Introduction to Biomimicry

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Anamarija Frankic (Assistant Professor, EEOS) has been working for more than 25 years in the field of integrated ecosystem management and coastal stewardship; her interest is in developing and applying innovative educational, research and outreach methodologies to help solve environmental issues in situ, right here and now. In doing so, she recently started with her students the Green Boston Harbor Project (GBH): www.gbh.umb.edu. Where they work with the coastal and watershed areas. She has brought her expertise in comprehensive environmental management and education to many research projects on the local, state, national, and international levels.

Why Biomimicry?

Biomimicry is an innovation method that seeks sustainable solutions by emulating nature's time-tested patterns and strategies, e.g., a solar cell inspired by a leaf. The goal is to create products, processes, and policies by learning from and 'listening to' nature that has been evolving and accumulating wisdom for 38 million years. Biomimicry is inspired by nature to study the structure and function of biological materials for the purpose of analogous synthetic design and manufacturing. It is an abstraction from nature into a sustainable technical object, process and/or life cycle.

List of topics to be covered

- What is biomimicry and why is it important?
- Biomimicry principles, concepts, and methodologies
- How biomimicry relates to natural sciences, engineering, design, architecture, and sustainability?
- Biomimicry solutions and new inspirations for addressing environmental and other challenges
- How do we learn from nature? How do we ask nature? How do we live in a harmony with nature? (Examples of strategies for listening to and learning from nature's designs)

References: www.biomimicryinstitute.org; www.asknature.org
http://www.biomimicry.info/reviewoftheliterature; http://www.biomimicry.info/examples

Learning outcomes

Students will learn about the above listed topics. In particular, students will learn about six key biomimicry principles and their applications:

1. Be locally attuned and responsive
2. Integrate cyclic processes
3. Be resilient
4. Optimize and not maximize
5. Be Interdependent, fostering community based relationship, and
6. Use life-friendly materials, water base chemistry and self assembly

References:

Biomimicry: Innovation Inspired by Nature (2002) by Janine Benyus. USA Perennial
Natural Capitalism (2002) by Paul Hawkin, Amory Lovins & Hunter Lovins. (www.natcap.org)
Cradle to Cradle (2004) by William McDonough
Donella Meadows: *Thinking in systems*
Fritjof Capra: *Ecology, Systems Thinking and Project-Based Learning*

Websites:

Biomimicry Guild: www.biomimicryguild.com
Biomimicry Institute: www.biomimicryinstitute.org
Biomimicry Newsletter: http://biomimicry.typepad.com/newsletter
The Center for Ecoliteracy: www.ecoliteracy.org
Rivers & Tides: http://www.imdb.com/title/tt0307385/

Additional resources:

http://www.youtube.com/watch?v=n77BfxnVlyc
http://www.youtube.com/watch?v=BiMZYdVLqME
http://www.youtube.com/watch?v=JnBkbaFsZOY&feature=related
http://www.designboom.com/contemporary/biomimicry.html