

DFG-funded Ph.D. position in Origin of Life research

The research group of Prof. Dr. Andres Jäschke at the Institute of Pharmacy and Molecular Biotechnology (IPMB), Heidelberg University, offers a Ph.D. position funded by the CRC 392 “Molecular evolution in prebiotic environments”. The candidate will investigate one of the greatest mysteries in modern science, namely the **origin of the genetic code**.

Background:

The genetic code is a crucial mechanism of life that links a three-letter nucleotide code with the corresponding amino acid, thereby encoding proteins from genetic information. Despite its importance, the evolutionary origin of the genetic code remains poorly understood. Over the past five years, our lab has developed methods for the interrogation of large combinatorial RNA libraries by combining Illumina sequencing with novel aminoacylation assays (*JACS* 2023, doi: 10.1021/jacs.3c03931). This project builds on our core expertise of interfacing chemistry and molecular biology with next-generation sequencing technology to answer previously inaccessible questions [*Nature* 2015, *Nat. Protocols* 2017, *Nat. Comm.* 2021, *Nature* 2023, *Acc. Chem. Res.* 2023].

Objectives:

The candidate will apply our methodology to experimentally test different hypotheses regarding the origin of the genetic code, such as the relationships between “anticodon” sequences and the preferentially charged amino acids, the preference of L-amino acids over D-amino acids, or the role of “helper” peptides as hypothetical primordial aminoacyl tRNA synthases. In addition, the candidate will further refine and expand the methodology to provide a thorough understanding, and will make first strides towards coded peptide synthesis. Thus, the project will consist of ~20% chemistry, 40% biochemical lab experiments, and 40% computational analysis.

The Ph.D. candidate will *learn, develop, and apply state-of-the-art techniques* ranging from next-generation sequencing to detailed mechanistic studies within this project. The graduate program of CRC 392 will ensure a broad and cross-disciplinary training of highest caliber.

Requirements:

- Applications are invited from enthusiastic and motivated candidates with a keen interest in the origin of life and a desire to answer fundamental questions in science.
- The applicant ideally holds an MSc in Biochemistry, Biotechnology, Chemistry, or a related discipline.
- Essential attributes for success in this role include creativity, initiative, teamwork, proficiency in the English language, and an inclination for teaching.
- Experience in the following disciplines will be considered advantageous:
 - Standard molecular biology techniques, and in particular with RNA.
 - Analysis of NGS data and/or familiarity with python or R.
 - Some exposure to synthetic chemistry.

Application details: To apply, please send a letter that motivates your application for this position, your CV, transcripts, a summary of previous research, and contact details of two academic references as a single pdf file to Prof. Dr. Andres Jäschke (jaeschke@uni-hd.de).

Practical information: The initial duration of the contract is fixed until 12/2027. The salary corresponds to E13 (65 %) TV-L after the probation period.