Post-Doctoral Position
Data Fusion for Agronomical Analysis of Farm Data

Context

The agricultural sector faces numerous challenges including climate change, biodiversity loss, a strained socio-economic landscape, escalating societal demands and subsequent logistical constraints. Simultaneously, the development of digital technologies enables the generation of large volumes of spatialized data. This presents a significant opportunity to address the current challenges by improving crop monitoring and promoting more efficient and sustainable agricultural practices. However, analyzing this data and effectively applying the resulting conclusions in the field requires a higher degree of technical expertise. Farmers alone will not cope with the scale and complexity of these transformations. More than ever, they will need personalized support from agricultural technical advisors, whose tools and methods must evolve to adapt the context.

UMR ITAP, specifically the DéMo team (Decision and Modeling for Agriculture), and Fruition Sciences (a viticulture consulting company) are partnering within a LabCom (French National Research Agency funds) to address this context. Their joint research aims at developing tools to deploy a 3.0 version of agricultural advisory services: data-augmented advisory. This involves integrating data acquired from the many and diverse sources of available spatial information, analyzing these shared datasets to improve and standardize global expertise, and integrating the operational characteristics of farms to produce locally relevant advice.

We are recruiting a post-doctoral researcher who will participate in the initial work launched by the LabCom for 18 months.

Job description

State of the art

Farm data is derived from the technical and economic traceability of farms. It may be collected manually, through proximate sensors, or via remote sensing. This data is necessarily less structured than data acquired in a controlled experimental context: it is uncertain, heterogeneous, asynchronous, incomplete, sparse, etc. Various studies have shown the potential of farm data to generate new knowledge adapted to the local context (Lamour et al., 2021; Laurent et al., 2022). However, these studies also highlighted the challenges related to the valorization of this data, such as the detection of local or global outliers (Leroux et al., 2018), spatial and temporal interpolation to address data incompleteness (Velez et al., 2022), and uncertainty management (Laurent et al., 2022).

Scientific objectives

Data analysis approaches are constantly evolving in data science but are relatively underapplied to farm data. Therefore, the primary objective of the post-doctoral position is to diagnose the challenges specifically posed by the characteristics of farm data and to conduct a state-of-the-art review of data fusion methods that would be suitable for these challenges. This review can be built from the example of the databases provided by the DéMo team and Fruition Sciences. The aim is to create a typology of the data to be cross-referenced: multivariate, spatialized (homotopic or heterotopic), temporal (synchronous or asynchronous), for what purpose (exploratory, estimation, etc.), and to compare the associated analysis or processing methods, or even to propose a new approach if no method is identified.

By leveraging this new framework, the second scientific objective of the post-doctoral position is to implement and evaluate the selected method(s) on example databases, starting with the Fruition Sciences database.

Operational objective

The objective of the post-doctoral position is to develop a method for integrating a farm data database, similar to the Fruition Sciences database, to support two key applications: i) expert-driven, ad hoc data analysis using a data visualization tool to generate reference points for agricultural advisors, and ii) the development and implementation of statistical models for estimating agronomic parameters.

During the last semester, the post-doctoral researcher will work in collaboration with the developer team of Fruition Sciences to enable the implementation of the standardization method in the company's platform and, if time allows, the data visualization application.

Work environment and conditions

The post-doctoral researcher will benefit from co-supervision by researchers from UMR ITAP and researchers from UMR MISTEA, in close relationship with Fruition Sciences, which will provide its database and expertise.

The post-doctoral researcher will primarily be based at the DéMo team's facilities, with 1 to 2 days per week spent at the Fruition Sciences office, both located in Montpellier, France.

The post-doctoral researcher will benefit from an employment contract with l'Institut Agro and a gross monthly salary in line with the salary scale for contractual staff (between €2,800 and €3,300 gross depending on professional experience).

Eligibility

We are looking for a Ph.D. in data science or statistics, motivated to contribute to applied research projects for the agriculture of tomorrow.

We are looking for an individual with expertise in applied mathematics, statistics, and data science, who has a strong understanding and concern for the implications of data manipulation on interpretability. Knowledge of and/or sensitivity to agronomy would be an asset.

We are looking for a curious and rigorous collaborator who can manage the project autonomously, dynamically, and communicate effectively within the team.

Fluency in English is required and fluency in French would be appreciated.

Why choose this position ?

This position is for you if you want to work at the interface between a public research laboratory and an innovative private company. The teams know each other well, and the work atmosphere is good.

Working with Fruition Sciences will allow you to join a Franco-American team that aims to have a positive impact on society. It will also allow you to understand the realities of decision-making based on the analysis of complex data from concrete examples.

Working with the DéMo team will allow you to benefit from a research environment that is both supportive and demanding, at the forefront of research in processing complex data in an applied context.

We pay particular attention to ensuring that you can publish and participate in at least one conference during the post-doctoral period.

Contacts and deadlines for submission

Please send your CV and cover letter before the November 1st ,2025 to :

Dr. Cécile Laurent : cecile@fruitionsciences.com

Pr. Bruno Tisseyre : bruno.tisseyre@supagro.fr

The postdoctoral position is scheduled to begin in January 2026.

References

Lamour, J., Le Moguédec, G., Naud, O., Lechaudel, M., Taylor, J., Tisseyre, B., 2021. Evaluating the drivers of banana flowering cycle duration using a stochastic model and on farm production data. Precision Agric 22, 873–896. https://doi.org/10.1007/s11119-020-09762-y

Laurent, C., Le Moguédec, G., Taylor, J., Scholasch, T., Tisseyre, B., Metay, A., 2022. Local influence of climate on grapevine: an analytical process involving a functional and Bayesian exploration of farm data time series synchronised with an eGDD thermal index: This article is published in cooperation with Terclim 2022 (XIVth International Terroir Congress and 2nd ClimWine Symposium), 3-8 July 2022, Bordeaux, France. OENO One 56, 301–317. https://doi.org/10.20870/oeno one.2022.56.2.5443

Leroux, Corentin, Jones, H., Clenet, A., Dreux, B., Becu, M., Tisseyre, B., 2018. A general method to filter out defective spatial observations from yield mapping datasets. Precision Agric 19, 789–808. https://doi.org/10.1007/s11119-017-9555-0 Vélez, S., Rançon, F., Barajas, E., Brunel, G., Rubio, J.A., Tisseyre, B., 2022. Potential of functional analysis applied to Sentinel-2 time-series to assess relevant agronomic parameters at the within-field level in viticulture. Computers and Electronics in Agriculture 194, 106726. https://doi.org/10.1016/j.compag.2022.106726