11. Workshop Projekthaus NanoBioMater mit Leitungsgremium-Meeting

Sprecher: Prof. Dr. Sabine Laschat **Koordinatoren:** Prof. Dr. Christina Wege, Prof. Dr. Günter Tovar
Leitungsgremium: Prof. Dr. Joachim Bill, Prof. Dr. Franz Brümmer, Prof. Dr. Holger Jeske, Prof. Dr. Sabine Ludwigs, Prof. Dr. Bernhard Hauer, Prof. Dr. Ingrid Weiss
Teamleiter: Claudia Koch, Dr. Dirk Rothenstein, Dr. Alexander Southan

Datum: 26. April 2017
Uhrzeit: 13:00 - 15:00 Uhr
Raum: Raum 6AB am Fraunhofer IGB, Nobelstr. 12, 70569 Stuttgart – B-Gebäude 6.OG

Programm

13:00 – 13:05 Uhr **Begrüßung**
Prof. Dr. Christina Wege und Prof. Dr. Günter Tovar
Koordinatoren des Projekthauses NanoBioMater

13:05 – 13:30 Uhr **Progress in NanoBioMater**
Dr. Alexander Southan, Dr. Dirk Rothenstein, Dr. Sabine Eiben
Teamleiter des Projekthauses NanoBioMater

13:30 – 14:00 Uhr **Interaction of cardiac tissue morphology and dynamics in mechano-sensitive environments during development**
Dr.Marcel Hörning
Institut für Biomaterialien und biomolekulare Systeme
Universität Stuttgart

14:00 – 14:30 Uhr **Biological Design and Integrative Structures**
Prof. Dr.-Ing. Jan Knippers
Institut für Tragkonstruktionen und Konstruktives Entwerfen
Universität Stuttgart

14:30 – 15:00 Uhr **Collaborative Research Centre 1244 Adaptive Envelopes and Structures for the built environment of tomorrow**
Prof. Dr.-Ing. Dr. h.c. Oliver Sawodny
Institut für Systemdynamik
Universität Stuttgart

15:00 – 15:05 Uhr **Schlussworte Sprecher**
Prof. Dr. Sabine Laschat
Sprecher des Projekthauses NanoBioMater

15:05 – 16:30 Uhr Kaffee-Pause

15:30 – 17:00 Uhr **Leitungsgremium-Meeting**
Prof. Dr. Christina Wege und Prof. Dr. Günter Tovar
Koordinatoren des Projekthauses NanoBioMater

Interaction of cardiac tissue morphology and dynamics in mechano-sensitive environments during development

Dr. Marcel Hörning

Institut für Biomaterialien und biomolekulare Systeme, Universität Stuttgart

The presentation will give a general overview on my main research interest that I have investigated during the last years, as well as an outlook to topics that I will work on in future.

I will give a short overview on the importance of the mechano-sensitive environment during the development of cardiac cells into confluent functional tissues. Here I will highlight the coherent strategy to investigate the tissue function and morphology using quantitative tools. Further, I will briefly introduce a novel quantitative methodology to extract 3D lipid dynamics in Dictyostelium membranes, which serves as model system for the application on cardiac tissues in future.

Biological Design and Integrative Structures

Prof. Dr.-Ing. Jan Knippers

Institut für Tragkonstruktionen und Konstruktives Entwerfen, Universität Stuttgart

During the last few decades, computational methods have been introduced into all fields of science and technology. In architecture, they enable the geometric differentiation of building components and allow the fabrication of materials with locally adjusted physical and chemical properties. In the natural sciences, a multitude of digital analysis methods as micro CT have been introduced. The step towards digital technologies enables the direct exchange of information between until now widely separated fields of science and have opened a new era in biomimetics: local differentiation at various scales, the main feature of natural constructions, can for the first time not only be analysed, but to a certain extent also be transferred to building construction. Almost all load-bearing biological structures are fibrous

composites, using the principle of anisotropy to developed finely tuned mechanical and physical properties. This may lead to the fact that fiber based building materials may play a larger role for future developments in architecture and building construction. The presentation will show various projects as the EXPO Pavilion 2010 in Yeosu, Korea, or the Elytra Pavilion at the V&A in London that attempt to explore and demonstrate the potential of biomimetic research for architecture and engineering.

Adaptive Envelopes and Structures for the built environment of tomorrow

Prof. Dr.-Ing. Dr. h.c. Oliver Sawodny

Institut für Systemdynamik, Universität Stuttgart

Considering the massive growth in world population predicted for the upcoming decades, a fundamental question coming up is, how to create the needed space with less energy. Building materials are one of the largest CO_2 emission sources and therefore reduction of building materials is a very important task. Fundamental research needs to be done in order to answer this question. At the University of Stuttgart, a total of 15 institutes are collaborating for the next four years to take a first step in this innovative field of research.

The primary goal of this research collaboration is to answer the ecological and social challenges of these times by civil engineering solutions. One promising approach is to integrate adaptive elements into a building's support structure as well as into facades or the interior fitting. The CRC will investigate the fundamentals, the potential and the impact of this approach.

Through the development of new and innovative concepts for adaptive elements in all areas of the built environment, the CRC stands for sustainable architecture that is committed to economical, ecological and sociocultural solutions. The basis for these goals is the common believe of all collaborators that the consumption of resources in civil engineering has to be drastically reduced while at the same time increasing the user comfort.

The CRC 1244 is going to bring together, analyze and improve methods from mechanical engineering, architecture, aircraft engineering and civil engineering. Eventually, this will lead to techniques for integration and planning of adaptive systems in civil engineering.

To reach this ultimate goal, a close cooperation of all partners is inevitable. On that account, the CRC's basis of successful past cooperations between the collaborating institutes in the fields of lightweight design, design of components, system dynamics, planning theory, visual analysis and design, and the competencies acquired in those projects are a great advantage.