Stockholm University

Ref nr: SU-465-0007-26
Datum: 2026-01-15

Postdoctoral fellowship in synthetic biology with a focus on engineering generalizable strategies to mitigate small-molecule toxicity in unicellular microorganisms
at the Department of Molecular Biosciences, The Wenner-Gren Institute, Stockholm University.

Reference number: SU-465-0007-26

Deadline for applications: February 28, 2026

Stockholm University is a leading European university offering a multicultural environment in one of the world's most dynamic capital cities. With more than 60,000 students and 5,000 staff, the University facilitates individual and societal development by providing top quality education that is tightly linked to its internationally recognized research programs.

Research at the Department of Molecular Biosciences, The Wenner-Gren Institute (MBW) experimentally addresses fundamental problems in molecular cell biology, integrative biology, and infection and immunobiology. State-of-the art and advanced methodologies are applied in a professional research environment characterized by its well-established international profile. The institute has approximately 30 research groups with a research staff of 200, of which 65 are PhD students. Read more about MBW at www.su.se/mbw.

This fellowship will be placed in the Wäneskog group led by group leader Marcus Wäneskog. Current research in the group is centered on understanding microbial stress and growth inhibition, with a particular focus on combinatorial toxicity. Some of the ongoing projects in the group study how common pharmaceutical drugs, antibiotics, bacteriophages, and antimicrobial toxins and peptides can interact and inhibit the growth of microorganisms. The aim of these studies is to understand the molecular mechanisms behind how complex mixtures of toxic compounds can either enhance or attenuate each other's antimicrobial effects.

Project description
Many industrially relevant and environmentally persistent small molecules are intrinsically toxic to unicellular microorganisms. This toxicity is a major bottleneck for both sustainable biomanufacturing, where high product titers are required, and for bioremediation, where microorganisms must function under harsh and chemically complex conditions. This project aims to overcome such issues by developing broad and generalizable strategies that could enable synthetic microbial tolerance and/or resistance against a diverse range of toxic small-molecule compounds.

This fellowship will explore two parallel research directions:

Novel resistance discovery by identifying intrinsic cellular factors and pathways that enable broad-range small-molecule detoxification and toxicity tolerance in environmental microorganisms, using both adaptive laboratory evolution and random genetic engineering.

Rational engineering of resistance by combining innovative *de novo* synthetic biology approaches with both semi-targeted and random mutagenesis, followed by selection, screening and high-throughput phenotype-to-genotype mapping.

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The ultimate goal of this project is to develop synthetic and generalizable microbial stress mitigation strategies that can be implemented in most currently used microbial cell-factory platform strains, and in any future bioremediation organism(s). Thus, enabling optimal growth and normal cellular functions even in the presence of most toxic small-molecule compounds.

If you desire hands-on work designing, building and screening synthetic DNA libraries, while also turning novel microbial stress biology into synthetic resistance, this fellowship is a strong fit.

Meritorious qualifications for the fellowship applicant

- Previous experience designing and building high-diversity DNA libraries using either random, semi-targeted or rational DNA mutagenesis.
- Previous experience designing and validating novel selection and/or screening assays.
- Previous experience using NGS-based techniques for high-throughput phenotype-to-genotype mapping.
- Previous experience identifying and characterizing novel stress-response mechanisms (membrane stress, redox stress, proteotoxicity and/or metabolic stress) using genetic or omics-based approaches.
- Previous experience with high-throughput genome engineering.
- Previous experience analyzing large datasets (using for example R or Python).

Qualification requirements
This postdoctoral fellowship is primarily for the purposes of research. Applicants are required to hold a Swedish doctoral degree, or an equivalent degree from another country. The PhD degree must have been awarded at the latest on the 28th of February 2026, and no more than six years prior. An older degree may be acceptable under special circumstances, which includes sick leave, parental leave, clinical attachment, elected positions in trade unions, or similar.

Terms of the fellowship
The terms of the fellowship are regulated by the Carl Trygger Foundation. The fellowship is awarded as a tax-free stipend of 30 000 SEK/month and covers 2 years of full-time postdoctoral studies. A half-time report must be submitted after 12 months. Starting date for the fellowship is per agreement, but no later than July 1, 2026.

Additional information
Further information about the research project and the conditions of the postdoctoral fellowship can be obtained from Marcus Wäneskog, PhD, marcus.waneskog@su.se.

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Application
Applications should be marked with the reference **SU-465-0007-26** and submitted electronically **as a single PDF file**. The PDF should be sent to the following address:

- marcus.waneskog@su.se

The application deadline is **February 28, 2026.**

The application should comprise of the following parts:

1) Complete CV, including full contact information, date of birth, education and the title of the candidates PhD thesis.
2) List of all publications.
3) Personal statement describing research interests and previous research experiences (maximum 1-2 A4-pages).
4) The names, e-mail addresses and telephone numbers of 1-2 references.