

## 2025 Helmholtz – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

### PART A

**Title of the project:**

Harnessing Genome Mining and ACTIMOT for Natural Product Discovery and Biosynthetic Elucidation

**Helmholtz Centre and/or institute:**

Helmholtz Centre for Infection Research / Helmholtz Institute for Pharmaceutical Research Saarland

**Project leader:**

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**Department:**

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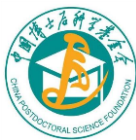
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**Description of the project (max. 1 page):**

We seek a motivated postdoctoral researcher to discover novel natural products (NPs) through genome mining and elucidate the biosynthetic pathways, building on ACTIMOT technology (*Science*, DOI: 10.1126/science.abq7333). This project will use bioinformatics tools to identify and prioritize uncharacterized biosynthetic gene clusters (BGCs) from bacterial genomes, followed by activation using ACTIMOT in native hosts and heterologous hosts. The candidate will employ genome editing, synthetic biology and metabolic engineering to optimize NP production and use analytical chemistry (LC-MS, NMR) for compound characterization.

Biosynthetic pathway elucidation will involve genetic manipulation of native strains, heterologous expression of BGCs, biochemical assays, and mutagenesis studies to uncover enzymatic mechanisms. Isotope labeling and metabolomics will aid in precursor tracking, with opportunities to engineer pathways for structural diversity.

Candidates should have a PhD in microbiology, molecular biology, synthetic biology, or natural product chemistry, with expertise in bacterial genetics, genome mining, and biosynthetic pathway



analysis. Experience with microbiology, bacteria genetics, and analytical chemistry is desirable. The ideal candidate will be independent and collaborative in a multidisciplinary research setting. We offer access to cutting-edge facilities, a collaborative research environment, and professional development support. This project presents an exciting opportunity to contribute to NP discovery and biosynthetic innovation with state-of-the-art genome mining and synthetic biology approaches.

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**Description of existing or sought Chinese collaboration partner institute (max. half page):**

Helmholtz International Labs. In cooperation with the Chinese Shandong University, an interdisciplinary research team at the Helmholtz International Lab will work on the development of antibacterial and antiviral strategies that should ultimately lead to innovative drug candidates.

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**Required qualification of the postdoc:**

- A PhD in natural product research or a related field
- Extensive hands-on experience in microbiology, genetics and biochemistry
- Experience in writing publications, conference papers and research proposals
- Fluency in spoken and written English and excellent oral and written communication skills
- Planning and organisational skills, prioritisation of multiple tasks, meeting strict deadlines
- Demonstrated project and laboratory management skills in multiple tasks
- Capability of creative and critical thinking, independent thought and experimentation, decision making, problem solving with discretion, self-motivation and curiosity.