Transcoding Crystals on the search for Extreme in Architecture

Arzu Gönenç Sorguç
(Joint work with Müge KRUSA, Fırat ÖZGENEL)
(Professor, Dr., Vice Dean of the Faculty of Architecture,
Director of METU Design Factory)

Abstract

Biomimetics is an overarching subject breaking up the borders of the disciplines. Biomimetic studies can be interpreted as transcoding of nature into man-made world and one of the major challenges in this process is the diversity of the scale from nano to macro. It is seen that most of the recent biomimetic studies is focused on the animate part of the nature, and studies on inanimate part of it is relatively limited and confined mostly in the silos of material related disciplines

Crystals are extremely interesting and challenging formations of nature in which perfect symmetries in all scales are possible and although they are in-animate they can grow, mutate, evolve, change state but in a way never “die”. Their initial unit cells and lattices in nano scale determines their formations in different scales together with internal and external forces acting on them.

Computational design in broad sense is a relatively new, by-nature, an interdisciplinary field spanning over various subjects. This work is a part of on-going study aiming to explore the re-use of inanimate nature first understanding the formations for which thermodynamic and mechanic forces are the major inputs of the processes.

This part of the present study as a true challenge is concerned to develop a generative computational model/simulation/visualization system for the crystal formation processes in different scales and in different media from mathematical/computational models to 3D fabrication and virtual environments in order to extend the research to transcode formation forces of crystal to mechanical forces of the environment through similitude approach to further discuss new implementations in architecture.

Research area(s): Computational Design, Biomimicry, Fabrication Technologies