RCB-Colloquium

Thursday, November 19, 2026 – 14:00 h

H 53



Dr. Johannes Stein

Max Planck Institute for Molecular Genetics, Berlin

Integrating DNA-PAINT with electron microscopy for ultrastructural molecular imaging

DNA-PAINT enables highly multiplexed molecular imaging in cells, yet the resulting maps remain largely disconnected from cellular ultrastructure. Electron microscopy resolves cellular architecture at nanometer resolution but lacks molecular specificity. Bridging these views has been a longstanding challenge.

We present a correlative workflow combining kinetically enhanced DNA-PAINT (tkPAINT) with transmission electron microscopy (TEM). Cellular ultrastructure is preserved during cryosectioning, labeling, and multiplexed Exchange-PAINT imaging, followed by TEM processing of the same sections. This allows nanometer-scale registration of single-protein localizations directly onto defined ultrastructural features.

Biomolecules can thus be assigned to specific membranes and organelle subdomains within the same specimen, enabling molecular organization to be interpreted in their structural context. Our approach links highly multiplexed single-molecule imaging with electron microscopy and provides a promising route toward ultrastructure-resolved cell biology.

Host: Prof. Dr. Dina Grohmann, Microbiology
Dina.Grohmann@ur.de

Universität Regensburg
Biochemie-Zentrum Regensburg