

Angewandte Physik - Experimentelle Biophysik

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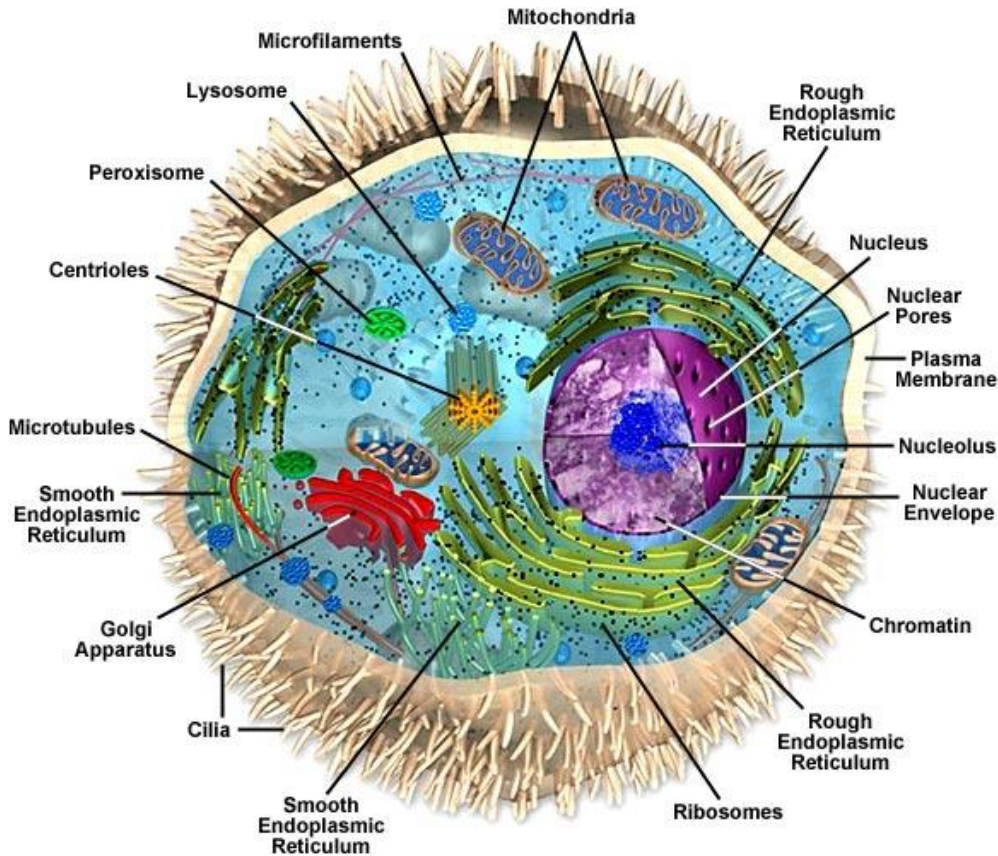


