

MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2024*

EXPRESSION OF INTEREST FOR HOSTING A POSTDOC FELLOW

*with the ERA-Fellowship bonus (see below)

JOIN US IN OUR QUEST TO TRANSFORM
ISLANDS ENERGY LANDSCAPE AT ENERGY-LAB !



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By Friday the 26th of April 2024



University of La Reunion, France, Island of La Reunion

Host institution

[University of La Reunion](#), Saint-Denis, La Reunion, France

Research group

[ENERGY-Lab](#) is a pioneering research hub at the University of La Réunion, dedicated to shaping the future of sustainable energy solutions in islands. Created in 2006, ENERGY-Lab is at the forefront of energy, electronics, telecommunications, and environmental physics research. Our research group develops cutting-edge projects, including solar potential analysis, energy storage innovations, and optimization of wireless sensor networks. Leveraging advanced metrology and modeling, we unravel the complexities of solar and wind variability in tropical regions. At ENERGY-Lab, we are committed to collaborative partnerships, aligning closely with the Regional Smart Specialization Strategy (RIS3).

Partnership

The post-doc project is part of an international partnership bringing together European champions in the field of energy transition :



The [LSCE](#) - Climate and Environmental Sciences Laboratory, a French joint research unit between the CEA, CNRS, & the University of Versailles Saint-Quentin (UVSQ)



The [Institute of Energy and Climate Research \(IEK\)](#) from the Forschungszentrum Jülich, one of the largest interdisciplinary research centers in Europe



The [DTU Department of Wind and Energy Systems](#), a European leader in renewable energy science & technology (to be confirmed)

Project title and short description

Striving for Self-Sufficiency: Green Hydrogen Initiatives in the Renewable Energy Transition of the South-West Indian Ocean Islands

By leveraging green hydrogen as a clean and versatile energy carrier, islands of the South West Indian Ocean (SWIO) can enhance their energy independence, reduce greenhouse gas emissions, and transition towards a more sustainable and resilient energy system. The development of green hydrogen however relies heavily on a comprehensive understanding of available resources in Variable Renewable Energies (VRE) such as solar and wind. Accurate assessment of these resources is crucial for efficiently and sustainably planning, designing, and implementing green hydrogen projects. This assessment requires precise and reliable data from various categories with sufficient spatial and temporal resolution that does not yet exist for the region. In addition, estimating the potential of development of green hydrogen also involves a thorough assessment of land eligibility considering several key aspects: topography, land use and occupation, environmental constraints, access to infrastructure, and local regulations.

In this context, the project will contribute to addressing the technical challenges for green hydrogen development in the SWIO region. Specifically, it will develop a regionalized approach tailored to the geographical peculiarities of the territories in the SWIO region (climate, topography, land use and occupation, etc.) and constraints on the availability of observational data in the SWIO, to generate essential data, assess the

potential of development of green hydrogen, and create new knowledge for green hydrogen management and planning in the region.

Generation of high-resolution climate data for the assessment of VRE resources, and hence green hydrogen development potential, will be achieved by statistical downscaling (SD), less consumptive than dynamical downscaling. While standard SD approaches over the past two decades have primarily relied on perfect prognosis methods utilizing linear regression and analogs, the project will highlight the potential of machine learning methods (e.g., neural networks, support vector machines, random forests, genetic programming) and deep learning methods (e.g., convolutional neural networks) in regionalizing climate information at high-resolution. Despite the widespread use of these advanced techniques in various regions, their application in the SWIO region in the context of green hydrogen development potential remains unexplored. The choice of method for SD will be guided by specific constraints such as geographical diversity, data availability, and the method's capability to handle multiple variables. By leveraging machine learning and deep learning methods, the study aims to enhance the accuracy and effectiveness of SD in the SWIO region, ultimately improving our understanding of regional climate dynamics and supporting informed decision-making in climate-sensitive sectors.

About the Supervisor

Dr. Beatrice Morel (phD in Environmental sciences) is an associate professor at ENERGY-Lab. Her research focuses on variable renewable energy, climate variability, and regional climate modeling, supported by numerous publications and impactful projects in the Indian Ocean region. Holding a HDR degree (Accreditation to Conduct Research, the highest level of qualification in the French academic system), as a Physics teacher and Vice-head of ENERGY-Lab, she is dedicated to foster the next generation of researchers.

