



IBS Center for Molecular Spectroscopy and Dynamics

COLLOQUIUM

- **SPEAKER**

Dr. Björn Kemper (Biomedical Technology Center of the Medical Faculty, University of Muenster, Germany)

- **TITLE**

Digital holographic microscopy for quantitative imaging of cell cultures and tissue

- **ABSTRACT**

Digital holographic microscopy (DHM) provides label-free multi-modal quantitative phase imaging which can be modularly integrated into common light microscopes. The numerical reconstruction of the digitally captured holograms allows multi-focus imaging of specimen parts in different layers and subsequent autofocussing without mechanical focus realignment. As DHM requires only low light intensities for object illumination, the interaction with the sample is minimized. This is important for minimally invasive long-term monitoring of living cell cultures. DHM phase contrast imaging simplifies automated object tracking and image segmentation for quantification of cell migration and morphology by extraction of absolute biophysical parameters such as cellular volume, thickness and dry mass. In addition, from quantitative DHM phase images the cellular refractive index is accessed, which is related to the cellular water content, intracellular solute concentrations and tissue density. In an overview, different DHM principles for multi-modal quantitative imaging of living cells and unstained tissue sections are presented. Then, by selected applications, the usage of DHM for investigation of the influence of drugs, toxins and nanoparticles on cell morphology, growth and motility in 2D and 3D environments as well as for quantification of inflammation mediated tissue density changes is demonstrated. Finally, it is shown how DHM can be applied to quantify the cellular response to optical manipulation, wound healing in vitro and the quality of living cell cultures.

- **DATE AND VENUE**

May 25, 2017 (Thursday, 5:00-6:00 p.m.)
Seminar Room 116, KU R&D Center

■ **LANGUAGE**

English

■ **INVITED BY**

Associate Director Wonshik Choi

* If you want to discuss with Dr. Björn Kemper (from 1pm to 5 pm) or have a dinner with him, please contact to Prof. Wonshik Choi(wonshik@korea.ac.kr).