

JOB DESCRIPTION

ISLANDS – Doctoral Candidate (DC)

UCL-1: Signalling and waveform design for Integrated Sensing and Communications (ISAC) in vehicular environments

University College London is seeking to appoint one Doctoral Candidate (DC) to join the Marie Skłodowska-Curie Doctoral Network on “**Integrated Sensing and communications for future vehicuLAr systems a Network of Doctoral Students**” (ISLANDS).

Position:	Doctoral Candidate (DC) “Signalling and waveform design for Integrated Sensing and Communications (ISAC) in vehicular environments”
Location:	Bloomsbury Campus, University College London, with secondments to project partners internationally
Working time:	Full-time (36.5 hours per week)
Duration:	Fixed term (3 years)
Salary:	Between £35,859 and £47,459 gross per annum at the current rate of exchange. These figures are before employer and employee deductions, including tax, national insurance and pension contributions, subject to the pension choices of the appointee. The level of salary is also subject to the family status of the appointee as to whether they qualify for a family allowance, as well as whether the employee will make pension contributions. Due to potential future changes in the Euro/Pound Sterling exchange rate over the period of the appointment, where amendments are required, corrective payments will be made. Salaries are not subject to either cost-of-living adjustments or increment progression and are inclusive of London Allowance.
Living, mobility, family, and research allowances:	In agreement with the MSCA Doctoral Network financial regulations https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-2-msca-actions_horizon-2023-2024_en.pdf (Section 1. MSCA DOCTORAL NETWORKS, page 81)

About ISLANDS

For decades communication systems have been developed independently to radar systems, leading to a duplication of systems and devices that exploit the electromagnetic spectrum in common ways. Yet, the future wireless infrastructure will need to do more than just communications to support smart cities, intelligent mobility, infrastructure monitoring, security. It will need to perform multiple functions and will rely on high-reliability communication and sensing. The independent growth of radar and communication systems is no longer sustainable and will lead to a congestion of devices, emitters and sensors. There is a skills gap in the community to address this as communication engineers work isolated to radar engineers, and a new set of skills need to be developed. ISLANDS is a doctoral network that focuses on the theoretical and algorithmic foundations of integrated sensing and communication for the automotive sector, with the objective of developing new physical-layer and network-level solutions, to explore the fundamental limits of such technology, and to provide experimental validation and testing for the developed techniques. Specifically, ISLANDS will: 1) develop new transceiver algorithms, capable of integrating and leveraging the communication and sensing functionalities, with the purpose of achieving superior performance and energy and hardware efficiency; 2) investigate the ultimate network performance limits that the integration of communication and sensing can achieve in environments with extreme mobility; and 3) provide experimental validations of the developed techniques with proof-of-concept testbeds and realistic system-level simulators. ISLANDS will train the next generation of EU experts and leaders with specific interdisciplinary expertise, combining sensing and communications, with the aim of reinforcing European leadership in the automotive sector of the next decades.

The Role

The DC will be enrolled on the PhD programme at UCL's Electronic & Electrical Department and will write his/her thesis on a topic related to Algorithms for multimodal data-based inference and prediction for climate science applications, supervised by Prof. Christos Masouros at UCL and co-supervised by members of the other academic/industrial teams during the secondments. Further information about the PhD project is below:

<p>Project Title: Signalling and waveform design for Integrated Sensing and Communications (ISAC) in vehicular environments</p>
<p>This project will consider the design of new waveforms and signalling approaches in ISAC for automotive applications. This represents a broad study across new transmitter and receiver design to enable simultaneous data transmission and target estimation. The work will span theoretical and experimental research. The DC will also realize, during a secondment and with the assistance of the staff at the secondment host, further experimental activities using the test vans available at the project, and will investigate roadway geometry-aware and 5G NR based sensing assisted V2X communications.</p>
<p>Objectives:</p> <ul style="list-style-type: none"> • new waveforms for ISAC in vehicular environments • new transmitter and receiver processing methodologies for ISAC • theoretical analysis of the achievable performance.
<p>Expected Results: Novel waveforms and performance bounds for Multiple-input-multiple-output ISAC in vehicular environments; experimental Proof of Concept.</p>

The successful candidate will be a team player, prepared to work closely with the Project's senior staff and other DC of ISLANDS.

