Recruitment Procedure for
11 PhD Positions in Horizon Europe
Marie Skłodowska-Curie Actions
Doctoral Network

Beneficiaries

Applications are invited for 11 PhD positions ("Doctoral Candidates", DCs)

SMARTTEST, European Doctoral Network for Resilient Remote Healthcare using Intelligent Sensing and Communication Technologies, is funded by Horizon Europe (HORIZON) through the Marie Skłodowska-Curie Actions (MSCA) Training & Mobility Actions (TMA) in the form of a Doctoral Networks (DN) which will host 11 doctoral candidates across Europe and beyond. The inter/multi-disciplinary characteristics is guaranteed by the presence of six academic beneficiaries (University of Twente, KU Leuven, Politecnico di Milano, Consiglio Nazionale delle Ricerche, University Medical Center Utrecht, Technical University of Ostrava) and one industrial beneficiary (Adant Srl) located in four countries (the Netherlands, Belgium, Czechia and Italy) which possess top class expertise in electromagnetic interference, electronic control, radio systems, wireless systems, communication, radar, antennas, and propagation, signal/data processing, biomedical signals and systems, and clinical health monitoring.

Furthermore, the inter-sectoral characteristic is guaranteed by the support of a series of industrial entities: ten Industrial partner organisations from three European countries (The Netherlands, Belgium and Czechia) and even partners from Canada and United States. Having Pharrowtech BV, Televic Healthcare, Remcom Inc., University of Waterloo, Goal 3 ,Ziekenhuis Groep Twente, Sentigrate (Eventegrate), Rijksinspectie Digitale Infrastructuur Benetronic s.r.o. ,Toegepast-Natuurwetenschappelijk Onderzoek, (Netherlands Organisation for Applied Scientific Research),Domovy na Orlici, p.o. , Catalyze group forms a fully interrelated, integrated, and international consortium.

Key dates

Feb 1, 2025:	Deadline for on-line application
Feb 15, 2025:	Circulation list "preselected candidates"
March 2025:	SMARTTEST Recruitment Event (Online);
March 2025:	Circulation list "recruited SMARTTEST DCs"
Sept 2025:	Targeted starting date for DC contracts

Field of Research and Keywords

Integrated Sensing and Communication; Radar, Radio Communications;

Joint Communication and Human Sensing; Vital Sign, Pose, and Motion Estimation;

Biomedical Signal Processing; Proactive Health Assessment;

Remote Health Monitoring & Assessment.

Key Background Information

Eligibility, Benefits and Salary

Mobility

Researchers are required to undertake trans-national mobility (i.e., move from one country to another) when taking up the appointment. At the time of selection 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 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.

Career Stage

Master of Science (M.Sc.) or equivalent, Doctoral Candidate (DC) or 0-4 yrs. (Post Graduate)

You are also eligible to apply, if you expect to graduate your M.Sc. or equivalent before the targeted staring date. Simply indicate this clearly in your application form and/or CV and please provide an overview of the transcripts that are already available.

The candidate must be at the date of recruitment a doctoral candidate (i.e. **not already in possession of a doctoral degree**). Researchers who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree **will not be** considered eligible.

English language:

Doctoral Candidate (DCs) must demonstrate that their ability to understand and express themselves in both written and spoken English is sufficiently high for them to derive the full benefit from the network training.

Exclusivity

The candidate must be working exclusively for the action.

Each student will benefit from a wide-ranging training between universities, research centers and industry that will take advantage of both local and network-wide activities.

Salary (MSCA allowances)

Excellent salaries will be offered. Doctoral Candidate will benefit from the following MSCA allowances:

Monthly living allowance: 3,400 €/month {Bruto Salary}. This is adjusted through the application of a *country correction coefficient* to the living allowance of the country in which the researcher is recruited. The country correction coefficients are listed in Table 1 of the MSCA Work Programme . This Bruto salary is subject to taxes and all compulsory deductions under national legislation, including any employer contributions at the country in which the researcher is recruited.

Monthly mobility allowance: 600 €/month

Monthly family allowance, if applicable and depending on the family situation: 660 €/month.

The guaranteed PhD funding covered by the training network is for 36 months (i.e., EC funding, additional funding is possible, depending on the local Supervisor, and in accordance with the regular PhD time in the country of the hiring host). Check the vacancy description of each beneficiary for further clarification per country.

