

Job Description

MetaWireless Early Stage Researchers

Greenerwave SAS

6 rue Jean Calvin,75005 Paris, France

Greenerwave, 6 rue Jean Calvin,75005 Paris, France is seeking to appoint one high-calibre Early Stage Researchers (ESRs) to join the Marie Skłodowska-Curie Innovative Training Network on ‘**Future Wireless Communications Empowered by Reconfigurable Intelligent Meta-Surfaces**’ (MetaWireless).

Position:	Early Stage Researcher - GRW-1: Integrated communication and sensing meta-surfaces for wireless networks
Location:	Greenerwave SAS, 6 rue Jean Calvin; 75005 Paris, France
Working time:	Full Time
Duration:	Fixed-Term (3 years)
Living, mobility, family, and research allowances:	In agreement with the MSCA-ITN financial regulations (http://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide-appl-msca-itn_en.pdf - Section 5, page 27)

About MetaWireless

Wireless connectivity has become a pillar of our society. The growth of wireless traffic is relentless, forecast to reach a staggering worldwide aggregate of 5,016 exabytes by 2030, along with bit rates of 1 Tb/s and new services related to sensing, localization, low-latency, and ultra-reliability. While the performance of wireless networks has improved phenomenally over the last decades, progress is by now pushing against fundamental limits and the mechanisms that have sustained these huge improvements are starting to falter. New evolutionary leaps are called for in order to ensure that the aforementioned forecasts can become a reality. To date, every wireless system has abided by the premise that the propagation radio channel is fixed by nature and cannot be tampered with, but only compensated through ever more sophisticated transmission/reception schemes. A potential evolutionary leap for 6G-and-beyond networks is to break free from the postulate that channels are uncontrollable factors. Serving such a vision, MetaWireless pursues the disruptive idea of designing wireless networks by treating the environment itself as a quantity to be controlled and optimized. Precisely, the manipulation of the wireless environment can be made possible by incorporating reconfigurable intelligent surfaces. These are planar structures, made of meta-materials and electromagnetically discontinuous, which do not adhere to conventional reflection and diffraction laws; rather, they can modify in a controllable fashion the phase and wavefront of impinging radio waves. If deployed to coat objects, walls, or building facades, they could allow customizing in real time the electromagnetic response of environments. Making this vision a reality requires the training of a new generation of researchers and a multidisciplinary effort involving wireless communications, physics, electromagnetic theory, and computational learning, which are the ingredients that define the MetaWireless project.

The Role

GRW-1 will be hosted by Greenerwave, which is located 6 Rue Jean Calvin 75005 Paris, France. ESR will be enrolled on the PhD programme of PSL University, France, and will write his/her thesis on a topic related

to “Integrated communication and sensing meta-surfaces for wireless networks” under the supervision of Dr. Geoffroy Lerosey (Greenerwave) and Dr. Mathias Fink (PSL) for the entire duration of their Ph.D. programme. GRW-1 will benefit, in addition, of a secondment period at other partners of the MetaWireless project.

Further information about the Ph.D. projects can be found in the following tables.

Position: GRW-1
Title: Electromagnetic modelling of signal propagation in RIS-empowered wireless networks.
Scientific context: RIS-based wireless networks will integrate communications and sensing in a single platform. So, a new generation of meta-surfaces is needed to enable this joint functionality. To overcome Gap 1.3, this ESR project is focused on the development of novel wirelessly-controlled and energy-autonomous meta-surfaces that are deployed with minimum infrastructure cost. To this end, the unit of the meta-surfaces will be designed to possess electromagnetic properties that can be modified by ultra-low power components that harvest their energy from the ambient electromagnetic energy. Conventional approaches based on printed circuit boards, which are expensive and polluting, will be replaced by printed electronics-based fabrication. For high-frequency applications, very low complexity and very low power consumption meta-surfaces will be designed and manufactured. Current methods based on GaAs or AlGaAs are, in fact, not appropriate because of their high cost and power consumption. On the contrary, designs of unit cells based on simpler, cheaper, and lower power consumption PIN diodes and MMIC chips will be investigated.
Objectives: To design low-power consumption meta-surfaces capable of harvesting ambient electromagnetic energy and sensing.
Expected results: Novel wirelessly-controlled, energy-autonomous meta-surfaces requiring minimum infrastructure and low cost.
Acquire knowledge: Electromagnetic tools for describing the interaction of electromagnetic waves with objects in the radio path.
Planned secondment(s): Aalto University (Finland) for 3 months + Southeast University (China) for 3 months
Ph.D. enrolment: PSL University (France).

Duties and Responsibilities

1. Undertake postgraduate research in support of the agreed doctoral research project.
2. Work closely with the academic supervisors to ensure the compatibility of the individual project with the overall goals of MetaWireless.
3. Present and publish research in both academic and non-academic audiences.
4. Attend and participate to academic and non-academic conferences, events and seminars.
5. Attend and participate to all training events and supervisory meetings.
6. Be seconded to other network partners as necessary to fulfil the grant obligations.
7. Prepare progress reports and similar documents on research for funding bodies, as required.
8. Contribute to the delivery and management of the wider programme, including attending and participating in programme committee meetings.
9. Actively contribute to the public engagement and outreach activities as described in the grant agreement.

As job descriptions cannot be exhaustive, the ESR may be required to undertake other duties, which are broadly in line with the above duties and responsibilities.

