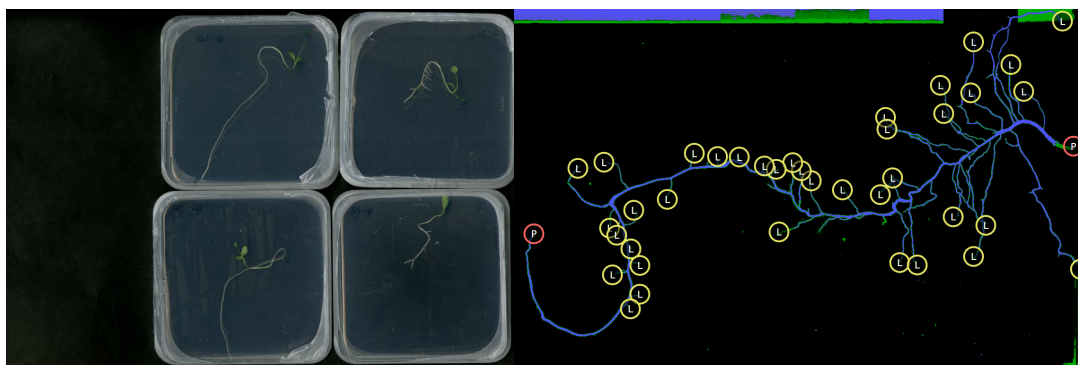




# Developing and training a new model for alfalfa root phenotyping using deep learning

Nowadays, our plants are facing more challenges to survive with the environment changing, especially with diverse abiotic stresses from soil deterioration. The root system is the first organ sensing soil-related abiotic stresses and is responsible for the stress resistance system in plants. Root phenotyping plays an important role in the underground root system research. There has been some manual or semi-manual software, such as RootNav and Whirizho, for root analysing root system architecture, but they are very labour intensive and time-consuming. Under this scenario, machine learning has recently driven the analysis to be automatic. Nevertheless, the current developed models are only for wheat, rapeseed and Arabidopsis. And they are not suitable for other plants because there are great variations not only in root images under different conditions but also intrinsically in the complicated root system structures among different plant species. Alfalfa, also known as the forage queen, possesses great potential in agricultural productivity and meliorating soil condition. Yet, the variability of the alfalfa root system has rarely been studied. Therefore, we would like to develop and train a new model for the alfalfa root system using Python combined with plant morphological and physiological knowledge.



## Methods:

Python, Root physiological lab work (optional)

## Further reading:

Robail, et al. (2019). RootNav 2.0: Deep Learning for Automatic Navigation of Complex Plant Root Architectures. *GigaScience*; doi: <https://doi.org/10.1093/gigascience/giz123>

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**Type of project:**  Bioinformatics  Fieldwork  Laboratory  Theoretical  Data analysis  
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 Biomedical Sciences  Behavioural and Cognitive Neurosciences

**ECTS:**  30  40 **Language:**  Dutch  English

**Start date:** Flexible

**Location:** Linnaeusborg and remotely