Angewandte Physik - Experimentelle Biophysik

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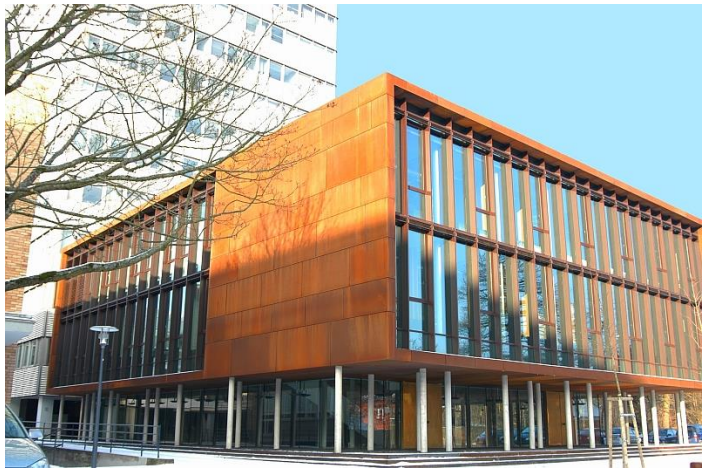
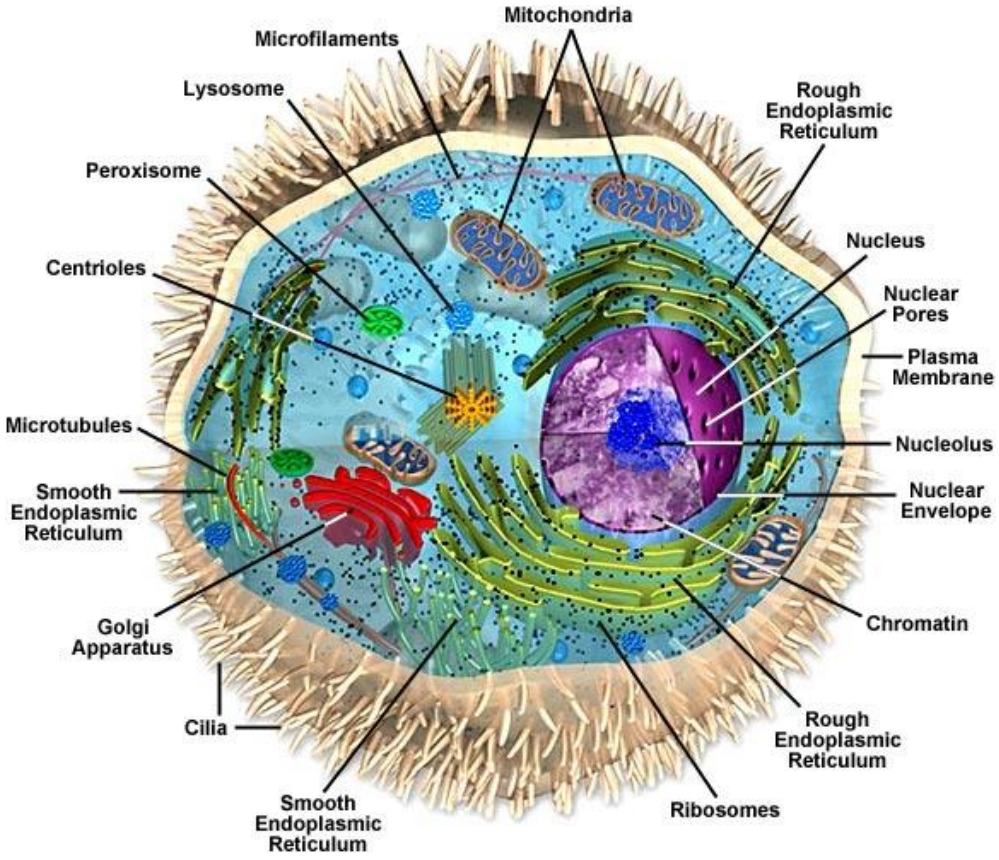
Physikhochhaus