Person Specification

1. An undergraduate degree and a postgraduate Master's degree (or equivalent) in electronic or electrical engineering, mathematics, electromagnetics, or a physical sciences subject.
2. Solid background on meta-surface/reflectarray/transmitarray/phased array design and characterisation.
3. Excellent numerical skills and mathematical background especially in Electromagnetic computation methods (FDTD, FEM, MoM, ...).
4. Knowledge on one or several topic such as wireless communications (antennas, propagation), PCB/circuit design and characterization, Wavefront shaping, experimental electromagnetic methods (Near Field/ Far field measurements, antenna or circuit characterization, ...) are highly appreciable.
5. High proficiency in Matlab, Python, C/C++ or similar programming software/ language.
6. Knowledge on simulation software such as CST, Comsol, HFSS or similar software are a plus
7. Some knowledge on PCB CAD software (KIKCAD, Eagle,...) and/or mechanical CAD software (FreeCad,Solidwork,AutoCAD,...) are a plus
8. Knowledge on software development for interfacing and/or measurement automation is a plus.
9. Excellent written and verbal communication, including presentation skills.
10. Highly proficient English language skills.
11. Excellent organisational skills, attention to detail and the ability to meet deadlines.
12. Ability to think logically, create solutions and make informed decisions.
13. Willingness to work collaboratively in a research environment.
14. A strong commitment to his/her own continuous professional development.
15. Willingness to travel and work across Europe.

Eligibility Requirements

All candidates must meet the following requirements to be considered for this post:

- a) Early-Stage Researchers (ESRs) shall at the time of recruitment by the host organisation be in the first four years (full-time equivalent research experience) of their research careers and not yet have been awarded a doctoral degree. Full-time equivalent research experience is measured from the date when a researcher obtained the degree which would formally entitle him or her to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the researcher is recruited.
- b) At the time of recruitment by the host organisation, ESRs must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the three years immediately prior to the recruitment date. Compulsory national service and/or short stays such as holidays are not taken into account.

How to Apply

Applications must be submitted, to the attention of Dr. Geoffroy Lerosey and Dr. Jean-Baptiste Gros, according to the following procedure:

- 1) Registration and submission of the application material to the MetaWireless recruitment website (<https://h2020-msca-itn-metawireless.cnit.it/jobs/>).
- 2) Parallel application and submission of the application material send to job-application@greenerwave.com

Informal enquires for further information about the positions can be send to Dr. Jean-Baptiste Gros (jean-baptiste.gros@greenerwave.com).

Note 1: Registrations and submissions need to be done to MetaWireless website and Greenerwave Job application email.

Note 2: By registering on either of the two websites mentioned above, the applicants agree that all members of the MetaWireless project can access their personal data and application material.

Each application must include the following material:

- a) **A cover letter explaining the motivation for applying for the post.**
- b) **A curriculum vitae setting out the educational qualifications as well as any additional scientific achievements and publications.**
- c) **Evidence of English proficiency.**
- d) **Copy of Bachelor's and Master's certificates.**
- e) **Copy of Bachelor's and Master's transcripts.**
- f) Any additional material useful for the assessment of the candidate (e.g., recommendation letters, research project/statement in agreement with the requirements specified in previous text).

Note 3: Text in bold correspond to mandatory material.

Selection Process

The selection and recruitment processes of the ESRs will be in accordance with the European Charter and Code of Conduct for the Recruitment of Researchers. The recruitment process will be open, transparent, impartial, equitable, and merit-based. There will be no overt/covert discrimination based on race, gender, sexual orientation, religion or belief, disability or age. To this end, the following selection criteria for the recruitment of the ESRs will be considered:

- 1) Curriculum vitae
- 2) Academic performance (diplomas, university transcripts, etc.)
- 3) Research and industrial experience
- 4) Awards and fellowships
- 5) Publications and patents
- 6) Research, leadership, and creativity potential
- 7) English knowledge
- 8) Other relevant items based on the specific candidate

The recruitment process will adhere to the guidelines described in the Grant Agreement of the MetaWireless project. At the network's level, the recruitment will be coordinated by the Recruitment Committee of the project in order to guarantee gender- and sector-balance. At the Greenerwave's level, the recruitment and selection of the ESRs will be executed by the Chief Scientific Officer and Scientist-in-Charge of the MetaWireless project (Dr. Geoffroy Lerosey) and the scientist co-responsible of the MetaWireless project at Greenerwave's level (Dr. Jean-Baptiste Gros). The entire process will be overseen and approved by the Chief Executive Officer (Timothée Laurent).

The application deadline for the post is on **1 April 2021**. The application will be acknowledged electronically (e.g., by return email) and a unique ID number will be assigned to it. The application will be analysed after the application deadline, and the shortlisted candidates will be invited to a teleconference interview. The selected candidates are expected to be recruited during the period **1 May 2021 - 30 November 2021**. At the end of the selection process, all the applicants will be informed of the outcome of their application by return email.

Further Information

For more information about the post GRW-1, please contact Dr. Jean-Baptiste Gros (jean-baptiste.gros@greenerwave.com).

Disclaimer

By applying for this position, the applicants give their consent to circulate their application and personal data within the members of the consortium.

By applying for this position, the applicants declare to fulfil the eligibility requirements defined by the MSCA.

By applying for this position, the applicants agree that they will comply with the secondment plan.

By applying for this position, the applicants agree that they will comply with the planned Ph.D. enrolment.