On-line Recruitment Procedure and Principles

Recruitment will be carefully executed and monitored in accordance with the principles of the **European Charter for Researchers** and **Code of Conduct** for the Recruitment of Researchers and in the DN mobility rules, establishing open and efficient recruitment procedures, which are tailored to the type of positions advertised. The recruitment procedures will be **open, efficient, transparent, supportive and internationally comparable.**

SMARTTEST participants will also aim for a representative **gender balance** amongst the researchers to be recruited, based on an equal opportunity policy during the recruitment phase. The vacancies description will explicitly encourage the application of female young researchers. Moreover, female candidates will be selected in preference should a female and a male candidate achieve the same evaluation results. In training lectures and seminars, particular attention will be paid to choosing, whenever possible, women scientists as speakers in order to provide positive role models to young female scientists.

Advertisement process: The advertisement process will start as soon as the Grant Agreement is signed and will be active until all positions are filled. In the vacancy notice the non-confidential project description, a broad description of knowledge and competencies required, which will not be so specialised as to discourage suitable applicants, and a description of the working conditions and entitlements, including career development prospects, will be included.

All applications proceed through the on-line recruitment portal via the University of Twente. Candidates apply electronically for one to maximum three positions and indicate their preference. Candidates provide all requested information including a detailed CV – (for example [Europass format](#)) - and motivation letter. During the registration, applicants will need to prove that they are eligible (cf. DC definition, mobility criteria, and English language proficiency). The deadline for the on-line registration mentioned above in the key dates.

Applicants will submit their applications electronically via the assigned process and all details are described on the website https://dn-smarttest.eu/ . Following screening of applications by the **hiring institute's Human Resources department**, applicants will undergo a rigorous selection on grounds of quality and potential, as well as a matching of their scientific profile with the individual projects. Assessment will be made according to background, academic qualifications, achievements, and other elements including language knowledge, mobility and volunteer work. This assessment will be done by a recruitment board comprising the local HR coordinator, technical experts including the direct supervisors for the open positions. The recruitment board will bring together diverse expertise and competences, have an adequate gender balance, including members from different disciplines and including representatives from industry. All members are adequately trained.

The short list with CVs will be distributed and a ranking will be made together by the Beneficiaries. After this initial screening of the application letters, the selected candidates will be given an opportunity to discuss the doctoral programme with the direct supervisors and the supervisor of the host in a face-to-face meeting, or a videoconference or Skype, or a telephone conference, depending on the logistics circumstances

The recruitment board will try to reach unanimous agreement regarding the final decision, together with the supervisors of the other host institutions. These supervisors are also member of the MT, and the full-professors are (co-)promotors of the DCs. All non-selected candidates will receive a letter including motivation for non-selection, in line with the **Code of Conduct**.

The selected DC are to start their research as quickly as possible in line with the specific requirements of the hiring institute's Human Resources department and in line with all provisions for VISA etc.

In case not all 11 DCs can be recruited during the collective Recruitment Event, the recruitment procedure is "decentralised", meaning that the involved supervisors continue the search for good candidates. The Consortium is kept informed at all times when new eligible candidates appear. The Recruitment Committee makes an official complaint in case the Code of Conduct for the Recruitment of Researchers is breached. The involved supervisor is then expected to find another candidate.

The 11 available PhD positions

In addition to their individual scientific projects, described below and on https://dn-smarttest.eu/, all doctoral candidates will benefit from further continuing education, which includes internships and secondments, a variety of training modules as well as transferable skills for the Jobs of Tomorrow acquired through a unique immersive learning. The obligations are described in the Grant Agreement of the SMARTTEST project.

