

## Postdoctoral Position

# Intra-Cellular DNA Nanoscience

**Key words: DNA Nanoscience, Cell Biology, Self-Assembly, Molecular Machines**



### BACKGROUND AND SCOPE

DNA Nanoscience has matured to create sophisticated structures, machines, materials, biosensors, as well as dynamic and information-processing devices. Such systems operate in their large majority outside of cells, even though DNA and RNA are elementary molecules inside cells, and therapies based on very simple siRNA or mRNA are emerging. However, the potential for regulating cell fate or for engineering de novo structures inside of cells using the technologies provided by structural and dynamic DNA nanoscience have not been realized. Our lab has pioneered approaches for DNA assembly, mechano-sensing DNA hydrogels, and life-like DNA protocells and ATP-fueled DNA systems. In this project, we want to take the next critical step and transfer this understanding to regulate cellular functions using principles of DNA assembly and dynamic systems inside mammalian cells. The project thus bridges from the molecular design of DNA devices to their operation in cellulo and finally to an understanding of regulatory aspects of cellular function.

**Team.** We are an ambitious team, and this position is embedded in an ERC Consolidator Grant project! 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. We run our own fully equipped cell lab. Prof. Walther (h-index 63, 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 PhD in Chemistry, Biomedical Sciences or similar and have a background at the interface between soft matter and/or cell biology. Previous exposure to DNA nanoscience is a plus. We are willing to train you in complementary skills.

### Selected references on life-like DNA systems in the past:

1. Signal-processing and adaptive prototissue formation in metabolic DNA protocells, *Nat. Commun.* 13, 1 (2022).
2. DNA protocells via signal processing prompted by artificial metalloenzymes *Nat. Nanotechnol.* 15, 914 (2020).
3. Programmable Dynamic Steady States in ATP-Driven Non-Equilibrium DNA Systems *Sci. Adv.*, 5, eaaw0590, (2019).
4. Programmable ATP-Fueled DNA Coacervates by Transient Liquid-Liquid Phase Separation *Chem* 6, 3329 (2020).
5. Modular Design of Programmable Mechanofluorescent DNA Hydrogels *Nature Commun.* 10, 529 (2019).

**The position is available from Spring 2023 and has a duration of 2 years.**

**Application Deadline is January 31st 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 PhD and master thesis; transcript of records of your Master 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
- Two contacts for reference letters

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