

# PhD Researcher Position in the Walther Lab in Mainz, Germany, embedded within the Research and Training Group 2516

## Transmembrane Signaling in Artificial Cells using DNA Structures/Superresolution Microscopy

**Key words: Artificial Cells, DNA Nanoscience, Superresolution Microscopy**

**BACKGROUND AND SCOPE OF THE POSITION.** Building an artificial cell able to [transduce the information from the external environment to its interior](#) is an essential steppingstone to creating artificial life-like systems and to better understand the origin of life. In this project, we want to engineer transmembrane communication processes in artificial cells using tools from DNA nanoscience and [quantitatively characterize their structures and dynamics using superresolution fluorescence microscopy](#). The scope of the project deals with building DNA structures and integrating them into liposomes as artificial cell mimics, as well as supported lipid bilayers for superresolution microscopy, in particular working with single molecule localization techniques (e.g. STORM, PALM, DNA paint). A brand-new Zeiss Elyra 7 superresolution fluorescence microscope is available.

The project is part of the **Research and Training Group 2516** "Structure Formation of Soft Matter at Interfaces" (<https://grk2516.uni-mainz.de>) and you will be part of a structured research and training program spanning ca. 10 research groups. You will closely collaborate with researchers doing computer simulations on these motifs. You will be hired according to the German Salary Scheme with full benefits.

**TEAM.** [Join our team to do cutting-edge research of highest international visibility](#). We provide you with an inspiring and collaborative team atmosphere in a multinational and multidisciplinary environment, and ample opportunities to develop. Brand new, cutting-edge synthetic and analytical infrastructure and facilities are available due to generous support by the University of Mainz and the Gutenberg Research College. Prof. Walther (h-index 67, age 42) is a Gutenberg Research Professor, a Max Planck Fellow and a 2 x ERC Awardee.

More information on the group can be found here: [www.walther-group.com](http://www.walther-group.com)

**EXPECTED CANDIDATE PROFILE.** As an ideal candidate you are creative, highly self-motivated, ambitious, and communicative to excel in scientific challenges. You hold a M.Sc. in Chemistry or Physics and ideally have a background in fluorescence microscopy, self-assembly or DNA nanoscience. We are willing to train you in this, as well as in complementary skills.

### Selected references:

1. "Switchable Hydrophobic Pockets in DNA Protocells Enhance Chemical Conversion" *J. Am. Chem. Soc.* 145, 7090 (2023).
2. "Insertion of 3D DNA Origami Nanopores into Block Copolymer Vesicles", *ChemSystemsChem* 2022, 4, e20220000 (2022).
3. "Signal-processing and adaptive prototissue formation in metabolic DNA protocells", *Nat. Commun.* 13, 1 (2022).
4. "Functional and morphological adaptation in DNA protocells via signal processing prompted by artificial metalloenzymes" *Nat. Nanotechnol.* 15, 914 (2020).
5. "Pathway-Controlled Formation of Mesostructured all-DNA Microgels and their Superstructures" *Nat. Nanotech.*, 13, 730 (2018).

**The position is available in Winter 2023/24 and has a duration of 3 years. Application deadline is November 1<sup>st</sup> 2023.**

Please send your full application as a **single** PDF file containing

- letter of motivation **including** a summary of your past research experience, in particular a meaningful summary of your master thesis; transcript of records of your Master and B.Sc. program.
- Detail in your letter why you believe you are the right person and what you expect from us
- curriculum vitae and list of publications (if applicable)
- Two contacts for reference letters

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