Guide for Applicants

**"USES²: USES of novel UltraSonic and Seismic Embedded Sensors
for the non-destructive evaluation and structural health monitoring
of infrastructure and human-built objects"**

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USES²

What is USES²?

Horizon European Project "**USES** of novel **U**ltra**S**onic and **S**eismic **E**mbedded **S**ensors for the non-destructive evaluation and structural health monitoring of infrastructure and human-built objects" (**USES²**) which is granted for 4 years starting March 1st 2023 (HORIZON – MSCA - 2021 – DN **Project n° 101072599**). The aims of USES², a **MARIE SKŁODOWSKA-CURIE ACTIONS Doctoral Network**, is **to train a new generation of European scientists with skills across sensing and signal processing to develop and combine novel emerging sensing technologies** (optical fibre and wireless pieozoelectric sensors), **advanced processing** (compressed sensing, artificial intelligence) and **full-mechanical-waveform-based imaging**.

USES² includes Scientific Research from around Europe in **7 First-Class Academic Organisms** (Université Gustave Eiffel/ France, Universidad Politécnica de Madrid/ Spain, CEA/France, IZFP/Germany, University of Bristol/United Kingdom (founded by UKRI), BAM/Germany, Université Libre de Bruxelles/Belgium) and **3 Industrials Companies** (Isamgeo/Italy, Airbus/Spain, Zensor/Belgium) **who will recruit 11 Doctoral Candidates** and **12 Associated Partners** (ENI/Italy, Vallen Systeme GmbH/Germany, Temai Ingenieros S.L./Spain, EDF/France, IMMS/Germany, Faber Industrie SPA/Italy, Inductosense Ltd/United Kingdom, ENSAM/France, TUIL/Germany, RWTH AACHEN/Germany, UNIPD/Italy, VUB/Belgium).

The major aim of USES2 programme towards excellence is to develop and combine novel emerging sensing technologies (optical fibre and wireless pieozoelectric sensors), advanced processing (compressed sensing, artificial intelligence) and full-mechanical-waveform-based imaging to tackle these issues.

Key to this cross-disciplinary work is a new generation of researchers with skills across **sensing** and **signal processing**. They will be trained with a unique combination of "hands-on" multidisciplinary research demonstrators, industrial placements, and courses /workshops on scientific and transferable skills. All of which is facilitated by the **broad intersectoral composition of the consortium**.

USES² will produce world class researchers **expert in innovative sensing solutions, advanced mechanical wave processing and robust EOC compensation methods**. Their skills will be embodied in a series of laboratory demonstrators and in situ industrially relevant experiments spanning three key sectors of European industry: **energy [power plants (nuclear, wind), hydrogen storage, pipeline networks for fuel exploration and transport], mobility for citizens (aircraft, automotive industry) and construction (urban subsurface soil, infrastructures)**.

The titles of 11 PhD topics are listed in Annex A (and details can be found on uses2 website).

Eligibility rules

In order to be eligible, applicants must comply with all the following rules:

> ➢ At the **date of application deadline**, applicants must be in possession or finalizing their Master's degree or equivalent/postgraduate degree.

> ➢ At the **date of recruitment**, applicants must be in possession of their Master's degree or equivalent/postgraduate degree which would formally entitle to embark on a doctorate.

> ➢ At the **date of recruitment**, applicants must fulfill the transnational mobility rule: applicants must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before the recruitment date - unless as part of a compulsory national service or a procedure for obtaining refugee status under the Geneva Convention.

> ➢ At the **date of application deadline**, applicants must **not yet been awarded a doctoral degree.**

> ➢ Applicants must be available, full-time, to start the program in September 2023.

> ➢ Researchers are recruited for minimum 3 and maximum 36 months

There are no restrictions concerning the age, gender or nationality[1] of the candidates. For more information, please check the PhD subject on Euraxess. Applicants with career breaks or variations in the chronological sequence of their career, with mobility experience or with interdisciplinary background or private sector experience are welcome to apply.

At the end of the call and after verification, applicants will be informed of their eligibility. Once the eligibility check is done, the applicants will be evaluated. Applicants not meeting the eligibility criteria will not be evaluated.

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[1] unless specified otherwise in the PhD topic on Euraxess.

Why should I apply

a. Work Environment

Each of the beneficiary institution/organization offers a great work environment that you check on https://www.uses2.eu/.

➢ USES2 community of excellence will be built through connections between you, your fellow Doctoral Candidates and the experts providing an excellent supervision and close follow-up of the PhD project.

➢ You will be surrounded by an excellent network of researchers.