DC01

Task	ISAC implementation and performance of WLAN beam-steering system & multi-beam multi-band hopping combined with 5G NR FR2/FR3 cellular beam-reconfigurable system (WP1 and contributing to WP2/WP4)
Host institution	ADANT
Country	(IT)
Supervisor	Dr. Daniele Piazza (ADANT, IT)
Co-supervisors	Prof. Michele D'Amico (POLIMI, IT), Prof. Dominique Schreurs (KUL, BE)
Objectives	To implement ISAC and advanced signal processing for accurate range, angle and (micro-)Doppler estimation from channel state information using sub-6GHz WLAN beam-steerable system in the presence of hardware imperfections. To develop fast multi-band multi-beam hopping mechanism to enhance ISAC performance of simultaneous use of mm-wave and sub-6 GHz with minimal overhead.
Expected Results	Techniques for beam-steering WLAN ISAC as well as practical strategy for multi-band and multi-beam hopping.
PhD enrolment	POLIMI (IT)
Planned secondments	KUL, BE (M18-20, mentor & co-supervisor: Prof. Dominique Schreurs): train DC01 on aspects of wireless networks, integrated circuits and components, microwave systems and phase shifters, 5G/6G and WLAN.
	TELEVIC, BE (M31-33, mentor: Dr. Pieter Crombez): train DC01 on practical resource management in radio-based sensing

DC02

Task	ISAC implementation and performance of mmWave cellular beam-configurable systems & joint performance optimization using RIS (WP1 and contributing to WP2/WP4)
Host institution	KUL
Country	(BE)
Supervisor	Prof. Sofie Pollin & Dr. Zhuangzhuang Cui (KUL, BE)
Co-supervisors	Dr. Stefano Savazzi (CNR, IT)
Objectives	To implement ISAC and advanced signal processing techniques for accurate range, angle and (micro-)Doppler estimation from channel state information using mmWave cellular beam-reconfigurable system in the presence of hardware imperfections. To devise techniques to control mmWave multipath signals using reconfigurable intelligent surfaces (RISs) and to jointly maximize communication capability and sensing accuracy.
Expected Results	Techniques for beam-reconfiguration mmWave ISAC as well as practical strategy for optimized RIS assistance.
PhD enrolment	KUL (BE)
Planned secondments	PHARROW, BE (M18-20, mentor: Dr. Hany Assasa): train DC02 on mmWave phased array systems and RFSoC.
	CNR, IT (M31-33, mentor & co-supervisor: Dr. Stefano Savazzi & Dr. Sanaz Kianoush): train DC02 on RIS models, hardware imperfection mitigation

DC03

Task	Co-existing MIMO radar/cellular, synchronization, interference cancellation (WP1 and contributing to WP2/WP4)
Host institution	UT
Country	(NL)
Supervisor	Prof. Andre Kokkeler & Prof. Yang Miao (UT, NL)
Co-supervisors	Dr. Hany Assasa (PHARROW, BE)
Objectives	To develop ISAC solutions of co-existing communication device and modular, distributed mmWave frequency/phase-modulated continuous-wave (FMCW/PMCW) multiple-input multiple-output (MIMO) radar, to investigate how coms/radar device can help each other, and to investigate the synchronization and interference.
Expected Results	Formulation and signal processing techniques for distributed signal processing with limited computation resources and guidelines for coms-radar co-existence for ISAC.
PhD enrolment	UT(NL)
Planned secondments	UW, CA (M18-20, mentor: Prof. George Shaker): train DC03 on interference cancellation of distributed sensing systems. PHARROW, BE (M31-33, mentor & co-supervisor: Dr. Hany Assasa): train DC03 on mmWave phased array, hardware and RFSoC

DC04

Task	Bayesian federated & distributed model/algorithm for localization and mapping (WP2 & contributing to WP3,4)
Host institution	CNR
Country	(IT)
Supervisor	Dr. Stefano Savazzi & Dr. Sanaz Kianoush (CNR, IT)
Co-supervisors	Prof. Monica Nicoli (POLIMI, IT), Prof. Sofie Pollin (KUL, BE)
Objectives	To design and develop advanced distributed learning mechanisms (i.e., Bayesian learning, federated learning (FL), self-supervised) for accurate and efficient multi-target mapping, localization and tracking in indoor scenarios, collaborative sensing and association of node/link, band, time. The effectiveness/efficiency of the proposed approaches will be demonstrated in mixed static/moving persons. The DC candidate will explore novel Bayesiasignal processing approaches as well as recent advances in physics-driven generative AI tools designed to reconstruct the effects of body motions on wireless signals. These tools have recently opened new perspectives for the development of novel RF sensing systems.
Expected Results	Documented design and verification of efficient data-driven learning (AI) localization and mapping algorithms.
PhD enrolment	POLIMI (IT)
Planned secondments	KUL, BE (M18-20, mentor & co-supervisor: Prof. Sofie Pollin): train DC04 on localization using coms system and massive MIMO testbed. RDI, NL (M31-33, mentor: Loek Colussi): train DC04 on over-the-air radio experimentation

