

Freiburg

Profile



Prof. Dr. Thomas Speck.

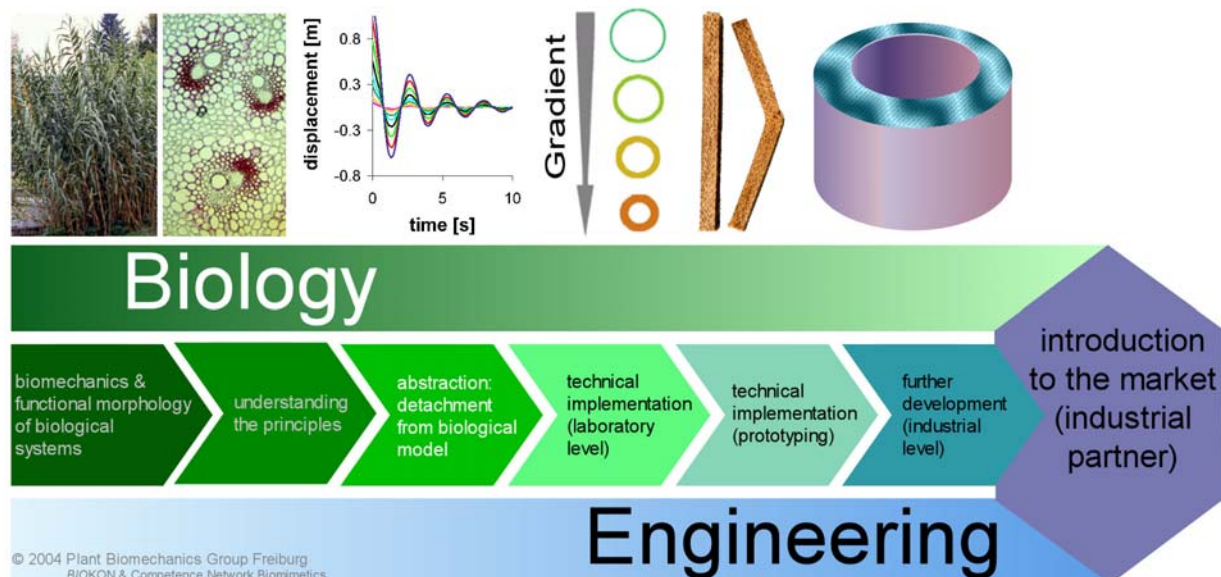
The *Plant Biomechanics Group* of the Botanic Garden of the University of Freiburg is lead by Prof. Dr. Thomas Speck. Our group is characterised by its many international connections. There are cooperations with research groups in Switzerland, Austria, France, French Guyana, Great Britain, New Zealand and the USA.

Apart from this “horizontal” network, almost the whole of the “vertical” spectrum of bionical work is covered through cooperations. This encompasses solid basic biological research, finding appropriate abstractions of biological models for technical implementations as well as the development of prototypes on a laboratory level.

The *Plant Biomechanics Group Freiburg* is not only member of *BIOKON* but also part of the Baden-Württembergian “Competence Network Biomimetics” (together with the University of Tübingen and the Institute of Textile and Process Engineering Denkendorf - ITV). Due to the interdisciplinary approach of our cooperation partners and current R&D projects, the knowledge transfer from research to technical applications is ensured for the whole value chain. The strong networking of the *Plant Biomechanics Group* makes the *BIOKON* centre in Freiburg a very qualified contact for any queries on structural properties of plants and their possible uses in bionics.

Doing bionics as seen by the Plant Biomechanics Group Freiburg

The approach taken in Freiburg to doing bionics is that the first step is carrying out basic biological research in biomechanics and functional morphology. In a second step, new insights are prepared for and made available to technology for further processing (*bottom up*). Additionally, we also follow an alternative strategy, i.e. searching for possible biological model solutions for specific technical problems (*top down*). From our point of view, the latter approach enables the development of bionically inspired products in shorter time, whereas the former approach has the potential to yield greater steps in innovation.



The process of doing bionics as seen by the *Plant Biomechanics Group Freiburg*.

The Botanic Garden – treasure trove of ideas for bionics

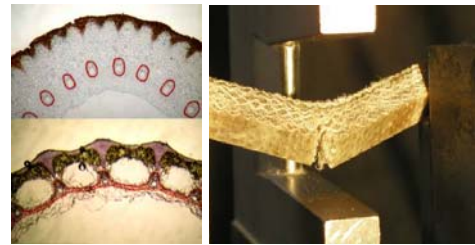


The Botanic Garden of the University of Freiburg provides an excellent infrastructure for projects in bionics.

Through the Botanic Garden, the *Plant Biomechanics Groups Freiburg* is integrated in a national and international association of botanical gardens. Research projects in bionics can thus fall back on this extraordinary and well-established infrastructure. The accessible reservoir of plants as possible biological models for any topic in bionics is excellent. Comparative studies on different representatives of bionically interesting genera or families can often be conducted easily. As a consequence, general – and therefore evolutionary particularly successful – principles can be distinguished from specific solutions of individual species. Because of the availability of a plentitude of plants, a screening of plants for properties potentially relevant in bionics is possible. The necessary basic research of biological models can thus be carried out with the set goal in mind of future uses in bionics.

Research and development project in bionics

The core competence of the *Plant Biomechanics Group Freiburg* lies in the field of light-weight structures, new materials (gradients, composites with natural fibres) and smart materials (self-repairing and self-adaptive). From all three domains, we are currently developing projects for market introduction, in close cooperation with our industrial partners and business-like research institutes (e.g. ITV in Denkendorf, Research Centre in Karlsruhe, Max-Planck-Institute in Golm).



Horsetails can be used as biological models for technical applications.

Public relations, study courses and professional training



Students are getting to know an impact pendulum made from Lego® in a very playful yet investigative way.

An additional competence of the *Plant Biomechanics Group Freiburg* is the education sector. Public relations like science fairs, trade shows, tours of the Botanic Garden or public discussion forums are considered to be of particular importance. Lectures and seminars are offered as part of the post-grad level tuition at the Botany Department of the University of Freiburg. Additionally, scientific basics and the how-tos of doing bionics are taught in trainings on the job for teachers and in specifically developed teaching modules for high schools. We pride ourselves in providing excellent didactical preparations of complex scientific ideas as well as clear and easy-to-understand descriptions of the interdisciplinary methodology of bionics. We thus try to convey a more detailed and sophisticated picture of bionics to the general public and in particular at schools and universities.

Contact

For further information, please contact:

Dr. Olga Speck
Competence Network Biomimetics
Botanic Garden
Schänzlestr. 1
D-79104 Freiburg
Germany
Phone: +49 (0)761-203 2803
Fax: +49 (0)761-203 2804
E-mail: pflanzen.biomimetik@biologie.uni-freiburg.de

Dr. Deane Harder
BIOKON centre of Freiburg
Botanic Garden
Schänzlestr. 1
D-79104 Freiburg
Germany
Phone: +49 (0)761-203 2877
Fax: +49 (0)761-203 2880
E-mail: biokon@biologie.uni-freiburg.de