This is an outstanding opportunity to be part of a network of leading scholars working on the state of the art in Wireless Communications and Sensing. 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 Integrated Sensing and Communications relevant to the scope of the ISLANDS project, and a range of transferrable skills;
- b) An overseas research secondment to one of the partner universities in the ISLANDS 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 DC will help organise and present their research at a major international conference on the themes of the ISLANDS research programme.

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 ISLANDS.
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 DC may be required to undertake other duties, which are broadly in line with the above duties and responsibilities.

Person Specification

Essential

1. A good Undergraduate degree and a postgraduate Master's degree (or equivalent) in electronic or electrical engineering, mathematics, electromagnetics, or a physical sciences subject.
2. Excellent mathematical skills and background.
3. Solid background on wireless communications (antennas, propagation, stochastic geometry is a plus).
4. Excellent written and verbal communication, including presentation skills.
5. Highly proficient English language skills.
6. Excellent organisational skills, attention to detail and the ability to meet deadlines.
7. Ability to think logically, create solutions and make informed decisions.

8. Willingness to work collaboratively in a research environment.
9. A strong commitment to his/her own continuous professional development.
10. Willingness to travel and work across Europe.

Desirable

1. Understanding, or familiarity with, principles of Radar sensing systems
2. Experience in writing research proposals

Eligibility Requirements

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

- a) Doctoral Candidates (DC) must not have a doctoral degree at the date of the recruitment by the host organisation. A postgraduate Master's degree (or equivalent) is required at the time of recruitment to enrol in the doctoral program.
- b) At the time of recruitment by the host organisation, DCs 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, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account.

How to Apply

Applications must be submitted to the attention of Professor Christos Masouros according to the following procedure:

- 1) Registration and submission of the application material to the ISLANDS recruitment website: <https://www.islands-mscadoctoralnetwork.eu/jobs/>
- 2) Parallel application and submission of the application material at the UCL website: <https://www.ucl.ac.uk/work-at-ucl/search-ucl-jobs>

Please note that it is essential that the candidate makes a double submission of his/her application by executing both the above steps 1) and 2).

Note 1: Informal enquiries for further information about the positions can be sent to Professor Christos Masouros c.masouros@ucl.ac.uk

Note 2: By registering on the website mentioned above, the applicants agree that all members of the ISLANDS 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 – for more details please see: <https://www.ucl.ac.uk/prospective-students/graduate/english-language-requirements>
- d. Copy of Bachelor's and Master's certificates (if available at the time of application).
- e. Copy of Bachelor's and Master's transcripts.

- f. Two letters of recommendation from researchers familiar with your academic activities, e.g. the advisor of your Master's thesis. The referees must e-mail their recommendations directly to becca.thomas@ucl.ac.uk.
- g. A short research proposal on the project's theme (max. 2,000 words)

Selection Process

The selection and recruitment processes of the DCs 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 DCs 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 ISLANDS 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 UCL, the recruitment will be coordinated by Rebecca Thomas. More precisely, the recruitment and selection of the DCs will be executed by Professor Christos Masouros. The entire process will be overseen and approved by the Recruiting Committee of the ISLANDS Doctoral Network.

The application deadline for the post is on **15th April 2024**. Each application will be acknowledged electronically (e.g., by return email) and a unique ID number will be assigned to it.

The applications 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 course of the current year (2024). 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, please contact Professor Christos Masouros, c.masouros@ucl.ac.uk. For information about the application process, please contact Rebecca Thomas, becca.thomas@ucl.ac.uk.

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.