CFN-Gebäude

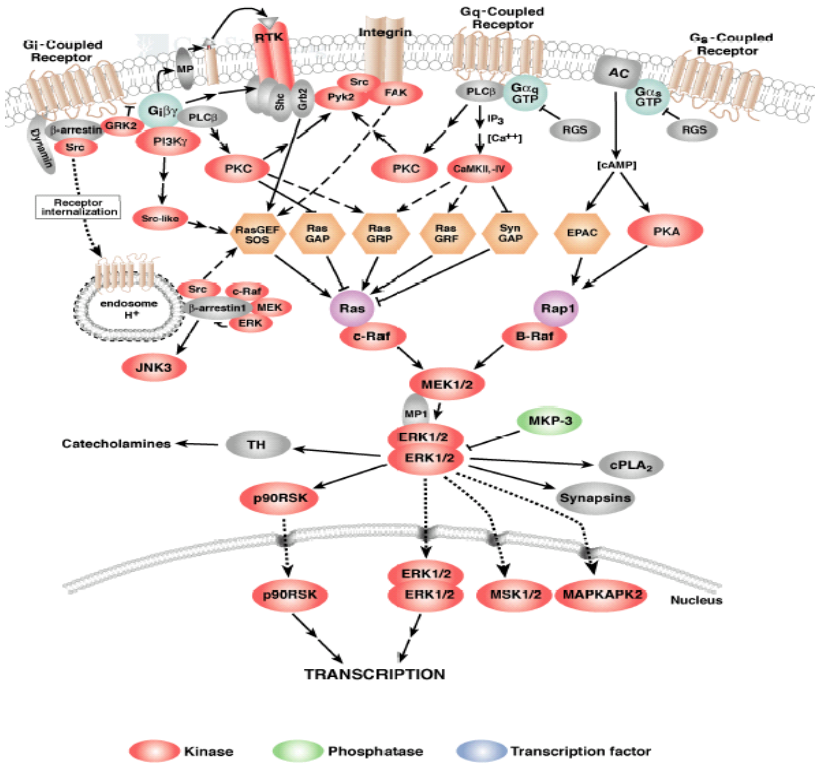
* https://en.wikipedia.org/wiki/Gerd_Ulrich_Nienhaus

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



http://micro.magnet.fsu.edu/cells/animals/animalmodel.html

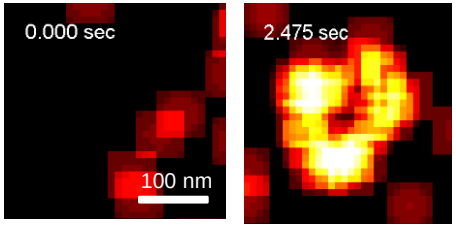
Cellular Information Networks



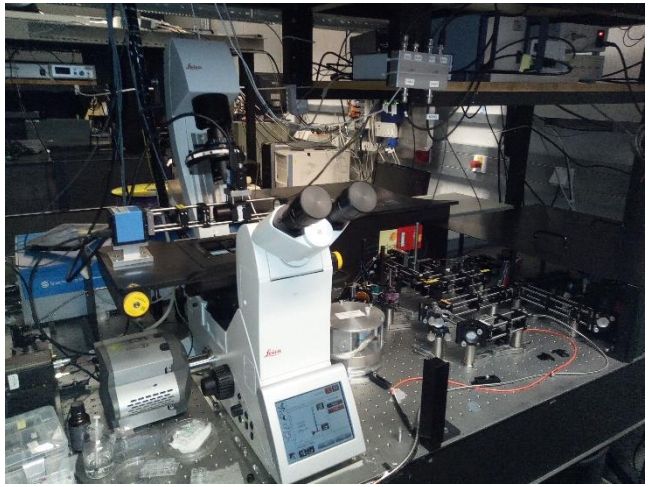
in vitro ↔ in vivo

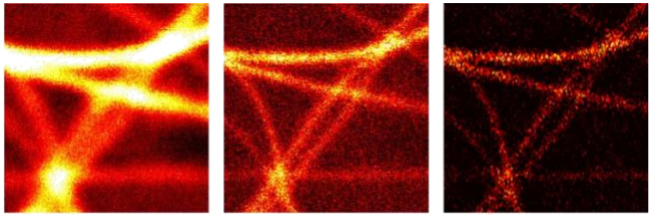
Approach: High Performance Fluorescence Imaging (Hardware / Software development)

Super-resolution single-molecule localization microscopy

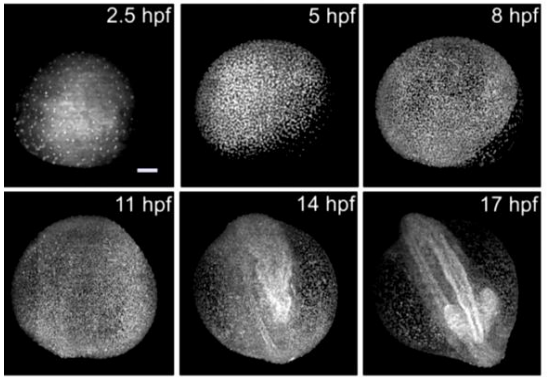


Super-resolution 2D / 3D STED nanoscopy



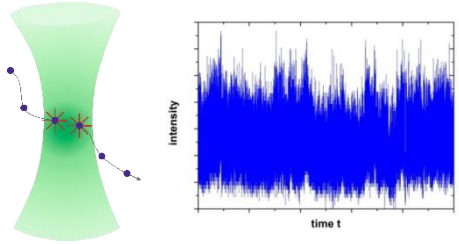


Light sheet microscopy (organismal imaging)