➢ You will benefit from international, intersectoral and multidisciplinary secondments :
   o International Environment : you will have secondments in at least 2 additional countries.
   o Intersectoral cross-pollination working conditions to advance knowledge and innovate for key domains requiring monitoring, such as Energy, Mobility for citizens and Construction (access to outstanding academic and industrial facilities).
   o Multidisciplinary approach: the 11 connected PhD subjects in the $USES^2$ project will ensure that all disciplines involved in the design and validation of new sensing solutions will be constructively shared.

b. Work Conditions

Scientific supports of high quality will be provided:

As a full time PhD within $USES^2$, you will have the opportunity to:

➢ Properly **communicate** and **disseminate** you research results.
➢ Publish your results in **high profile open access journals** and **conferences**.
➢ Elaborate, with the help of your supervisor, your **Personal Career Development Plan** (PCDP).
➢ Learn about the **research context** (such as Intellectual Property Right and Code of Ethics of Research).
➢ Access to all online subscriptions (Elsevier, Springer-Nature, IEEE, Web of Science; Scopus, etc.) and all campuses libraries.

➢ Access to a dedicated training programme (foreign language courses, personal development trainings, career development trainings, technical skills, etc.).

c.   Salary and employment contract

You will have an **employment contract** from the **recruiting beneficiary**.

You will benefit from a **competitive salary, number of days off, remote work[2], social security coverage**.

The salary will be composed of[3]:

➢ A living allowance (3400 euros per month - gross salary charged -) (Amount calculated as follows:
   [the monthly living allowance for researchers in MSCA-DN Fellowship actions multiplied by country-specific correction coefficient of the country in which the researcher is recruited (Table below)]
➢ A mobility allowance (600 euros per month)
➢ A family allowance (660 euros per month if applicable)

Country Code	Country-specific correction coefficient
FR	116,4%
IT	97,4%
ES	91,3%
DE	98,3%
BE	100,0%

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[2] Check on Euraxess additional information specific to each PhD topic.

3 For the PhD located in United Kingdom (DC11), information is available on Euraxess.

How to apply

a. Stage 1: Online application

Applications have to be done on the USES² website.

>> [Click here to access the online application platform](#)⁴

The **application must be written in English**. In order to be considered and examined, the **candidate's application package must be complete and submitted strictly before the application deadline** : May 31 2023, 12:00 pm (Paris time).

Deadline for applications is May 31 2023. Later applications may be considered until the position is filled.

In order to be considered and examined, the candidate's application must be in **PDF** format, and should be named like the following example:

<div align="center">SURNAME_NAME_..._DCXX</div>

DCXX being the reference number of the PhD subject you are applying to (01<XX<11).

In order to apply, you will need to upload:

➤ your cover letter explaining your motivation for the chosen DCXX topic, 3 pages max*

    SURNAME_NAME_CoverLetter_DCXX.pdf

➤ your CV, [Europass format](#) mandatory*

    SURNAME_NAME_CV_DCXX.pdf

➤ your Master's Degree certificate or last official transcripts of records if you have not yet graduated*

    SURNAME_NAME_master_DCXX.pdf

➤ a photocopy of your passport*

    SURNAME_NAME_passport_DCXX.pdf

➤ a letter of recommendation from your Master's supervisor, if you are still enrolled for the academic year 2022-2023

    SURNAME_NAME_letter_master_DCXX.pdf

➤ other recommendation letters - not mandatory -

    SURNAME_NAME_other_letters_DCXX.pdf

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⁴ https://www.uses2.eu/recruitment/submit-your-application

Once the application is submitted, you will receive an electronic receipt of your application by email. After the deadline, you will be notified by email of your status during the selection process as soon as a new stage has been reached.

All data will be protected and processed with confidentiality rules.

Important:

Before starting the Online Application process, it is strongly advised to contact the PhD supervisor.

b. Stage 2: Auditions

If you are selected for Stage 2, you will be auditioned by a panel of scientific experts online.

The audition will be composed of:

- ➢ A 10 minutes oral presentation.
- ➢ A 30 minutes discussion with the jury members.

Your presentation during the audition must cover the following aspects:

- ✓ Academic Excellence and Motivation
    - o Qualifications, coherence of the resume
    - o Knowledge of the state-of-the-art of the PhD topic, match between the candidate's profile and the PhD topic
    - o Personal, professional and scientific motivation

- ✓ Appropriation of the PhD project
    - o Explanation of the problematic and the hypotheses
    - o Description of the objectives and the methodology
    - o Feasibilty (scientific agenda, dissemination plan)

- ✓ Communication skills and maturity of the doctoral candidate
    - o Quality and clarity of the presentation
    - o Quality of answers given to the jury members
    - o Fluency in English

Note that you will not be allowed to use any supporting documents during the session of questions.

Selection Process

USES² selection process is designed to select the best candidates, in line with the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers

Selection process will run from:

1. Eligibility check: progressively
2. Evaluations based on application files (**Stage 1**)
3. Results from **Stage 1** will be announced to the applicants before 7th June
4. Auditions (**Stage 2**): from 31st May to 15th of July
5. **Final decision** before 31st of July
6. PhD contracts will start on **1ˢᵗ September 2023**.

a. Stage 1: Candidate's file selection

Each application file will be evaluated individually by international experts-evaluators of the **PhD Recruitment Board.**

The output of the evaluation of each application file will be a summary report and score average between the experts-evaluators.

