

<i>Title:</i>	<b>Research Seminar: Tissue Optics and Imaging, Experimental and Computational Approaches</b>
<i>Offered by:</i>	<b>International Max Planck Research School for Cell, Developmental and Systems Biology (IMPRS-CellDevoSys)</b>
<i>Lecturer:</i>	<b>Dr. Moritz Kreysing (kreysing@mpi-cbg.de)</b>
<i>Date:</i>	<b>Fortnightly Tuesdays 4:30pm, start 18<sup>th</sup> October 2016</b>
<i>Time:</i>	<b>4:30pm</b>
<i>Location:</i>	<b>SR3, MPI CBG, Pfotenhauer Str. 108, DD</b>
<i>Target audience:</i>	<b>MSc and PhD Students with a background in physics, biology, and computer science (we also welcome postdocs, staff and occasional visitors)</b>
<i>No of participants:</i>	<b>15</b>
<i>Registration deadline:</i>	<b>Register beginning of semester.</b>
<i>Pre-course work:</i>	<b>-</b>
<i>Course requirements:</i>	<b>Undergraduate level knowledge in <u>optics</u> and microscopy</b>

**COURSE AIM:**

Taking an interdisciplinary perspective, we are discussing recent approaches to the problem of image formation in biological tissues. This is of relevance not only in the eye, where photons need to travel through the thick neural tissue of the retina prior to the detection by the photoreceptor cells. The question of image formation in tissues currently also becomes the bottleneck in microscopy of living tissues and organisms: here, optical accessibility is largely determined by the optical properties of tissues. Throughout this seminar we will review literature addressing the cell-biological origin of light scattering in tissues, the physical problem of wave propagation in complex biological media, and the question how to reconstruct refractive index distributions of tissues using interference microscopy data. Also the course will cover recent strategies of how to use adaptive optics in microscopy in order to compensate for tissue-induced aberrations.

**COURSE CONTENT:**

see aim.

**COURSE STRUCTURE:**

Participants are expected to contribute to this seminar with the in-depth review of recently published research as a basis for critical discussions.

**METHODS ENCOUNTERED DURING THE COURSE:**

The course is not thought to provide hands on practical knowledge or skills. Methods will be discussed mostly on a theoretical basis. Topics will include: adaptive optics, computational methods to simulate light scattering and image formation, wavefront sensing, phase imaging, optical tomography, ultrastructural imaging, and the quantification of tissue induced light scattering.

**LITERATURE:**

TBA