

# Kolloquium

## Biomedizinische Technik und verwandte Gebiete

*Wintersemester 2016/17*

**Donnerstag, 08.12.2016, 17:00 - 18:30 Uhr**

**Prof. Dr. Jan de Boer**

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(Moderation: Prof. Dr. med. Dr. rer. nat. Wolfgang Wagner,  
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**„Digitizing the interface between cells and biomaterials“**

**Abstract:**

Research in our laboratory is dedicated to understanding and applying basic cell biological principles in the field of biomedical engineering. The research program is characterized by a holistic approach to both discovery and application, aiming at combining high throughput technologies, computational modeling and experimental cell biology to streamline the wealth of biological knowledge to real clinical applications.

In my seminar I will present our latest work on controlling the interaction of cells with biomaterials through design of surface topography. For instance, we are interested in the bone-inducing properties of a subset of porous calcium phosphate ceramics and show how through reverse engineering, we are uncovering an interesting and complex response of cells to materials. Inspired by this, we have started to design high throughput screening strategies of biomaterials libraries, and in particular libraries of surface topographies. Using a design algorithm, we have generated numerous different patterns, which can first be reproduced on a silicon mold and then imprinted onto polymers using microfabrication. After cell seeding, we use quantitative high content imaging and machine learning algorithms to characterize the response of the cells to the thousands of different surfaces and learn more about the relation between surface topography and cell response. For instance, we have identified surfaces which stimulate osteogenic differentiation of mesenchymal stem cells and we are currently testing whether these surfaces can be applied in orthopedic surgery. The focus of my seminar will be on our effort to digitize life at the interface of biomaterials and cells through parameterization of biomaterial properties, –omics based approaches to analyze cell response and computational science to understand and design bio-active biomaterials.

**Veranstalter:** Direktorium des Helmholtz-Instituts für  
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