

R&D Master Trainee

Development of a microfluidic assay to study plastic biodegradation

Nestlé Research Lausanne and ETH Zürich - Switzerland

Internship (6 Months)
activity rate 100%

Position Snapshot

Location: ETH Zürich, Institute of Environmental Engineering
Opportunity to visit Nestlé Research Center in Lausanne
Internship opportunity that bridge academia and industry
Genuine opportunities for career and personal development

Position Summary

Plastic pollution by anthropogenic sources accumulates into any landfill and aquatic ecosystem and alters the ecosystem structure, functions, and, consequently, services and values. Being an inert and durable material, plastic can resist in the environment for decades. Using bioplastics for product packaging, which could be fully degraded by microorganisms at the end of their life, is a promising alternative to conventional plastics. Gaining a mechanistic understanding of bacterial surface colonization and biofilm formation on bioplastic particles is crucial to optimizing the biodegradation process.

This project aims to gain a better understanding of the influence of microbial surface colonization and biofilm formation on the biodegradation of bioplastic particles.

In particular, we will study the influence of bioplastic composition and surface properties on bacterial colonization and biofilm formation using bioplastic particles.

As a Master Trainee in the [bioMatter Microfluidics group](#), your aim will be to develop a microfluidic platform to trap hundreds of bioplastic particles and acquire quantitative and statistically significant data on their bacterial colonization and degradation.

Key responsibilities

- Development of a protocol for bacteria culturing and preliminary characterization of bacterial colonization of bioplastic particles in bulk
- Design of the microfluidic platform with the aid of fluid dynamics numerical simulations
- Realization of the microfluidic platform and calibration of the trapping efficiency with colloidal particles
- Characterization of bacterial colonization and degradation of bioplastic particles in the microfluidic platform
- Analysis of the data acquired during the experiments (image analysis)
- Report and present the key findings from the study

Education and experience

- The project will be started as a Master's Thesis and will continue as an Internship
- Masters Student in Engineering with experience in Biophysics/ Soft Matter Physics
- Good knowledge of MATLAB or Python for image analysis
- Previous experimental experience in a laboratory is an asset
- Exposure to microscopy, microbiology, microfluidics, and COMSOL Multiphysics would be a plus
- Fluent in English

Show us that you are autonomous, proactive and a good team player and apply in English at esecchi@ethz.ch.

This project is a collaboration between the *bioMatter Microfluidics* group of Dr. Eleonora Secchi (Institute of Environmental Engineering, ETH Zurich) and Dr. Hannah Kleyer (Nestlé Institute of Packaging Sciences) at Nestlé Research Lausanne.

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