Physikhochhaus

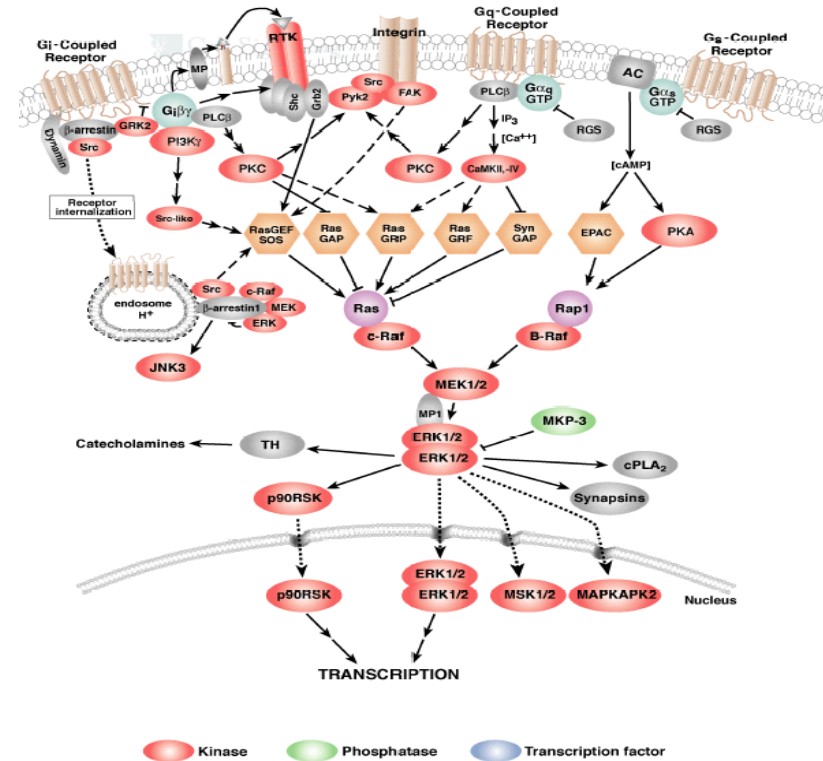


CFN-Gebäude

Aim: Understanding Life at the Cellular/Organismal Level on a Molecular Basis



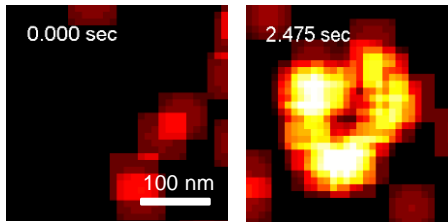
Cellular Information Networks



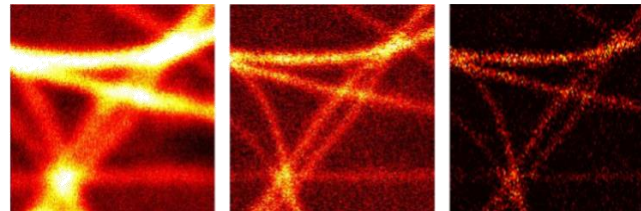
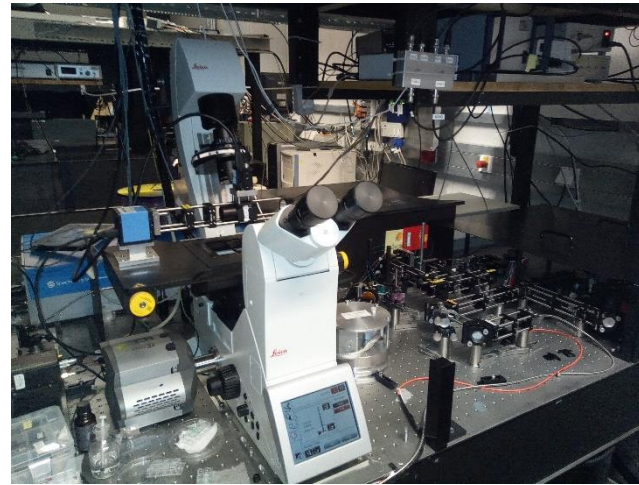
in vitro ↔ *in vivo*

Approach: High Performance Fluorescence Imaging (Hardware / Software development)

Super-resolution single-molecule localization microscopy



Super-resolution 2D / 3D STED nanoscopy

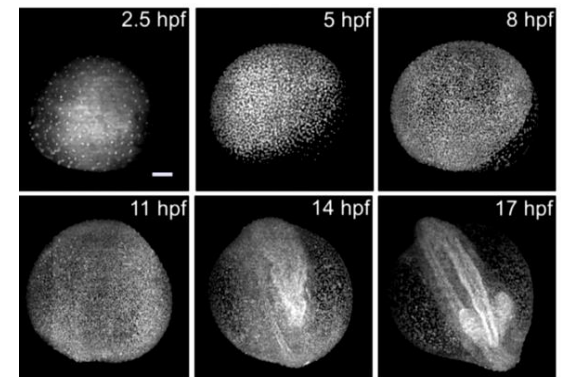


Confocal

STED

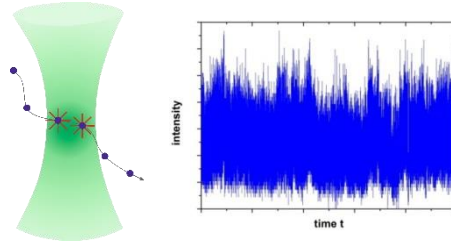
STEDD

Light sheet microscopy
(organismal imaging)

