

Engineering microbial cell factories for *in situ* bioplastic composite synthesis from lignocellulosic hydrolysates: A multifaceted approach for Active and Intelligent packaging

Supervisor: Prof. Rahul Mangayil

Contact: firstname.lastname@aalto.fi

We are now looking for a **Doctoral Researcher in the field of Functional Materials**.

Are you passionate about transformative research, that innovatively addresses challenges in-situ production of functional biological materials using microbial cell factories?

We are now looking for a motivated doctoral researcher with a passion for advancing synthetic biology tools for native biopolymer-producing cell factories to join our team.

The position offers an exciting opportunity to push the boundaries in bacterial nanocellulose and bioplastic research, by focusing on pioneering concepts and technological innovation aimed at creating in-situ programmed functional materials.

Scientific environment

The Department of Bioproducts and Biosystems (BIO2), one of three departments in the School of Chemical Engineering at Aalto University, has an internationally leading reputation in basic and applied research for the development of advanced materials from natural resources. It is one of Europe's leading research and higher education institutions in the field of sustainable chemistry and engineering based on the utilization of renewable resources. BIO2 aims to contribute to the development of novel solutions to move towards sustainable primary production and processing systems that can produce materials with fewer inputs, less environmental impact, and reduced greenhouse gas emissions. Within bioscience, the department has research in bioprocess technology, molecular biotechnology, enzyme technology, metabolic engineering, synthetic biology, biomolecular, and biohybrid materials. Other strengths of the department include sustainable materials and products based on lignocellulose, ranging from nanomaterials to novel cellulose-based textiles.

The selected candidate will be working in the [Biological Engineered Living Materials research group](#) led by Assistant Professor Rahul Mangayil. The research group closely associates with the Center of Excellence in Life-Inspired Hybrid Materials ([LIBER](#)), funded by the Research Council of Finland's Center of Excellence Programme (2022-2029).

In the first weeks, you will be assigned your own onboarding buddy who will help you get started with your work and studies at Aalto.

Your role and goals

The Doctoral Researcher will be working in a project that investigates ways for cell surface protein display systems in microbial cell factories, and how such approach can open avenues in designing functional materials for smart packaging applications. At start, the candidate will be working with *Komagataeibacter* spp. and will progress in developing synthetic biology tools for *Pseudomonas putida*. Microbial genetics, strain engineering using synthetic biology tools and biomaterial characterization are central in the project.

The role will involve developing scientific independence, result dissemination, and peer interactions with team members and collaborators in the field.

Your experience and ambitions

Required qualifications:

- Master's degree in biotechnology, bioengineering, synthetic biology or a closely related field.
- Experience in synthetic biology, microbiology, and protein analytics.
- Enthusiasm for pursuing independent scientific work.
- Strong analytical and problem-solving skills
- Excellent student track records

Expertise considered as an advantage:

- Record of scientific productivity in internationally renowned journals.
- Experience in bacterial cell surface display or protein secretion systems.
- Experience in genome, or metabolic engineering.

The applicant must have completed the Master's degree by 31 July 2024 or preferably earlier (to start employment on 1 August 2024) or by 31 December 2024 or preferably earlier (to start employment on 1 January 2025)

- a master's degree awarded by a university, or
- a study programme that in the awarding country gives eligibility for doctoral level studies

in biotechnology, bioengineering, synthetic biology, or a closely related field. A good command of English is required, Finnish language is not.