What is Ecomimicry?

- *Ecomimicry involves mimicking local animals and plants (or their ecological settings) to produce sustainable, eco-friendly, socially-responsible designs, innovations and technologies*

Ecomimicry is a process of Innovation

Biomimicry and Biomimetics

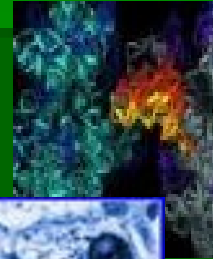-Ecomimicry is similar to biomimicry or biomimetics or bionics

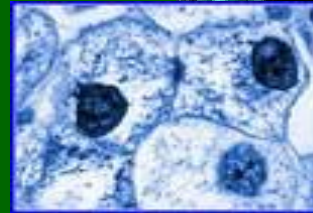-Ecomimicry is more careful to produce designs that serve the local environment and community

MULTIPLE SCALES OF NATURE TO MIMIC

Molecular level

Cellullar level

Organismal level

Landscape/Community/
Ecosystem level

The theory behind Ecomimicry/Biomimicry

- Nature is imaginative by neccessity
- *There's billions of years of R&D to study*
- Nature has solved many of the problems of sustainability that we face
- *Local adaptations to local environmental situations (ecomimicry)*

BIO-WHAT?

- BIO-UTILIZATION, acquire the product/producer

- BIO-ASSISTED, Domesticate the Producer

- BIOMIMICRY, mimic the producer

NATURE AS TEACHER

- *Nature as Model*: Biomimicry is a new science that studies Nature's models and then imitates or takes inspiration from these designs and processes to solve human technological problems; eg: a solar cell inspired by a leaf. (Scientific)

- *Nature as Measure*: Biomimicry uses an ecological standard to judge the rightness of our innovations. After so many billions of years of evolution, Nature has learned what works and what will last without damaging the environment in the future. (Environmental)

- *Nature as Mentor:* Biomimicry is a new way of viewing and valuing nature. It introduces an era based not on what we can extract from the natural world but on what we can learn from it. (Philosophical)

Biomimicry/Ecomimicry Principles

(according to for eg: Sendzimer *et al*, 2005; The Biomimicry Guild, 2005; Plotkin, 2004)

- *Waste = Food!* (Natural systems have developed over time so that waste from one part of the ecological cycle is a resource for another part).

- *Evolve solutions, don't plan them!* (Solutions to problems have to develop over time through adaptive processes and consultative interactions between many actors; human and non-human).

- *Relentlessly adjust to the 'here and now' of specific locales!* (Communities--both human and ecological--change over time, and so do the optimum solutions to problems in these locales).

- *Diversify to fill every niche!* (Find untapped niches where waste is not being utilised as a resource and where space exists for innovation).

- *Use minimal energy and materials!* (This will also have financially beneficial effects for businesses as well as discouraging large ecological footprints).

Nature's 9 basic laws worthy of mimicking

(according to Janine Benyus, author of 'Biomimicry')

- 1-Nature runs on sunlight
- 2-Nature uses only the energy it needs
- 3-Nature fits form to function
- 4-Nature recycles everything (no 'waste')
- 5-Nature rewards cooperation
- 6-Nature banks on diversity
- 7-Nature demands local expertise
- 8-Nature curbs excesses from within
- 9-Nature taps the power of limits

Ecomimicry:

Strategies of eco-inspiration

Starts with the question:
"What would nature do here?"

1) TRANSPORT DESIGNS--how do organisms move?

2) THERMOREGULATION DESIGNS—how do organisms keep cool?

3) BUILT ENVIRONMENT DESIGNS—how do organisms build their dwellings

4) MATERIALS SCIENCE DESIGN—how do organisms build their bodies?

5) AGRIFORESTRY—how do ecological settings develop biomass/resistance/diversity?

6) DEFENCE and PROTECTIVE DESIGNS—how do organisms protect themselves from predation and adverse environmental conditions

7) CLEANING and HEALTH—how do organisms clean themselves and repel invasive attack?

Biomimicry places

CBID, Georgia Tech

U. Reading

U. Bath

Montana B.I.

Biomimicry - Enter

Ecomimicry:

- Biology

- Innovation and Design

- Social Studies

What to design?

- Building, artwork, landscape, garden, product, service, agricultural or forestry system, street or city plan, society.

- Public, private, governmental, commercial, non-commercial

- Experimental, speculative, qualitative or established, practical, work-in-progress

ECOMIMICRY DESIGN METHODS

2 Strategies

1) Design Problem strategy

- 2) Bio-inspiration

1. DESIGN PROBLEM STRATEGY

- 1) Define Problem (don't ask "what do I want to design but "what do I want the design to do")
- 2) Identify organisms/ecological principles that have solved the problems (specimens and literature and websites)
- 3) Work out system/technology/idea/innovation that mimics the organism
- 4) Graphically represent the system/technology/idea/innovation (including an exegesis)
- 5) How does it stack up against the 9 principles of Nature

2) BIO-INSPIRATION STRATEGY

- 1) Pick an interesting organism/ecological setting

- 2) Identify processes and strategies that help that help the organism/ecological setting sustain itself (and select one process or strategy)

- 3) Project this process or strategy into a mechanical/technological form that can be made by humans.

- 4) Graphically represent this mechanical/technological form

- 5) How does your design stack up against the 9 principles of Nature?

DESIGN CHALLENGES (for method No 1)

- -a wildlife park that humanely keeps local wildlife and involves humans as much as possible
- -an prison that allows inmates to interact with the local environment
- -a main street that allows for transport but is not clogged with cars and is pedestrian friendly
- -Global warming solutions
- -A new eco-friendly school
- -a sustainable forestry industry
- -sustainable low-cost housing
- -artworks that celebrate the region's biodiversity
- -sustainable and humane boats to take tourists whale-watching
- Natural lighting for public buildings
- Walkways in parks and reserves that don't damage nature

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PROBLEMS WITH BIOMIMICRY

- Biological determinism/ecological determinism
- learn from Nature's techniques not morals
- Knowledge filtered through social activity (not really biological, anyhow)
- Do we rely on expert knowledge of biology
- Design tools already exist, biomimicry slows the design process down
- Does biomimicry make unsupportable assumptions about nature?
- What does it mean to learn from this thing called Nature?
- What does biomimicry assume about technology/design?
- Biomimicry is not inherently sustainable