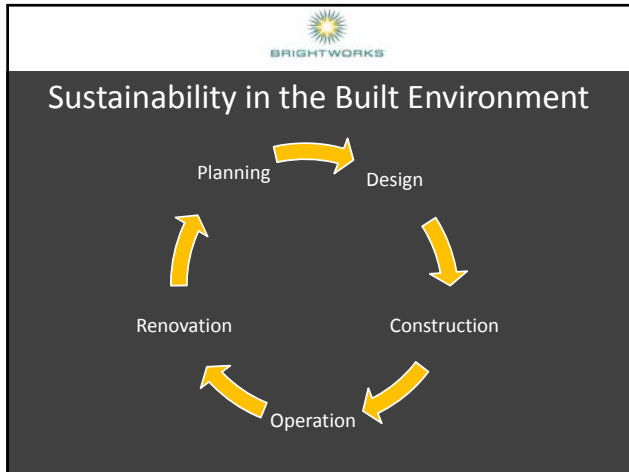
A Holistic Approach to System Transformation










## Sustainability Education

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





  
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Building Shell  
Performance

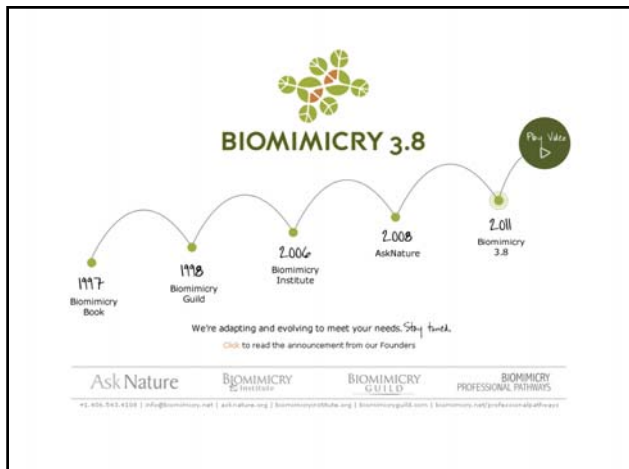
Daylight  
Optimization

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

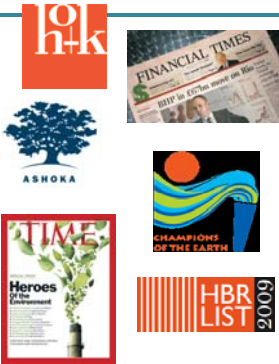
  
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## Inspiring the World

**BusinessWeek**

World's Most Influential Designers





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## What is Biomimicry?

**Sustainability**

- Ecological literacy
- Environmental ideal – ecological imperative

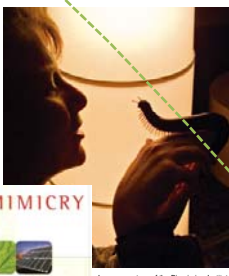
**Innovation**

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

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## What is Biomimicry?

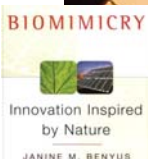
“the conscious emulation of life’s genius”



Bio = life, living things

Mimic = simulate, emulate

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



Images courtesy of the Biomimicry Institute

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## The survivors know what works

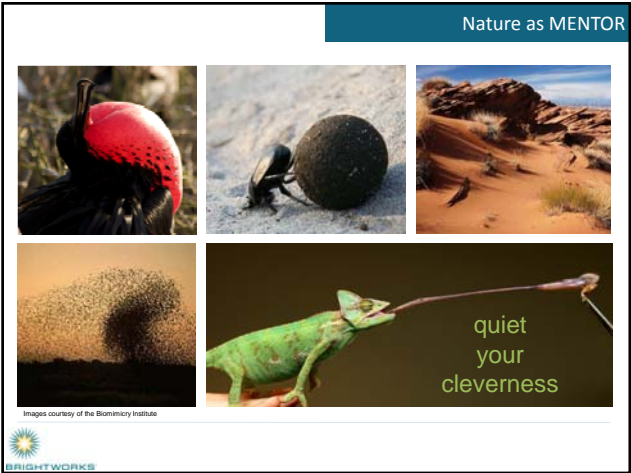
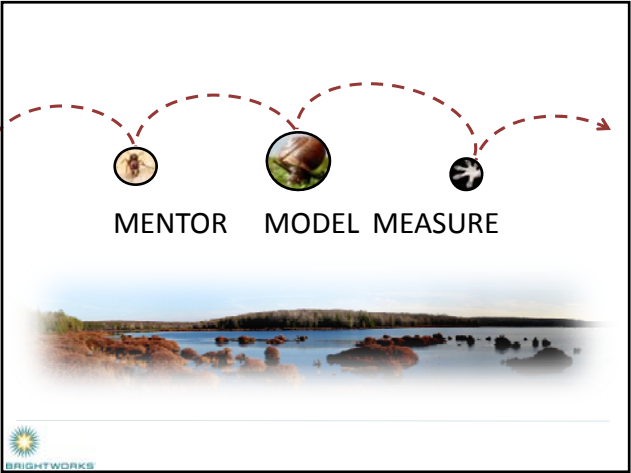



“... After 3.8 billion years of research and development, failures are fossils, and what surrounds us is the secret to survival.”

