MOLECULAR SCIENCES
biochemie chemie pharmazie

# Research Internship

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

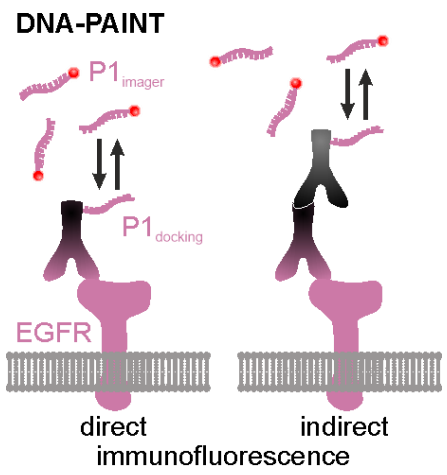
# Optimization of DNA-PAINT measurements

## Motivation

Different single-molecule localization microscopy (SMLM) methods exist to circumvent the diffraction limit. One of these methods is DNA point accumulation for imaging in nanoscale topography (DNA-PAINT). It is a versatile method for acquiring fluorescence images with near-molecular resolutions, but a drawback is the relatively long data acquisition time per measurement. There are several recent strategies to optimize the measurement time. Civitci et al. for example established the addition of ethylene carbonate (EC) to accelerate the dissociation of bound imager strands from docking strands and reduce the measurement time.

## Task Description

For improving DNA-PAINT with regard to localization precision and acquisition time, different parameters can be varied. As model system the receptor tyrosine kinase epidermal growth factor receptor (EGFR) will be used. EGFR will be labeled either by indirect or direct immunofluorescence to evaluate the effect of the labeling strategy on the quality of the super-resolved image. In addition, different concentrations of EC will be tested to reduce the binding time enabling faster measurements. For the project you should be familiar with SMLM.




## Key References


1. Schnitzbauer, J., Strauss, M.T., Schlichthaerle, T., Schueder, F. and Jungmann, R. (2017) Super-resolution microscopy with DNA-PAINT. Nature Protocols 12, 1198–1228.
2. Civitci, F. et al. (2020) Fast and multiplexed superresolution imaging with DNA-PAINT-ERS. Nature communications 11, 4339.


## Work Area

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| Laboratory | ■ ■ □ □ □ |
| Microscopy | ■ ■ ■ □ □ |
| Data Analysis | ■ ■ ■ ■ □ |
| Programming | □ □ □ □ □ |

## Time

**Possible Start**

August 2021

**Duration**

4 weeks

## Contact


**Mathilda Glaesmann, Marina Dietz**

glaesmann [at] chemie.uni-frankfurt.de
dietz [at] chemie.uni-frankfurt.de


**Language**