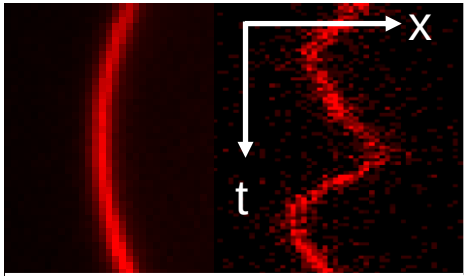


Beyond Imaging – Quantitative Microscopy

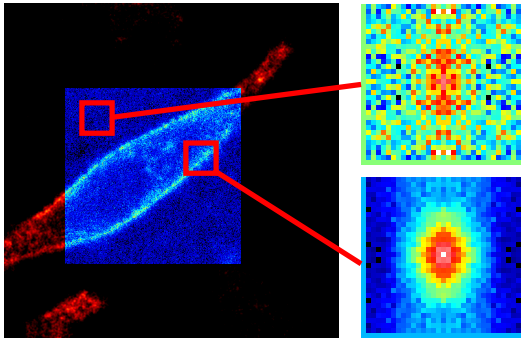
Fluorescence
Correlation
Spectroscopy



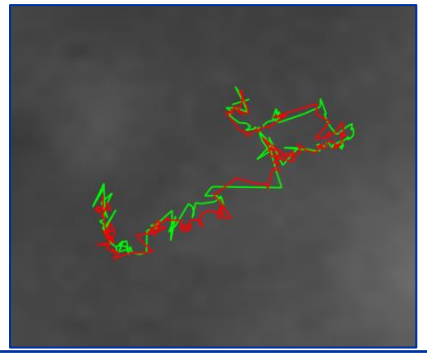
Scanning
Fluorescence
Correlation
Spectroscopy



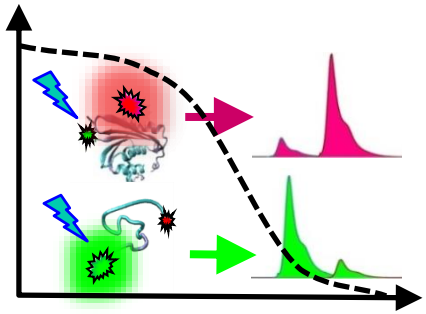
Raster
Image
Correlation
Spectroscopy



Single
Particle
Tracking



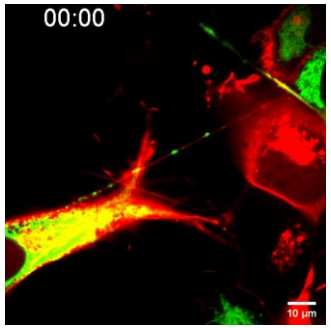
Förster
Resonance
Energy
Transfer

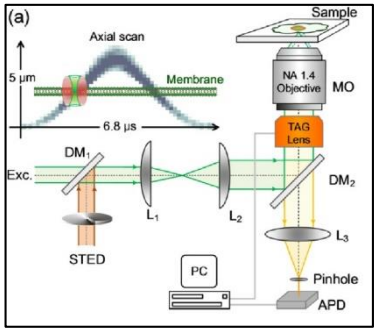


- diffusion coefficients
- concentrations
- protein-protein interactions (receptor-ligand affinities)
- signalosome formation: dynamics, composition, …

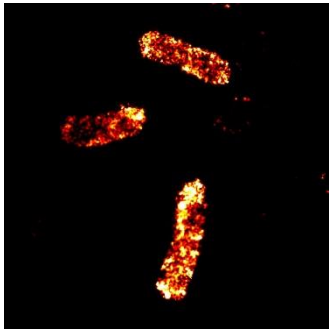
Current Research Topics

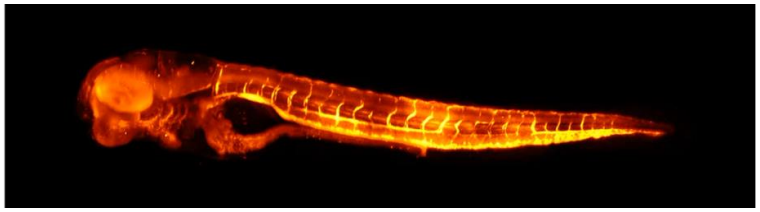
- Cell-cell communication



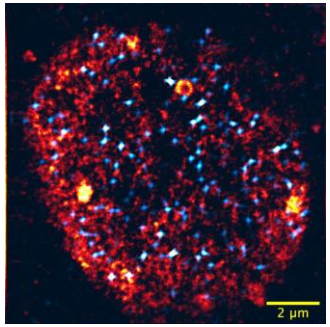


- Cell membrane repair

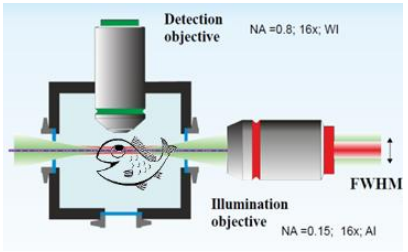




- RNA imaging in cells



- 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.