The following table lists the **evaluation criteria in Stage 1**

Evaluation criteria in Stage 1 – Candidate's application file	Score
Academic background and excellence of the applicant: • Originality of appropriation of the research, clarity of the objectives • Research experience • Education, qualifications, academic marks	/35
Strength and relevance of the topic: • Feasibility within 3 years based on former experience • Capacity to carry out the project and preliminary career plan • Communication and Dissemination plan	/35
Professional references: • Ability to work independently • Quality of previous work performed and scientific curiosity • Soft skills	/15
Career development of the applicant: • Past and planed diversity of research agenda • Past and planed international experience • Past and planed non-academic experience	/15
Rejection under 75/100 threshold. In case of **equality, criteria 1 will prevail on criteria 2, then criteria 3 and then 4.** The best applications will be kept for the Auditions.	Total=.../100

b. Stage 2: Auditions

<u>Preparation of Auditions for the candidates on the short-list</u>:

The short-listed candidates will be invited by e-mail to participate to the audition.

Each candidate will be **evaluated through a web-based audition**, by the **PhD Recruitment Board**.

Evaluation criteria in Stage 2– Auditions	Score
Academic background and Motivation: • Qualification, coherence of the resume • Knowledge of the state of the art of the topic, match between candidate's profile and PhD topic • Personal, professional and scientific motivation	/40
Appropriation of the PhD project: • Explanation of the problem and hypotheses • Description of the objectives and methodology • Feasibility (scientific agenda, dissemination plan)	/35
Communication skills and maturity of the applicant: • Quality and clarity of the presentation • Quality of answers given to reviewers' question • Fluency in the required language(s)	/25
Rejection under 75/100 threshold. In case of **equality, criteria 1 will prevail on criteria 2, then criteria 3**. In case of equality, the score in the 1st stage will prevail.	Total=.../100

During the decision-making process, the interview will count for 60% and the application documents the other 40%.

Unsuccessful applicants will be informed by email by the Coordinator of their strengths and weaknesses, allowing them to improve future applications.

The first of the top 3 successful candidates will be contacted and asked to communicate their acceptance by email to uses2@univ-eiffel.fr within 1 week after receiving the confirmation of the success of their applications. Failure to do so will result in the position being offered to the candidates best ranked on the reserve list.

Redress procedure

Unsuccessful applicants can contest the decision: they will be given 8 days to submit a written complaint (sent to uses2@univ-eiffel.fr) to be examined by a dedicated complaint board.

subject : DCXX_ FAMILY NAME_Name_ Redress procedure.

The processing of the requests for redress will only deal with procedural aspects of the selection process, also meaning that the scientific evaluation shall not be questioned.

Support and contacts

USES² helpdesk

Support service is available during every step of the application process by email:
uses2@univ-eiffel.fr

Please mention the PhD topic (starting by #DCXX) in the object of the email.

DCXX being the reference number of the PhD subject you are applying to (01<XX<11).

ANNEX 1

List of the 11 PhD topics

DC01 - Design and development of photonic integrated circuits for optical fibre sensing interrogation
Local supervisor: Antonio FERNANDEZ-LOPEZ
Host Institution: UPM, Madrid, Spain

DC02 - High speed/High capacity distributed FBG sensing for SHM applications
Local supervisor: Sylvain MAGNE
Host institution: CEA, Paris, France

DC03 - Efficient sensor data acquisition via compressed sensing for autonomous sensor applications
Local supervisor: Florian Röemer
Host institution: Fraunhofer, Ilmenau, Germany

DC04 - Embedded self-powered sensor devices for passive monitoring of composite components
Local supervisor: Vincent LE CAM
Host institution: UEiffel, Nantes, France

DC05 - Joint processing and inversion of active and passive ultrasonic data
Local supervisor: Vera Lay
Host institution: BAM, Berlin, Germany

DC06 - Densely distributed sensor networks for seismic wave detection in complex environments for civil engineering applications
Local supervisor: Alessandro Brovelli
Host institution: ISAMGEO, Gallarate, Italy

DC07 - Nonlinear Coda Wave Interferometry imaging (NCWIi) with active and passive pumps
Local supervisor: Pierric MORA
Host institution: UEiffel, Nantes, France

DC08 - Filtering of environmental effects for ultrasonic based monitoring using embedded piezoelectric transducers
Local supervisor: Arnaud DERAEMAEKER
Host institution: ULB, Brussels, Belgium

DC09 - Study on environmental and operational conditions for SHM systems
Local supervisor: Jaime GARCIA-ALONSO
Host institution: Airbus, Getafe, Spain

DC10 - Sensor data fusion and analysis for reliable premature detection of degradation in full-scale assets
Local supervisor: Yves VAN INGELGEM
Host institution: Zensor, Brussels, Belgium

DC11 - Embedded wireless sensor devices for monitoring composite components
Local supervisor: Anthony CROXFORD
Host institution: UBRI, Bristol, United Kingdom