

Job Description

PAINLESS Early Stage Researcher

Department of Electrical and Computer Engineering University of Cyprus, Nicosia, Cyprus

The Department of Electrical and Computer Engineering of the University of Cyprus is seeking to appoint one high-calibre Early Stage Researcher (ESR) to join the Marie Skłodowska-Curie Innovative Training Network on ‘**energy-autonomous Portable Access points for INfrastructure-LESS networks - (PAINLESS)**’.

Position	Early Stage Researcher 4: Advanced signal processing techniques for wireless powered backscattering communications
	University of Cyprus, Nicosia, Cyprus
Location:	
Working Time:	Full Time
Duration:	Fixed-Term (2,5 years)
Salary:	<ul style="list-style-type: none"> • €2,701 monthly salary (before employer and employee deductions – fixed for the period of the appointment), plus a monthly taxable mobility allowance of €600 – paid in Euro using an appropriate conversion rate. • If applicable, an additional taxable monthly family allowance of € 500 subject to family status of the appointee.

About PAINLESS

The explosive growth of applications and industrial sectors that rely on broadband connectivity, is set to stretch the demand for wireless networks beyond the reach of the power grid infrastructure. Access points are being deployed on board of drones, while more than 84,000 hybrid-energy base stations are expected to be deployed annually in remote areas by 2020. Portable network nodes that are energy-autonomous and operate detached from the power grid will become indispensable in the coming applications of wireless networks. Energy-autonomy presents immense challenges for the wireless network design and imposes a complete re-think of technological solutions. PAINLESS has the visionary aim to establish a training and research platform to pioneer green, energy-autonomous portable network nodes which are self-subsistent and limitlessly-scalable, to satisfy future demands with minimal infrastructure. It promises a paradigm shift by integrating and jointly optimising wireless networks with renewable energy sources, radiated energy harvesting and airborne access points, as well as establishing disruptive performance benchmarks for the combined wireless power-and-information distribution. Our results will kick-start an innovation ecosystem for infrastructure and service providers of ICT to develop and commercialise a new generation of autonomous, sustainable and power-independent communication networks with self-organising functionality, to enable 100% coverage in urban environments in a power-efficient manner; provide network access to all types of emergency, disaster and special events areas; and connect remote / developing areas with problematic infrastructure. PAINLESS relates to H2020-MSCA with a vision to produce the first generation of experts in a radically new wave of energy autonomous networks that will revolutionise the wireless networking technology landscape and the plethora of associated vertical business sectors.

The Role

ESR4 will be enrolled on the PhD programme at the Department of Electrical and Computer Engineering, University of Cyprus and will write their thesis on a topic related to **Advanced signal processing techniques for wireless powered backscattering communications** (ESR4), supervised by Prof. Ioannis Krikidis at the

University of Cyprus for the entire duration of their PhD programme. ESR4 will also benefit from secondments to other project partners of the PAINLESS project.

Position: ESR4
Title: Advanced signal processing techniques for wireless powered backscattering communications
Objectives: The ESR will study sophisticated signal processing techniques that combine wireless power transfer with backscatter communications. This beneficial combination allows the receivers to use a portion of the received signal for energy harvesting, while the remaining portion is modulated through antenna impedance mismatching and reflected back. The first part of this work is to model the dyadic backscatter channel and study the fundamental limits of this technology by using information theoretic tools. In the second part of this work, the ESR will study advanced signal processing techniques in order to boost the performance in terms of energy harvesting and probability of error; techniques such as MIMO, space-time coding, and spatial modulation will be re-designed for a backscatter communication framework. Finally, the ESR will be also in place to prototype the proposed technical solution in a real and complete simulation environment, by importing data from current cellular networks provided from 3GPP models.
Expected results: <ul style="list-style-type: none"> • Fundamental limits of wireless powered backscattering communications. • Enhancement of the energy harvesting and link performance through sophisticated signal processing techniques. • Prototype of cellular wireless powered backscattering system by using real-world 3GPP data.
Planned secondment(s): 3 months at RIO Systems, Israel and 6 months at Nokia, Ireland.

Each ESR's PhD must be designed and conceived as an integral part of the overall PAINLESS project. The successful candidate will be a team player, prepared to work closely with the Project's senior staff and other ESRs. By the end of the third year the ESR will be expected to complete a publishable chapter for the volume constituting one of the major deliverables of PAINLESS. This chapter can be a part of the PhD dissertation, which, most likely, will be completed at a later date.

This is an outstanding opportunity to be part of a network of leading scholars working on state of the art technologies in Wireless Communications. In addition to PhD supervision, the successful candidate will benefit from a wide-ranging training programme, which will encompass:

- a) Regular summer/winter schools pertaining to both, technical skills on topics in wireless communications relevant to the scope of the PAINLESS project, and a range of transferable skills (research management, entrepreneurship, patents, etc.);
- b) An overseas research secondment to one of the partner universities in the PAINLESS consortium;
- c) A secondment to a non-academic training partner;
- d) A number of career fares towards the end of their project, to assist in their future employment.

The ESR will help organise and present their research at a major international conference on the themes of the PAINLESS research programme.

Duties & 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 PAINLESS.
3. Present and publish research to both academic and non-academic audiences.
4. Attend and participate in academic and non-academic conferences, events and seminars.

5. Attend and participate in 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.

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

Person Specification

1. Undergraduate degree and a postgraduate Master's degree (or equivalent) in electronic or electrical engineering, or a physical sciences subject.
2. Excellent written and verbal communication, including presentation skills.
3. Highly proficient English language skills.
4. Excellent organisational skills, attention to detail and the ability to meet deadlines.
5. Ability to think logically, create solutions and make informed decisions.
6. Willingness to work collaboratively in a research environment.
7. A strong commitment to your own continuous professional development.
8. Ability 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, researchers 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 sent by email to Prof. Ioannis Krikidis (krikidis@ucy.ac.cy).

The application must include:

- a) A cover letter explaining your motivation for applying.
- b) A Curriculum Vitae setting out your educational qualifications as well as any additional scientific achievements and publications.
- c) A copy of your Master's certificate (or equivalent) or certificate of graduation.
- d) An official transcript of the completed subjects and grades achieved in the course of the Master's programme.
- e) Two letters of recommendation from researchers familiar with your academic activities, e.g. the advisor of your Master's thesis.
- f) A short research proposal on the project's theme (max. 2,000 words)

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 PAINLESS project. At the network's level, the recruitment panel will include a minimum of 3 members of the project in order to guarantee gender- and sector-balance.

Applications close on **06th April 2020** and the selected candidates will be recruited no later than the **30th April 2020**. The applications will be analysed after the application deadline, and the shortlisted candidates will be invited to a Skype interview.

Further Information

For more information about the post, please contact Prof. Ioannis Krikidis (krikidis@ucy.ac.cy)

Disclaimer

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