

EMBC Workshop Proposal

Workshop Type (select one):

Full Day Workshop

Half Day Workshop

Workshop Title:

Label-free Techniques to Monitor Phenotypic Assays

Workshop Organizer Name & Affiliation:

Prof. Dr. Joachim Wegener, Fraunhofer EMFT, Munich (G) & Universiaet Regensburg, Regensburg (G)

Workshop Organizer/Speaker Name & Affiliation 1:

Prof. Dr. Joachim Wegener, Fraunhofer EMFT, Munich (G) & Universiaet Regensburg, Regensburg (G)

Workshop Organizer/Speaker Name & Affiliation 2:

Workshop Organizer/Speaker Name & Affiliation 3:

Workshop Organizer/Speaker Name & Affiliation 4:

Workshop Organizer/Speaker Name & Affiliation 5:

Workshop Organizer/Speaker Name & Affiliation 6:

Theme (Select one):

- 01. Biomedical Signal Processing
- 02. Biomedical Imaging and Image Processing
- 03. Micro/ Nano-bioengineering; Cellular/ Tissue Engineering & Biomaterials
- 04. Computational Systems & Synthetic Biology; Multiscale modeling
- 05. Cardiovascular and Respiratory Systems Engineering
- 06. Neural and Rehabilitation Engineering
- 07. Biomedical Sensors and Wearable Systems
- 08. Biorobotics and Biomechanics
- 09. Therapeutic & Diagnostic Systems and Technologies
- 10. Biomedical & Health Informatics
- 11. Biomedical Engineering Education and Society
- 12. Translational Engineering for Healthcare Innovation and Commercialization

Workshop Synopsis— Max 2000 Characters

This workshop is dedicated to label-free, non-invasive monitoring of cell- and tissue-based assays that report on integral, phenotypic changes in vitro. Label-free bioanalytical techniques have been known for a long time as valuable tools to monitor adsorption processes at the solid-liquid interface in general – and biomolecular interaction analysis (BIA) in particular. The underlying concepts have been progressively transferred to the analysis of cell-based assays. The strength of these approaches is implicitly given with the name 'label-free': the readout is independent of any label, reagent or additive that contaminates the system under study and potentially affects its properties. Thus, label-free techniques provide an unbiased analytical perspective in the sense that the sample is not manipulated by additives but remains pure and accessible for follow-up studies or further biomedical use. Label-free readouts report on changes in integral physical properties of the sample like refractive index, conductivity, capacitance or elastic modulus to mention just a few. Even though it is not implied in the name, label-free approaches usually monitor the cells or tissues non-invasively meaning that the amplitude of the signal (e.g. electric field strength, mechanical elongation) that is used for the measurement is too low to interfere or affect. In contrast to label-based analytical techniques that are commonly restricted to a single reading at a predefined time point, label-free approaches allow for a continuous observation so that the dynamics of the biological system or reaction become accessible. In particular those approaches that are either based on reading the electrical impedance of cell-covered film electrodes deposited on the bottom of a cell culture dish or those that rely on optical wave guides that report on changes in refractive index have found widespread applications in fundamental and applied biomedical research. This workshop will focus on these.