

Job advertisement no. 039/2024

The department **MICA - Anti-infectives from Microbiota**, led by Prof. Christine Beemelmans at the Helmholtz-Institute for Pharmaceutical Research Saarland (HIPS) in Saarbrücken, is offering a position as

Doctoral Researcher (f/m/d)

Project title:

Heterologous expression of cryptic biosynthetic gene clusters

In our ERC-funded research project (Starting Grant MORPHEUS), we want to study the function and origin of natural products in the interspecies interaction between marine bacteria and marine eukaryotes. Since not all genes responsible for natural product biosynthesis are always upregulated or the cultivation of single marine organisms in a laboratory setting is not possible, we want to mine (meta) genomic data for suitable biosynthetic gene clusters (BGCs), heterologously express them and analyze the corresponding natural product for their biological function. In addition, we also focus on the structure elucidation of new compounds using state-of-the-art analytical methods. This multi-faceted project will enable the prospective PhD candidate to gain expertise in various biotechnological techniques and analytical method for the production and biological (as well as chemical) characterization of novel natural products.

The PhD project encompasses several key components and tasks:

1. **Genome Mining of Marine Bacterial Genomes and Metagenomic Datasets**
 - Genome sequencing (Nanopore, Illumina) to explore the biosynthetic capacity of bacterial (meta) genomes.
 - Evaluation and analysis (antiSMASH) of BGCs to find novel natural products or new biochemistry.
2. **Heterologous Expression of BGCs:**
 - Design of gene constructs for expression of BGC products in heterologous hosts (*Streptomyces*, *Pseudomonas*, etc. ...).
 - Optimizing heterologous expression conditions to achieve high production titers of the desired natural product.
 - Manipulation of BGCs (single point mutations, module exchange) to rationally alter the structure of natural products.
3. **Analysis of Heterologous Products:**
 - Utilizing liquid chromatography high-resolution mass spectrometry (LC-HRMS) to monitor product production and to gain initial structural information about new natural products.
 - Purification (HPLC) and biological testing (antibiotic activity, cytotoxicity or custom-made bioassays) of pure natural products.
 - If interested, further structural characterization of new natural products with the help of other experts in the group (NMR, x-ray, chemical derivatization).

Qualifications:

- Master degree or equivalent in Life Sciences, Biotechnology, Pharmacy, Biochemistry, or related fields.
- Strong hands on experience in molecular biological (PCR, Cloning, Gene editing) as well as chemical and biochemical transformation techniques.
- Experience in analytical chemistry (NMR, LCMS, HPLC, UV, etc. ...) is a plus.
- Ability to pay attention to details, pursue research independently and work in a goal-oriented manner.
- Willingness to work in a plural, collegial, international (co-workers come from 30+ countries) and interdisciplinary environment.
- Excellent English communication skills (written and spoken); very good skills in scientific writing

Disabled persons are given preference in the case of equal professional qualification. The HIPS aims for a corporate culture of appreciation and promotion of equal opportunities between women and men. The position is suitable for part-time work.

We offer:

- modern laboratories and state-of-the-art instrumentation
- a dynamic and international research environment
- extensive further training opportunities and the opportunity to enroll in a structured PhD program
- unique network of excellent partners to support your research endeavors
- 30 days vacation (24.12. & 31.12. are considered as completely free days)
- an annual additional payment (Weihnachtsgeld) analogue to § 20 TVöD
- social security included
- flexible working hours

The Helmholtz Institute for Pharmaceutical Research Saarland (HIPS) focusses on identifying and developing new treatment options for infectious diseases with an emphasis on natural product research. Especially researchers in the department of *Microbial Natural Products* are aiming to identify, investigate and optimize novel natural product based actives, applying diverse approaches and methods mainly from the field of biotechnology, microbiology, molecular biology and biochemistry. HIPS was jointly started in August 2009 by the HZI in Braunschweig and Saarland University on Campus Saarbrücken.

In 2015 HIPS moved into a new 4500 m² research building in which currently 220 international employees work. HIPS represents the first and only publicly funded extra-university research unit in Germany dedicated to pharmaceutical research. The Institute collaborates with universities and various industries both nationally and internationally.

Starting date:	as soon as possible, 2024 - initial contract for 3 years.
Salary:	alike E13 TVöD/Bund (55%)
Probation period:	6 months
Working place:	Saarbrücken
Published:	04 March, 2024
Closing date:	01 April, 2024
Application:	Applicants are required to complete the online application form here: https://hzi.opencampus.net/ (Please select Job No. 039/2024)

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