



SoilRob



Leibniz Centre for Agricultural Landscape Research (ZALF)
Eberswalder Straße 84, 15374 Müncheberg, Germany

25. April 2025

Offer for a Bachelors-/Master's thesis

Tillage erosion through mechanical weed control conducted by autonomous field robots

As part of the BMBF-funded junior research group *SoilRob*, the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg is offering a thesis (Bachelor's or Master's) on **tillage erosion due to mechanical weed control with autonomous field robots**.

The growing digitalization in agriculture is leading to an increasing relevance of autonomous field robots. Their use holds great potential for improving efficiency and sustainability, particularly in diversified cropping systems that demand intensive management

A central field of application for autonomous robots is **weed control**, which they carry out either chemically or mechanically.

Mechanical weed control, in particular, is seen as a promising alternative to herbicide application, but it also holds potential risks for **soil health**, including **tillage erosion**. This form of erosion is caused by the displacement of soil material as a result of mechanical interventions and can impair the soil structure and fertility of the top soil layers in the long term. The advertised thesis aims to initially select **field methods** that are suitable for the application in cropping systems managed with robots and subsequently use these methods and record the **effects of mechanical weed control on tillage erosion** under field conditions. A field trial is set up at ZALF in Müncheberg with mechanical weed control carried out by the FarmDroid FD20 and offers the opportunity to investigate this question by collecting field data.



You can find more information on the project at www.soilrob.de



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Tasks:

- Selection and application of suitable methods of individual tracers for measuring tillage erosion in field trials
- Installation and adaptation of modern measurement systems and established methods to the conditions of autonomous robots
- Field data collection, laboratory analysis (**July - September 2025**), and scientific evaluation (**October - December 2025**)
- Opportunity to include own research questions

Requirements:

- Knowledge in soil science
- Basic understanding of agricultural cropping methods
- Willingness to engage in multi-day fieldwork and increased workload during sampling or field measurements
- Preferably, knowledge of statistical analysis in R

Conditions:

- Monthly compensation of 200 € as part of an internship contract
- Alternatively: possibility of free accommodation in the ZALF guest house during fieldwork (costs covered by the project)

Please note that application and travel costs cannot be covered by ZALF.

For further questions please do not hesitate to contact Dr. Kathrin Grahmann (kathrin.grahmann@zalf.de, 03343282-142) and Prof. Michael Märker (michael.maerker@zalf.de, 03343282-292)