

# Master Thesis: MINAGRIS – Micro- and NAno-Plastics in AGRicultural Soils: sources, environmental fate and impacts on ecosystem services and overall sustainability (Modelling)

GIUB, 22.07.2022

**Background:** Plastic use in agriculture has tremendously increased in the past decades resulting in plastic residues, macro-, micro-, and nanoplastics (MNP) accumulating in the soil. MINAGRIS aims to contribute to healthy soils in Europe by providing a deeper understanding and tools to assess the impact of MNP in agricultural soils (<https://www.minagris.eu/>).

**Project:**

- Quantification of the impacts of MNP on soil biodiversity and agricultural productivity
- Transport and degradation of MNP in the environment
- MNPs impacts on socio-economic components
- Identification of the benefits and risks associated with the use of plastics in agriculture

**Aims:** The aim of this Master thesis is to improve understanding of MNP transport in soils and to gain insights into the principal physicochemical mechanisms as well as the experimental conditions (e.g. degree of saturation, flow rate, particle concentration, and size) governing their mobility and retention. This thesis will be conducted in collaboration with Wageningen University and ETH Lausanne.

**Learning goals:** The candidate will learn to extract and analyse microplastics in the lab (Fourier transformed Infrared & X-Ray Tomography) and to model the transport of microplastics in-situ and in soil columns in the laboratory. She/he will learn how to manage her/his thesis project (data analysis, modelling, interpretation, writing, and presenting).

**Prerequisite:** The candidate should have attended the Bachelor course “Introduction to Physical Geography Labwork”. The following courses are also recommended: “Advanced Lab Methods in Physical Geography Labwork I and II” as well as the lecture and the block course “Soil Biogeochemistry”.

**Supervision:** PD Dr. Abdallah Alaoui, [abdallah.alaoui@giub.unibe.ch](mailto:abdallah.alaoui@giub.unibe.ch)

**Co-supervision:** Adrian Grunder, [adrian.grunder@giub.unibe.ch](mailto:adrian.grunder@giub.unibe.ch)

**MINAGRIS website:** <https://www.minagris.eu/>

