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Sustainability through biomimetics: Lessons from Attenborough, Loos and Biornametics

Ille Gebeshuber
Universiti Kebangsaan Malaysia

Biomimetics is per se not sustainable. It is a design method, and as such, it is free from values. However, when we are learning from nature for our engineering and artistic endeavours, why should we just be constrained to patterns, structures, materials or processes – why not transfer the most amazing property of life itself – sustainability?! This keynote address is dealing with sustainability on three interdisciplinary levels: first, to set the stage, the state of the planet is described. Earth’s biosphere is approaching a critical state shift. We humans are currently causing a 6th mass extinction of species. In the 5th, 55 millions of years ago, %80 of all species died out. Second, Adolf Loos’s famous 1908 article “Ornament and Crime” is critically dealt with regarding its inspirational potential regarding sustainability. Loos’s famous article builds the bridge to the third level: Biornametics, architecture defined by natural patterns, a new methodology that interconnects scientific evidence with creative design in the field of architecture. It takes on the history of one of the composed parts of this word “ornament” referring to Loos and extends into another, “biomimetics”, the strategic search for nature’s solutions in order to gain innovation. The emergence of patterns in nature at all scales of existence of organisms as one of the most important signs of life – order – is not arbitrary, but highly interconnected with boundary conditions, functional requirements, systems requirements, material and structure. In bringing all these three levels together the authors show that the exploration of aesthetic and functional interpretation for a new sustainable architecture, contributing to improving the state of the planet, is indeed possible.

Sustainability in Science, Architecture and Design

Lessons from attenborough, loos and
biornametics

Ille C. Gebeshuber

Universiti Kebangsaan Malaysia

Petra Gruber

transarch

Barbara Imhof

LIQUIFER Systems Group

Abstract

Biomimetics is per se not sustainable. It is a design method, and as such, it is free from values. However, when we are learning from nature for our engineering and artistic endeavours, why should we just be constrained to patterns, structures, materials or processes – why not transfer the most amazing property of life itself – sustainability?! This paper is dealing with sustainability on three interdisciplinary levels: first, to set the stage, the state of the planet is described. Earth's biosphere is approaching a critical state shift. We humans are currently causing a 6th mass extinction. In the 5th, 55 millions of years ago, %80 of all species died out. Second, Adolf Loos's famous 1908 article "Ornament and Crime" is critically dealt with regarding its inspirational potential to sustainability. Loos builds the bridge to the third level: Biornametics, architecture defined by natural patterns, a new methodology that interconnects scientific evidence with creative design in the field of architecture.

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Keywords

architecture, biomimetics, biornametics, ornament, science, sustainability, the state of the planet, tipping point

Abstract & short biography for a keynote presentation at the First International Conference “Sustainability through Biomimicry: Discovering a World of Solutions Inspired by Nature”, Dammam, Kingdom of Saudi Arabia, Nov. 27-28, 2012.

Sustainability through Biomimetics:

Lessons from Attenborough, Loos and Biornametics

Ille C. Gebeshuber

Institute of Microengineering and Nanoelectronics, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia & Institute of Applied Physics, Vienna University of Technology, Wiedner Hauptstrasse 8-10/134, 1040 Wien, Austria, Europe

Contact: gebeshuber@iap.tuwien.ac.at

URL: <http://www.ille.com>

Synopsis: Biomimetics is per se not sustainable. It is a design method, and as such, it is free from values. However, when we are learning from nature for our engineering and artistic endeavours, why should we just be constrained to patterns, structures, materials or processes – why not transfer the most amazing property of life itself – sustainability?! This keynote address is dealing with sustainability on three interdisciplinary levels: first, to set the stage, the state of the planet is described. Earth’s biosphere is approaching a critical state shift. We humans are currently causing a 6th mass extinction of species. In the 5th, 55 millions of years ago, 80% of all species died out. Second, Adolf Loos’s famous 1908 article “Ornament and Crime” is critically dealt with regarding its inspirational potential regarding sustainability. Loos's famous article builds the bridge to the third level: Biornametics, architecture defined by natural patterns, a new methodology that interconnects scientific evidence with creative design in the field of architecture. It takes on the history of one of the composed parts of this word “ornament” referring to Loos and extends into another, “biomimetics”, the strategic search for nature’s solutions in order to gain innovation. The emergence of patterns in nature at all scales of existence of organisms as one of the most important signs of life – order – is not arbitrary, but highly interconnected with boundary conditions, functional requirements, systems requirements, material and structure. In bringing all these three levels together the authors show that the exploration of aesthetic and functional interpretation for a new sustainable architecture, contributing to improving the state of the planet, is indeed possible.

Short Biography:

Prof. Ille C. Gebeshuber is a University Professor of Physics from Austria, Europe. She is expert in Nanotechnology, Biomimetics and Tribology. She was born on April 10, 1969, in the small city Kindberg. On the schoolbus, when she wrote a message on the window to a friend who was outside, she discovered that - a natural lefthander - she can write in mirror. She uses this ability to stimulate the

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right side of her brain and thereby her creativity and cross-border thinking. This has had major influence on her scholarly development and achievements - unlike most other physicists and engineers her approach to science is wide and holistic, and inherently trans- and interdisciplinary, bridging over from science and engineering to architecture, biology, the arts and the social sciences.

Since 2009 she has been at the Institute of Microengineering and Nanoelectronics at Universiti Kebangsaan Malaysia. Her permanent position is at the Institute of Applied Physics at the Vienna University of Technology. Prof. Ille is associate editor of the IMechE Journal of Mechanical Engineering Science (SAGE Publishing, London, UK), editorial board member of various scientific journals, author of two books on biomimetics and nanotechnology and editor of a book on biomimetics by Springer Scientific Publishing. Since 2011 she has been scientific advisory board member regarding nanotechnology for the Lifeboat Foundation, a US American think tank safeguarding humanity. Her research interests comprise the use of nanotechnology and biomimetics to address global challenges for humankind.

Prof. Ille C. Gebeshuber serves on various international strategy boards. She has been acting as reviewer and advisor for agencies, universities, research institutions and public bodies. Prof. Ille is doing extensive public science outreach work and her professional activities are widely covered in the media. She loves to go on rainforest expeditions with her students, who come from different cultures and different fields (Europe & Asia, physics, engineering, biology, veterinary medicine, applied arts, fine arts).

Her research interests are located at the interface of biology, engineering and the arts, systems thinking and nanotechnology. She is advisor in various expert panels, including the Science Advisory Board (Arlington, USA), the Strategy Board of the Austrian Center of Competence for Tribology (Wiener Neustadt, Austria), QS University Rankings and the ISESCO Expert Panel on Nanotechnology.