

What is the Architect doing in the Jungle?

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ABSTRACT

A biological paradigm is underlying current research and development interests in architectural design. Biomimetics as a strategic approach to translate information from biology to technology serves as a base for the projects presented in this talk. Different pathways to translate concepts of life to innovative design proposals and prototypes will be presented with a special focus on methods and tools.

Growth in biology was investigated in a research project at the University of Applied Arts Vienna, Austria, aiming at the transfer of growth concepts to the design of materials and structures. Main parts of the research focused on mycelium material, use of slime mold as a co-designer, use of algae in a bio-reactor and improving 3D printing as a tool for producing adaptive structures.

Thermodynamics of plants was identified as an interesting field delivering concepts for technical applications. Leaf morphology is influenced by a variety of factors, also affecting plant water balance and energy budget. In a current research project at the University of Akron, we investigate to correlation of leaf shape with evapotranspiration and thermal dynamics, to better understand the biological model and transfer the working principles to technical energy dissipation systems.

Birds nests are animals buildings that are generated in a wide variety of shapes and using locally available materials. Stick nests consisting of non-woven straight elements deliver an interesting example of an aggregate structure made of more or less randomly assembled elements without connections, but still delivering interesting mechanical properties. Research on birds nests was taken on in a recent workshop at the Bauhaus in Bernau, Germany, and interpreted in a range of prototypical structures.

The research presented led to prototypical solutions, laying the groundwork for future product-oriented technological solutions.

BIOGRAPHY

Dr. Petra Gruber is an architect with a strong interest in transdisciplinary design. Holding a PhD in Biomimetics in Architecture from the Vienna University of Technology in Austria she was a research fellow at the Centre for Biomimetics at The University of Reading, UK, visiting professor at Addis Ababa University in Ethiopia and held lectures and workshops worldwide. Her research spans from projects on lunar base design to arts-based research on the translation of growth principles from nature into proto-architectural solutions. Dr. Gruber is now based at the University of Akron at the Biomimicry Research and Innovation Center BRIC.