



Postdoctoral Researcher on modeling downwelling and upwelling solar radiation for plants (PAR, Photosynthetically Active Radiation) and photovoltaic conversion systems.

Fixed-term contract (CDD) for 24 months, available immediately

Institution: MINES Paris (Ecole Nationale Supérieure des Mines de Paris)
Assignment: Centre Observation, Impacts, Energie (O.I.E.)
CS 10207 - F-06904 SOPHIA ANTIPOLIS CEDEX, France
Site Web: <http://www.oie.minesparis.psl.eu>

Within the framework of the **AgriPV-ER** project of the TASE Priority Research Program (Advanced Technologies of Energy Systems), MINES Paris - PSL is opening a postdoctoral position on modeling upwelling and downwelling solar radiation, focusing on spectral bands corresponding to the sensitivities of photovoltaic systems and photosynthesis. The objective of the AgriPV-ER project is to develop a generic agrivoltaic model, establish a database to evaluate the environmental impact of agrivoltaic systems (LCA, Life Cycle Assessment), analyze this impact at the local and regional scale, and finally, assess the resilience of these systems to extreme hydrological events. The project also relies on an experimental and numerical approach, including the collection of in-situ measurements and the development of optimization methods for an agrivoltaic farm in Palaiseau, in the Paris region, focusing on water resource management, plant and soil conditions, as well as energy production.

1. JOB PROFILE DESCRIPTION

The sought-after candidate is a postdoctoral researcher who has demonstrated expertise in angular and spectral modeling of solar radiation, radiative transfer (such as libRadtran), exploitation and analysis of pyranometric measurements (PAR sensors, thermopiles, reference cells), as well as satellite-derived data and meteorological numerical models, particularly of reanalysis types. The candidate will work collaboratively with all members of the team in a multidisciplinary framework. They will conduct a literature review and develop/validate methods for modeling and transposing to downward and upward components of solar radiation to accurately evaluate the effective irradiance (spectrally specific for PV cells) on the front and back surfaces of bifacial photovoltaic modules, as well as PAR irradiance at the plant level. These models will be tested using high-quality in-situ pyranometric measurements from the SIRTa site, and potentially, for more operational application, solar radiation data from satellite or meteorological/climatological numerical models.

Candidate Profile Specifics

This position is open for a researcher with a graduate degree from a University or a Grande Ecole and a PhD, demonstrating a strong interest in angular and spectral solar modeling and the assessment of solar resources, particularly in the field of agrivoltaics (PAR and PV effective irradiance). Prior skills in Python programming and solid experience in the exploitation and analysis of in-situ measurements, as well as the use of radiative transfer codes (such as libRadtran), are important assets for this position. The candidate should also demonstrate autonomy and initiative, along with a strong interest in leading and publishing scientific projects.

Proficiency in both spoken and written English is imperative.

2. APPLICATION FILE

The application file should include the following elements:

- A detailed cover letter.
- A comprehensive curriculum vitae (CV).
- An annotated list of works and publications.

and should be sent to:

**Centre O.I.E - MINES Paris,
CS 10207 - F-06904 SOPHIA ANTIPOLIS CEDEX, France,
Attention: Head of the Center, Thierry RANCHIN,
And/or by e-mail at: thierry.ranchin@minesparis.psl.eu**

3. THE CENTER OBSERVATION, IMPACTS, ENERGY (O.I.E), MINES Paris - PSL

Context:

In coherence with its educational mission, [MINES Paris - PSL](#) engages in a broad spectrum of research activities covering a wide range of scientific disciplines. The eighteen research centers are organized into five departments: Earth and Environmental Sciences, Energetics and Processes, Mechanics and Materials, Mathematics and Systems, and finally Economics, Management, and Society.

The research at MINES Paris - PSL aims for both academic excellence and socio-economic impact. This research-oriented model is developed in close interaction with the socio-economic world, including private or public sector companies, as well as institutions and public administrations. MINES Paris is the leading Grande Ecole in France in terms of volume of partnership research contracts with industries, supported by [ARMINES](#), the [MINES Paris Foundation](#), or MINES Paris itself. This unique positioning has allowed MINES Paris to expand its teams (through the recruitment of lecturers/researchers on indefinite-term contracts funded by its own resources via the contractual research association ARMINES) and enables it to maintain long-term experimental and digital platforms that are both unique and recognized for their quality by its partners.

The Center for Observation, Impacts, Energy (O.I.E.), located on the Pierre Laffitte campus of MINES Paris – PSL in Sophia Antipolis. The center includes 8 permanent scientists, 8 postdoctoral researchers, 8 doctoral candidates, and an administrative assistant. The O.I.E. Center is a joint research team between MINES Paris and ARMINES. Its activities lie at the intersection of energy, the environment, and Earth observation. The center studies and models "renewable energy" resources and the environmental impacts associated with their utilization, drawing on fundamental and applied scientific disciplines (mathematics, metrology, physics, environment, etc.) and information and communication technologies. Databases and web services are crucial channels for disseminating the team's knowledge.

The O.I.E. Center's work aligns with strategic axis No. 3 of the Energetics and Processes Department (DEP) of MINES Paris, focusing on the integration of renewable energies.

The O.I.E. Center contributes to three main areas of activity:

1. Development of energy-specific meteorology for the assessment and prediction of renewable resources, particularly solar energy.
2. Analysis and decision support in terms of reducing environmental, social, and economic impacts of transportation, production, and energy usage.
3. Dissemination of scientific data through web services in an international collaborative environment (OGC, GEOSS, IRENA, IEA).

The center's research is linked to the assessment, modeling, and utilization of renewable energy resources, addressing temporal and spatial aspects through data science. The goals include improving the precision and reliability of estimates from Earth observation data (satellite and airborne data, in-situ, and models), enriching existing databases, and expanding the number of estimated variables for different energy conversion methods.

The general objectives of O.I.E. are to address scientific challenges related to spatiotemporal variability, precision, and uncertainty propagation in the assessment of renewable energy resources. The aim is also to facilitate the transfer of knowledge to students, the scientific community, industry professionals, and decision-makers involved in renewable energies and the energy transition.