



BPS2023

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Tuesday, February 21

9:30 AM – 11:00 AM

Room 10

Bruker

Single-Molecule Localization Microscopy For Advanced Biological and Genomic Imaging In Three Dimensions: The Bruker Vutara VXL

Most sub-cellular structures are smaller than 300 nm, beyond the optical resolution limit for fluorescence microscopy. The single-molecule localization microscope (SMLM) Bruker Vutara VXL overcomes this limitation. With an optical resolution of 20 nm, SMLM is uniquely qualified to address biological mysteries that require specific labeling as used in fluorescence microscopy but higher resolution than can be achieved with diffraction-limited microscopy. In addition to SMLM, the Vutara VXL implements imaging workflows for multiplexed chromatin tracing and smFISH applications. The system images, resolves, and quantifies cellular structures, molecular machines, proteins, RNA, and chromosomal structures.

SMLM modulates the emission from dye molecules to prevent their point-spread-function (PSF) spatial overlap. Advanced fitting algorithms localize the position of each dye molecule with a resolution well below the optical resolution limit. The proprietary bi-plane technology of the Bruker Vutara VXL extends the traditional 2D fitting into the third dimension, far away from the coverslip. In STORM and PALM, a laser switches dye molecules actively on and off. Special imaging buffers create a similar blinking spontaneously in dSTORM. DNA-PAINT relies on oligonucleotides' transient binding, and genomic applications use sparse labeling and multiplexing.

In this presentation, we will discuss how the Bruker Vutara VXL compact bench-top system brings the power of SMLM into your lab.

Speaker

Winfried Wiegraebe, Product Manager Super-Resolution Microscopy, Bruker