

**Position: Doctoral Candidate #3 (DC 3)**

**Project: Learning Transferable skills for agriculture robots**

**Host Institution:** OnePlanet – The Netherlands

**PhD programme:** Wageningen University, Agricultural Biosystems Engineering

### Research project description

This project is part of **AIGreenBots** (MSCA-DN project funded by the European Union), dedicated to advancing artificial intelligence, robotics, and related technologies for precision agriculture. The project's main goal is to develop and train a new generation of PhD researchers in agricultural robotics through an interdisciplinary and international framework, addressing key areas such as sustainable robotics, precision agriculture, and digital farming.

Within AIGreenBots, you will develop innovative methods for decision-making within a collaborative human-robot framework, leveraging the immersive capabilities of eXtended Reality. To begin, you will integrate the outcomes of sensors and semantic labels. These technologies will serve as the foundation for creating a virtual environment that seamlessly interfaces with a robotic arm, facilitating tasks like branch pruning and fruit thinning. The primary objective is to establish an environment in which robotics can learn from human actions and gradually assume decision-making roles based on real-time human data inputs. These algorithms will be carefully designed to prioritise safety, while optimising operational efficiency within the collaborative human-robot ecosystem.

### Objectives:

1. Explore learning by demonstration using eXtended Reality and Robotics.
2. Design a framework for Agriculture where sensors and actuators can be easily integrated for both Human control with XR and automatic decision algorithms.
3. Develop the software to bring both XR/learning by demonstration/automatic decision making in one framework.
4. Create a demonstrator that shows the concept of learning with XR how to prune trees. For validation, new trees can be recorded with the developed sensor platform and the robot can interact with the human in its decision making.
5. Explore (planned secondment) the XR platform as extended to use-cases where human can do some initial decision making from where the ML takes over.

### Expected Results:

- Literature review on Robotic, eXtended Reality, Decision making and learning from demonstration toward a PhD proposal.
- Creating an eXtended Reality environment where both sensing and inference results can be visualised, and robotics action can be taken by humans to learn the decision making.
- Generate results to be disseminated in patents, top conferences and journals.

**Keywords:** *robotic perception; machine learning; eXtended Reality.*

### Secondments

The secondments that offer your valuable opportunities to enhance your skills and foster international collaboration planned in this research project are:

- Instituto Politecnico de Coimbra (PT) to work on skill transfer applied to real environments.
- Critical Software S.A. (PT) to work on skill transfer in cognitive and ML-perception.

### Desirable skills, qualifications and specific requirements

- Your application should respect the **AIGreenBots** general requirements and eligibility criteria as described in <https://aigreenbots.eu/recruitment/general-info>.

- You should have a valid MEng/MSc degree, or equivalent, in electrical engineering, computer science, mathematics, physics, or related fields.
- Python programming skills
- Experience with game engines or virtual environments
- Some experience on robotics, machine learning, AI, coding
- Experience with VR/XR headsets is a pre
- Motivation, sense of responsibility, autonomy, problem-solving skills, effective communication and affinity with agriculture
- You are entitled to do a PhD internship in the Netherlands. This means that you are an EU/EEA citizen - we can't apply for a sponsorship / permit for non-EU citizens.

### Benefits

In this role, you will work with researchers at two of the world's leading institutes on agricultural robotics. You will collaborate closely with other researchers in a European consortium of leading research institutes in the field. You will be employed by imec in the Netherlands. We offer you an attractive compensation and benefits package, including the following:

- € 45.800 gross per year with remote working allowance of €2,35 net per day and commuting allowance of 23 ct/km. This includes the living allowance and the possible mobility and/or family allowance. Details will be discussed in the job offer stage.
- a 100% employer paid pension plan
- hybrid working and flexible working hours
- a wide range of training possibilities and attendance at international conferences
- research, training and networking costs covered for 30 ECTS on self-selected course program
- support in the relocation process
- receiving your PhD from the Wageningen University, one of the highest-ranked university in the field of agriculture and food production.

### How to apply

You should submit your application through this channel: <https://www.oneplanetresearch.nl/working-at/>

Deadline: 1<sup>st</sup> of March 2025, 23:59.

Please note that while we have set an application deadline, we reserve the right to close the vacancy early if we find a suitable candidate. Therefore, we encourage you to apply as soon as possible.

### Additional information

**Supervisors of this PhD project:** Dr. Bas Boom (OnePlanet), Prof Gert Kootstra (Wageningen University)

**Host institution and living conditions:** OnePlanet is a collaboration between Wageningen University & Research, Radboud University, Radboudumc and imec. You will work at the OnePlanet office with around 100 enthusiastic colleagues believing in our vision and working on our mission. Imec is a leading research and development hub specializing in nanoelectronics and digital technologies, known for its innovative work in semiconductor scaling, artificial intelligence, and smart energy. You will also be part of the Agricultural Biosystems Engineering group at Wageningen University, one of the highest-ranked university in the field of agriculture and food production, from which you will receive your PhD.

You will be working in the Data & AI department of imec in the OnePlanet digital twin team. The digital twin team consists of ~15 people working on data science, artificial intelligence, robotics enabling research on sensor technology and development of innovative products.

OnePlanet is a diverse Dutch/international organization. It's a young, dynamic, and continuously changing environment. There are lots of opportunities for personal growth, trainings in our academy, and personal development. OnePlanet has offices in Wageningen and Nijmegen. For your activities, the main location is the Wageningen office, located convenient on the Wageningen University Campus where there are also options for hybrid working.

Wageningen is a delightful town that seamlessly combines academic excellence with a peaceful, countryside ambiance. As a student, you'll find yourself in a small agriculture academic community that values innovation, sustainability, and a welcoming spirit. You can enjoy living in the rural areas surrounding Wageningen, with their scenic landscapes and peaceful environment. Alternatively, if you prefer a more urban lifestyle, you can easily commute from larger cities like Utrecht, Arnhem, and Nijmegen, which are well-connected and offer a broader range of amenities and activities.