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S E M I N A R
on
Semiconductor Physics and Nanotechnology

Mo, 30.10.2023, 11:15 Uhr,

Seminar in
person in the Physics lecture hall *or* via Zoom

"Plant structures and movements as models for novel materials systems in engineering, architecture, medicine and soft machines"

Prof. Dr. Thomas Speck

Institute for Biology II, Faculty of Biology, University of Freiburg, Germany

Plant Biomechanics Group @ Botanic Garden and Cluster of Excellence Living, Adaptive and Energy-autonomous Materials Systems (*liv*MatS) @ FIT, University of Freiburg

Today, biomimetics is attracting increasing attention in basic and applied research, as well as in various fields of industry and construction. Biomimetics has a high innovation potential and offers opportunities for the development of sustainable technical products and production chains. Novel, sophisticated methods for the analysis and simulation of the form-structure-function relationship on different hierarchical levels allow fascinating new insights into the multiscale mechanics and other functions of biological material systems. In addition, for the first time, new production methods allow many of the outstanding properties of biological models to be transferred into innovative biomimetic products at reasonable cost.

In recent decades, plants have been recognised as valuable concept generators for biomimetic research in many application areas of technology in general and architecture and medicine in particular. Plant-inspired novel materials systems for applications in architecture, medicine and soft machines are demonstrated by current research projects in the Plant Biomechanics Group Freiburg and the *liv*MatS Cluster of Excellence. Examples of mobile systems include liana-inspired soft robots, façade shading systems inspired by leaves and flowers, demonstrators for self-adaptive building shells inspired by pine cones, and artificial Venus fly traps. As an example of a medical application, a prototype of an adaptive wrist and forearm splint is presented. The cactus-inspired fibre pavilion is an example of the use of static plant-inspired materials systems in architecture. As with all examples of architectural applications, it was developed in collaboration with the ICD Cluster of Excellence at the University of Stuttgart. One aspect of current research is concerned with the embodied energy and intelligence found in moving plant organs, which offer a huge potential for a new generation of materials systems for soft robots, bio-inspired architecture and engineering.in general.

Zoom – Link:
https://zoom.us/j/96375934537?pwd=RTlKTWhSdzRHU211YTY1bGFxTUtpZz09
Meeting-ID: 963 7593 4537
Kenncode: =r=4YQ