Academic positions

Since 2005 Associate Professor in Environmental Physics, University of La Reunion

Current main responsibilities

Vice-head of ENERGY-Lab

Station scientist of the Baseline Surface Radiation Network (BSRN) station of La Reunion

PI of the topic "Variability of the solar resource over Reunion and in the Tropics" at ENERGY-Lab

PI of the solar metrology platform of ENERGY-Lab

Head of the Master programme in Energy

Education

- HDR in Meteorology, Oceanology and Environment, University of La Reunion, 2018
- PhD in Environmental Sciences, University of Pierre et Marie Curie (UMPC), 2004
- Master in Oceanology, Meteorology and Environment, UPMC, 2000

Most recent projects

2023 "Solar Concentration for Cooking in Mafate (off grid remote place)", Observatory of Natural Environments and Global Change (OMNCG)

2020–2023 "Solar and Wind Energy in the Indian Ocean", Interreg OI (915k€)

2016–2017 "Setting up multi-instrument sites in the South West Indian Ocean - role of cloud cover and water vapor on surface radiation", OMNCG (12k€)

2013–2016 "Regionalization of the effects of climate change on solar energy in the South West Indian Ocean", Reunion Regional Council (36k€)

Supervision of research work

1 Postdoctorate on the spatio-temporal variability of surface solar radiation over Reunion and the South West Indian Ocean (2017–2019)

6 Phd Students among which 4 defended (in December 2015, December 2017, September 2018 and June 2023) et 2 ongoing (2020-2023, 2022-2025)

Selected publications

1. Tang, C., Mialhe, P., Pohl, B., **Morel, B.** *et al.*, Intraseasonal and synoptic modulation of diurnal surface solar radiation over Reunion island in the South-West Indian Ocean, *Solar Energy*, 2023
2. Li, P., **Morel, B.** *et al.*, Intraseasonal and synoptic climate variability of surface solar radiation over South-West Indian Ocean : regional climate modelling. *International Journal of Climatology*, 2022
3. **Morel, B.** *et al.*, Surface measurement of total solar and ultraviolet irradiance and ancillary meteorological data at the South-West Indian Ocean Solar network stations, *Data in Brief*, 2021
4. Mialhe, P., Pohl, B., **Morel, B.** *et al.*, On the determination of coherent solar climates over a tropical island with a complex topography, *Solar Energy*, 2020
5. Tang, C., **Morel, B.** *et al.*, Numerical simulation of surface solar radiation over Southern Africa. Part 2 : Projections of regional and global climate models, *Climate Dynamics*, 2019
6. Tang, C., **Morel, B.** *et al.*, Numerical simulation of surface solar radiation over Southern Africa Part 1 : Evaluation of regional and global climate models, *Climate Dynamics*, 2019

Who are we looking for ? What is MSCA PF ?

We are looking for a promising candidate in **climate science, environmental engineering, renewable energy systems, computer science and/or data analytics**, with an innovative mindset who has already published papers in international peer-reviewed journals as first author, from any nationality, who wishes to engage in R&I projects and to acquire new skills through advanced training, international, interdisciplinary and inter-sectoral mobility.

The [MSCA postdoctoral fellowship](#) (MSCA-PF) implies that the researcher travels to La Reunion where he/she works under the supervision of Beatrice Morel to deliver a specific research project in line with the description in the above section “project”. The fellowship lasts 12 to 24 months and comprises secondments with the partners described above. The fellowship covers salary costs (combined living, mobility and family allowance), as well as a Research, training and networking contribution. The candidate must comply with the MSCA eligibility criteria :

- You must have completed a PhD at the time of the call deadline (11 September 2024).
- You can only apply up to eight years after the completion of your PhD
- You must not have resided or worked in France for more than 12 months during the three years up to the call deadline.

What is the ERA-Fellowship “Bonus” ?

Located in a widening territory, the University of La Reunion is eligible for the ERA-Fellowship “bonus”. If the MSCA PF application receives a good evaluation mark but fails to reach an adequate place in the ranking to be funded, the application is automatically re-submitted to the ERA-fellowship call with a budget reserved for widening countries, increasing the chance of success of the candidate.

Why you should apply ?

- to engage in impactful R&I projects to boost energy transition in EU islands and in La Reunion
- to acquire new skills through advanced training, international, interdisciplinary and inter-sectoral mobility
- to be part of an emerging research group in an excellent partnership with EU champions
- to receive guidance to build a strong MSCA proposal
- to support the University of La Reunion in its journey towards Excellence and EU networks

About La Reunion

<https://forward-h2020.eu/region/reunion/> : La Reunion is a French tropical volcanic island lying in the Mascarene Archipelago (Indian Ocean), one of the most preserved biodiversity hot spots in the world. With 2,512 km² of land and managing 315 058 km² of marine exclusive economic area, La Reunion provides a unique presence of France and Europe at the crossroads of Africa and Asia, at the heart of a millenary world-system. With these unique characteristics, advanced infrastructures and highly skilled human talent, La Reunion offers the opportunity for European researchers and entrepreneurs to develop innovative solutions contributing to the ecological and energy transition in tropical context.

How to apply ?

Please read the [MSCA PF call](#) and send an email to beatrice.morel@univ-reunion.fr with your CV by April the 26th 2024. The most promising applicant(s) based on the strength of CVs in relation to the MSCA award criteria will be provided with further guidance and support for the purposes of submitting a full MSCA Postdoctoral Fellowship application with the ENERGY-Lab research group as host.