

BioAFM & NanoIR: New Insights into Nanomechanical and High-Resolution Chemical Analysis

Tuesday, June 29, 2021 | 10:00 AM CEST | 6:00 PM AEST



Join us and two exciting guest speakers for this virtual webinar: “BioAFM & NanoIR: New Insights into Nanomechanical and High-Resolution Chemical Analysis”:

Atomic Force Microscopy (AFM) is an advanced multi-parametric imaging technique that enables the 3D imaging of the surface topography of living biological samples in the nm-range, the characterisation of nanomechanical properties, and the visualization of structural changes occurring at the molecular level. **Nanoscale Infrared (NanoIR) spectroscopy and imaging** measures spatially varying physical and chemical properties with nanoscale spatial resolution in samples as diverse as polymers, thin films, monolayers, and biological materials.

Our guest speakers will provide insights into their work using these techniques and speak on exciting applications in the field of life science and biomedical research. Dr Natalia Piergies will speak on the use of nanoscale IR spectroscopy and imaging to study and improve drug delivery systems using drug/metal nanocarriers. Dr Aaron Elbourne will speak on combining BioAFM with high-resolution imaging techniques to investigate virus-like-particles (VLPs), nanoparticle-cell interactions, and cell-virus adhesion.

Program

10:00 Welcome & Introduction

Dr Miriam Unger, Market & Applications Development Manager, Bruker NanoIR
Dr Heiko Haschke, Head of Applications, Bruker BioAFM

10:05 The Drug/Metal Nanocarrier Connection: Characterization and Imaging Using Nanoscale Infrared Spectroscopy

Dr Natalia Piergies, Institute of Nuclear Physics, Polish Academy of Sciences, Poland

10:30 Probing Bio-Interfaces using Atomic Force Microscopy and Complementary Techniques

Dr Aaron Elbourne, School of Science, RMIT University, Australia

10:55 Q&A

Dr Miriam Unger
Dr Heiko Haschke

Please don't hesitate to contact us at productinfo.emea@bruker.com if you have any questions.

Talk abstracts

The Drug/Metal Nanocarrier Connection: Characterization and Imaging Using Nanoscale Infrared Spectroscopy

Dr Natalia Piergies, Institute of Nuclear Physics, Polish Academy of Sciences, Poland

Nowadays, nanotechnology plays an important role in improving conventional therapies, in particular in the treatment of cancer. Drug delivery systems, based on nanosized vehicles, deliver therapeutic agents to the target site where they are released in a controlled manner. The critical step in designing effective drug/carrier conjugates is the formation of a stable connection between the drug and the carrier surface. Therefore, monitoring how the drug deposits onto the carrier and understanding precisely how it is attached to the carrier's surface is of great importance.

Application of surface-enhanced vibrational spectroscopy methods enables the detailed interpretation of the drug/metal nanocarrier connection. In this webinar, I will discuss the surface enhancement occurring in the AFM-IR technique and its use in the nanoscale imaging of drug/metal nanocarrier conjugates. This is a groundbreaking approach, as even subtle changes in drug adsorption behavior can be tracked at very high spatial resolution.



Dr Natalia Piergies is a specialist in surface-enhanced vibrational spectroscopy. She obtained her Ph.D. in 2014 from the Jagiellonian University. She joined the Department of Experimental Physics of Complex Systems at the Institute of Nuclear Physics PAN as an Assistant Professor in 2016.

Her scientific interest is focused on the application of metal nanoparticles as drug carriers which may improve the effectiveness of cancer therapies. She investigates the relationship between the drug/nanocarrier connection and the activity of these conjugates in in vitro models.

Probing Bio-Interfaces using Atomic Force Microscopy and Complementary Techniques

Dr Aaron Elbourne, School of Science, RMIT University, Australia

Atomic force microscopy allows in situ nanoscale systems to be probed unlike many other techniques. In this talk, Dr Aaron Elbourne will be speaking about his recent use of the Bruker JPK - BioAFM (NanoWizard 4) in tandem with other high-resolution imaging techniques. Specifically, the use of AFM techniques to probe fungal biofilms, virus-like-particles (VLPs), nanoparticle-cell interactions, and cell-virus adhesion will be discussed. In addition, hyperspectral Synchrotron-based IR-spectroscopy will be highlighted as a complimentary technique to these studies.

BioAFM & NanoIR: New Insights into Nanomechanical and High-Resolution Chemical Analysis

Tuesday, June 29, 2021 | 10:00 AM CEST | 6:00 PM AEST



Dr Aaron Elbourne is a postdoctoral researcher fellow within the School of Science at RMIT University. He currently holds a Jack Brockhoff Foundation Early Career Medical Research Fellowship and is a leader within RMIT's ECR network. He obtained his PhD in Chemistry in 2017 from The University of Newcastle, Australia under the supervision of Professor Erica J. Wanless. He began his postdoctoral fellowship in February of 2017.

His early research focused on molecular-resolution atomic force microscopy (AFM) imaging, with an emphasis on fundamental ion adsorption at the solid-liquid interface. His current research has 'shifted-gears' focusing on anti-microbial surface and particle technologies and bio-interfacial studies. He has a passion for research with real-world applications and industrial translation. More broadly, he is interested in developing next-generation vaccine technologies, antimicrobial technologies, anti-cancer antibodies, and new methods for combating antibiotic resistance.