

Study of the response of grapevine to reduced incident radiation in the context of agrivoltaism and climate change

The French National Research Institute for Agriculture, Food, and the Environment (INRAE) is a public research establishment. It is a community of 12,000 people with more than 200 research units and 42 experimental units located throughout France. The institute is among the world leaders in agricultural and food sciences, in plant and animal sciences, and is 11th in the world in ecology and environment. INRAE's main goal is to be a key player in the transitions necessary to address major global challenges. In the face of the increase in population, climate change, scarcity of resources and decline in biodiversity, the institute develops solutions for multiperformance agriculture, high quality food and sustainable management of resources and ecosystems.

WORKING ENVIRONMENT AND ACTIVITIES

- You will be welcomed in joint research unit "Ecophysiology and Functional Genomics of grapevine" (UMR EGFV) located in Bordeaux. The EGFV gathers a wide range of interdisciplinary skills, from agronomy and ecophysiology to molecular biology, through plant physiology, biochemistry and genetics. Different projects are studying the functioning of grapevine in interaction with its environment and the factors determining the quality of grape berries. The general aims are the adaptation of viticulture to present and future challenges, noteworthy climate change. The EGFV joint research unit offers high-quality scientific and technical environment. <https://www6.bordeaux-aquitaine.inrae.fr/egfv/>. You will also collaborate with research unit INRAE « URP3F » (<https://www6.nouvelle-aquitaine-poitiers.inrae.fr/urp3f/>) in Lusignan, under supervision by Didier Combes, and grapevine experimental unit (UEVB) of INRAE near Bordeaux (<https://www6.bordeaux-aquitaine.inrae.fr/uevb>).

The post-doc position will be associated with the « VitiSolar » project (EDF INRAE AMPEX... partnership, funded by the New Aquitaine region, EDF, Ademe) whose ambition is to achieve a sustainable and economically viable agriphotovoltaic solution for the wine sector, based on a structure of controlled , movable photovoltaic panels. The objective is therefore to combine the sustainability of quality wine production with the production of renewable energy, while being compatible with mechanization. A demonstrator is installed on the INRAE site in Villenave d'Ornon (UEVB) as an experimental validation field.

For viticulture, the project can be seen as a study of the shading of the vine as a potential adaptation to climate change. This shading probably results in a cooler microclimate in summer, and slows down the production of sugars, potentially improves the polyphenolic and aromatic quality of the grapes and therefore of the wine, or even protects against the risks of frost... The scientific questions involved are those of acceptable trade-offs, between reduction of intercepted radiation and photosynthesis and beneficial effects of a temperate microenvironment for the quality of the grapes. In a context of increasing atmospheric CO₂, a reduction in incoming radiation, modulated according to the phenological phases, could indeed prove favorable for the production of quality wines.

Additional to the effect on the vineyard there is the gain in electrical energy that will be studied by one of the other partners in the project.

The postdoc will attempt to validate or refine those initial assumptions on grape and wine, and measure various aspects of the vine's response to shading. You will be able to develop generic ecophysiological models to account for this response and ultimately to optimize this shading dynamically.

- You will be in charge of:
 - synthesize a state of knowledge on the response of the vine to agrivoltaism and more generally to conditions of reduced incident radiation
 - define the guidelines of a personal research project (within the constrained framework of the VitiSolar project)
 - the implementation and monitoring of field experiments on vines, sensors control, quality and traceability of measurements (agronomy, radiation, microclimate, photosynthesis, water status of the vines and soil water balance, condition and composition of grape berries, etc.)
 - ensure data formatting, analysis and interpretation
 - participate in the development of models to represent the functioning of the vine under conditions of stress related to incident radiation and/or modified microclimate
 - lead the publication of results
 - participate in the animation of the project, the supervision of trainees, communication, etc.
- Work activities include: bibliography, data analysis, modeling (computer-aided, R, Excel, programming/coding) but also field or laboratory work.

TRAINING AND SKILLS REQUIRED

- Recommended training: PhD in ecophysiology, if possible, including some physics of the environment.
- Desired knowledge: plant ecophysiology, micrometeorology, energy balance (radiative balance, water balance...), meteorology, agronomy, statistics (viticulture is optional).
- Experience appreciated: previous experience in the above fields, modelling, scientific publications.
- Skills sought: rigor, autonomy and interest in research, teamwork, critical analysis, but also field experimentation, data analysis, modeling and more. Understanding of the physical basis of ecophysiology. Data analysis under R and coding.

INRAE'S LIFE QUALITY

By joining our team, you benefit from (depending on the contract):

- up to 30 days of leave + 15 RTT per year (for full-time)
- [parenting support](#): CESU childcare, leisure services
- skills development schemes: [training](#), [career guidance](#), counselling
- [social support](#): advice and listening, social assistance and loans
- [holiday and leisure](#) services: holiday vouchers, accommodation at preferential rates
- [sports and cultural activities](#); collective catering.

↘ Reception modalities

- 📍 Unité: Unité Mixte de Recherche 1287 EGFV (Ecophysiology et Génomique Fonctionnelle de la Vigne)
- 📍 Zip code + city: 33140 VILLENAVE D'ORNON
- 📄 Type of contract: postdoctoral position
- 📅 Duration: 30 months
- 📅 Entry date: Early 2025, to be negotiated
- 💰 Gross monthly remuneration: according to experience (from 2600€ gross/month)

↘ How to apply

Send **cover letter** and **CV** to:
Marc Greven and Ghislaine Hilbert

📧 **by e-mail** :

marc.greven@agro-bordeaux.fr

ghislaine.hilbert-masson@inrae.fr

✖ **Application deadline: 01/11/2024**