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# Project Application

Case Examples



## Nature as Model: Form



WhalePower

Images courtesy of the Biomimicry Institute

WhalePower wind turbine blade design gains productivity by reducing drag.

- 32% less drag
- 20% production increase



## 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



## Nature as Model: Process

Mike Pearce  
ARUP

Images courtesy of the Biomimicry Institute

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



## 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



## 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



## Biomimicry Resources



Images courtesy of the Biomimicry Institute

[www.asknature.org](http://www.asknature.org)



## 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

Nature as Measure  
Life's Principles

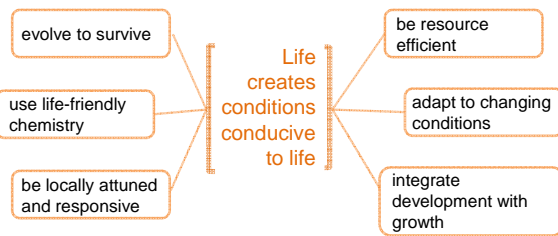
## earth's operating conditions


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



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


## Life's Principles





**BIOMIMICRY**  
Nature as Measure: Life's Principles


*Assessing success using Life's Principles as the performance benchmark*



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*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




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### 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



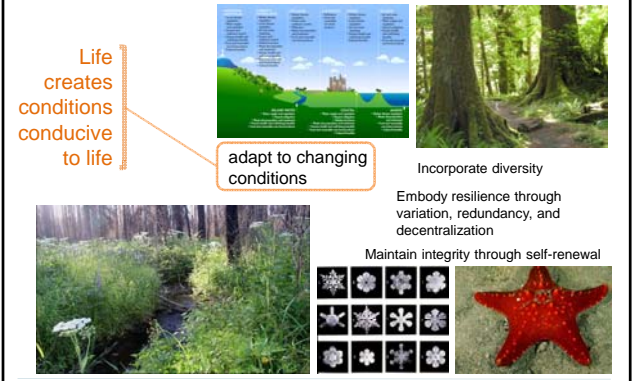
©Brian L. Currie

### 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



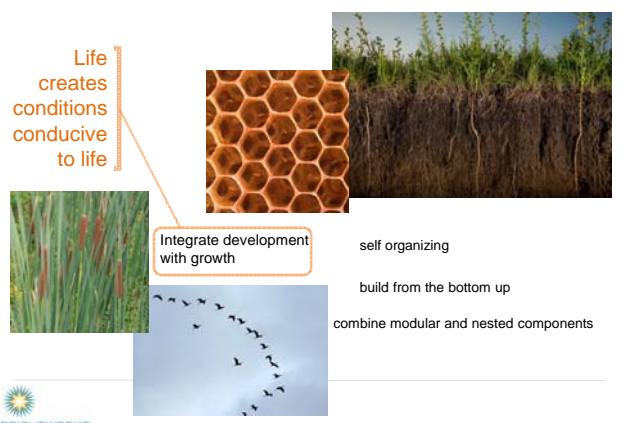
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### Life's Principles

Life creates conditions conducive to life

Integrate development with growth

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



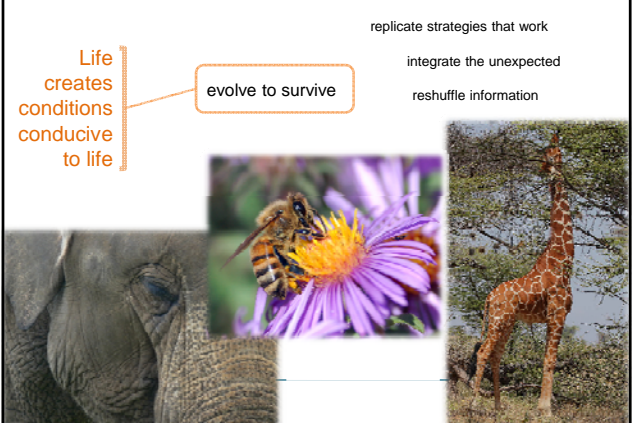
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### Life's Principles

Life creates conditions conducive to life

evolve to survive

replicate strategies that work  
integrate the unexpected  
reshuffle information

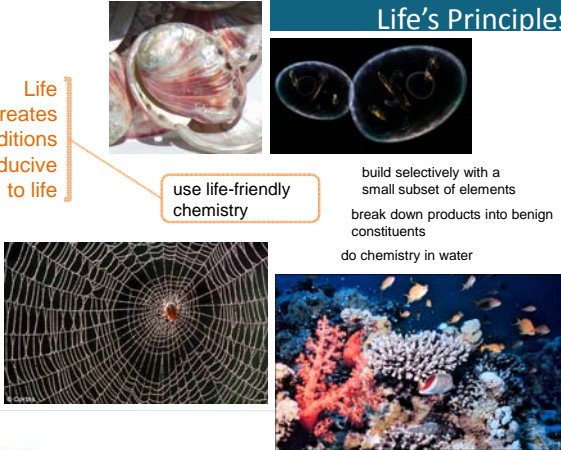


### Life's Principles

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



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### 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



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## Group Discussion

The Seattle Waterfront










**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](#)



**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 PROFESSIONAL PATHWAYS**

**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](http://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 