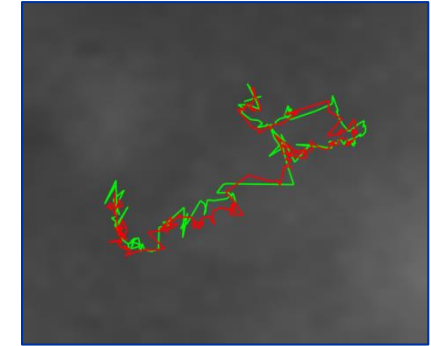


Beyond Imaging – Quantitative Microscopy

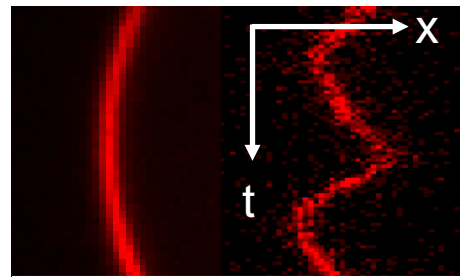
Fluorescence
Correlation
Spectroscopy



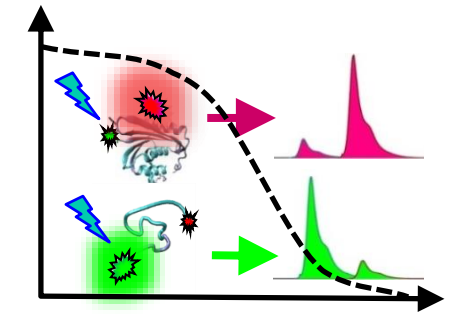
Single
Particle
Tracking



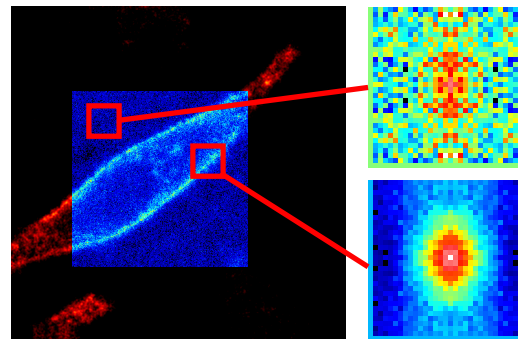
Scanning
Fluorescence
Correlation
Spectroscopy



Förster
Resonance
Energy
Transfer



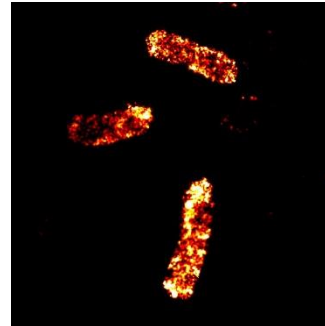
Raster
Image
Correlation
Spectroscopy



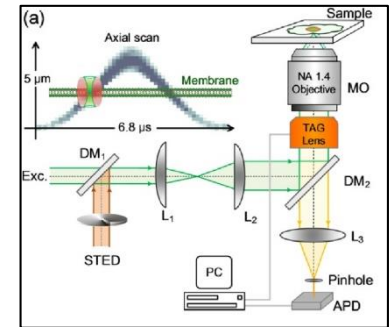
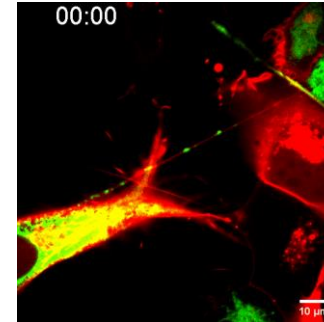
- diffusion coefficients
- concentrations
- protein-protein interactions (receptor-ligand affinities)
- signalosome formation: dynamics, composition, ...

Current Research Topics

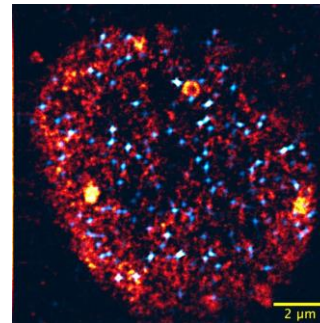
- Cell-cell communication



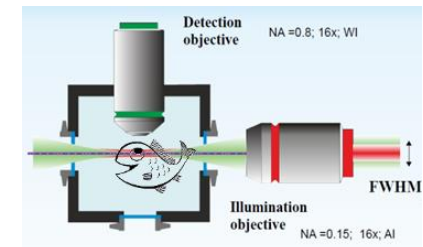
- Cell membrane repair



- RNA imaging in cells



- Super-resolution imaging of gene activity in cell nuclei



Bachelor/master thesis topics typically involve the development of new microscopy hardware and/or software for device control or data analysis as well as biophysics experiments. There is a considerable breadth of topics, and all thesis projects are embedded in our ongoing research. Candidates work closely alongside PhD students or Postdocs for best day-to-day guidance. The exact topic is arranged with the student to accommodate his/her interests as well as our research needs.