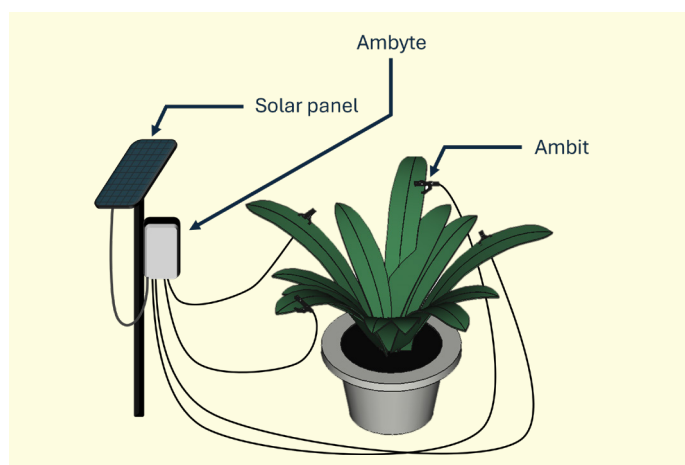


Miniature sensor for real-time photosynthesis tracking

Background & aim

This thesis focuses on improving and validating a miniature open-source leaf-clip sensor capable of monitoring plant photosynthetic activity in real time. Enhancing agricultural sustainability requires crops that produce more with fewer resources, yet measuring photosynthetic efficiency – one of the best predictors of plant productivity – remains a major bottleneck. Existing tools such as fluorometers and absorbance-based devices are costly, difficult to deploy at scale, and not optimized for continuous field use or large breeding trials.

The project aims to expand the capabilities of a low-cost sensor that measures chlorophyll fluorescence signals linked to electron transport, providing an accessible proxy for photosynthetic performance. You will collaborate with engineers, plant scientists, and programmers to build and refine hardware, develop simple firmware or software for data collection, and test the device in greenhouse or field conditions. No prior electronics experience is needed, but motivation and curiosity are essential. By enabling high-throughput, real-time measurements of photosynthetic efficiency, this work supports the development of crop varieties better suited to climate-resilient food production. The thesis merges engineering with plant physiology and contributes to democratizing advanced research tools for scientists and breeders worldwide.



Jan IngenHousz Institute

The Jan IngenHousz Institute (JII) is an open science research institute dedicated to improving photosynthesis to enhance global crop productivity, sustainability, and climate resilience. JII brings together expertise in engineering, data science, plant biology, biophysics, genetics, and breeding. We develop innovative sensors, research methods, and data analysis platforms that enable collection and interpretation of real-time field measurements of photosynthesis.

Located on the campus of Wageningen University, JII offers a dynamic, interdisciplinary environment where curiosity meets impact. If you're a student eager to apply your knowledge to photosynthetic efficiency challenges, this is your opportunity!

Institute: Jan Ingenhousz Institute

Theme: Crop photosynthesis

Type of experiment: Sensor development

Location: Radix

Methods

- Sensor design
- 3D printing
- Deployment of sensor in the field or greenhouse



For more information,
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