DC05

Task	Models and algorithms for human sensing and gesture recognition (WP2 and contributing to WP3/WP4)
Host institution	POLIMI
Country	(IT)
Supervisor	Prof. Monica Nicoli (POLIMI, IT)
Co-supervisors	Prof. Andre Kokkeler (UT, NL), Dr. Pieter Crombez (TELEVIC, BE)
Objectives	To design models and signal processing algorithms for high-precision sensing of multiple humans inside the coverage of next-generation wireless network (e.g., 6G) exploiting the high-precision sensing capability of mmWave MIMO systems in the 6D domain (position and angles), enabling human sensing and positioning, shape recognition and pose/gesture estimation for smart remote services. Cooperative and Bayesian signal processing algorithms and machine learning methods will be considered.
Expected Results	Documented characterization of the impact of the interaction of the radio signals with the environment and with humans, design of efficient data-driven models and learning algorithms.
PhD enrolment	POLIMI (IT)
Planned secondments	UT, NL (M18-20, mentor & co-supervisor: Prof. Andre Kokkeler): train DC05 on body motion influence on radio signal properties. TELEVIC, BE (M31-33, mentor & co-supervisor: Dr. Pieter Crombez): train DC05 on practical off-the-shelf motion solutions

DC06

Task	Robust vital sign estimation (WP2 and contributing to WP3/WP4)
Host institution	KUL
Country	(BE)
Supervisor	Prof. Dominique Schreurs (KUL, BE)
Co-supervisors	Prof. Ying Wang (UT, NL), Dr.Swagato Mukherjee (REMCOM, US)
Objectives	To investigate the use of mmWave and sub-6GHz MIMO communication systems, with compliment of RIS in obtaining sufficient vital sign information regardless of target orientation/ghost dynamics, to research the effect of stochastic patient movements on the accuracy of the vital signal characteristics measured and the benefit of having a supplementary radar to estimate target orientation.
Expected Results	Documented design of multi-band multi-modal vital sign estimation pipeline with resource requirement guideline.
PhD enrolment	KUL (BE)
Planned secondments	UT, NL (M18-20, mentor & co-supervisor: Prof. Ying Wang): train DC06 on real-world health care scenarios and conventional on-body ground-truth technologies. REMCOM, USA (M31-33, mentor & co-supervisor: Dr.Swagato Mukherjee): train DC06 on EM emulation of radio signal properties induced by human vital signs

DC07

Task	Early detection of abnormalities in young children with congenital heart disease (WP3 & contributing to WP4, 1)
Host institution	UMCU
Country	(NL)
Supervisor	Dr. Kim van Loon & Prof. Wolfgang Buhre (UMCU, NL)
Co-supervisors	Dr. Martijn Slieker (UMCU, NL), Dr. Ying Wang (UT, NL)
Objectives	To investigate the user expectations (family and doctor) of a remote health monitoring system, to develop a ground-truth reference system for validating the contact-free monitoring system by tracking vital sign parameters alongside characterising physical activities, to customize the monitoring system for children with CHD by developing self-adaptive early-detection method for progressive hypoxia, tachypnoea, growth restriction and stagnated development utilizing both data and biophysics theory for daily home monitoring.
Expected Results	Documented impact of time-critical early detection of complications and consequences of congenital heart disease, and an early abnormality detection pipeline using least set of human sensing data.
PhD enrolment	UU (NL)
Planned secondments	GOAL3, NL (M18-20, mentor: Niek Versteegde): train DC07 in physiological modelling, health data and machine learning..
	ZGT, NL (M31-33, mentor & co-supervisor: Prof. Johannes H. Hegeman): train DC07 on vital sign, motion estimation in clinical scenario

DC08

Task	Learning-assisted prediction for the recovery of elderly after hip fracture surgery (WP3, contributing to WP4/1)
Host institution	UT
Country	(NL)
Supervisor	Prof. Peter Veltink & Prof. Ying Wang (UT, NL)
Co-supervisors	Prof. Johannes H. Hegeman (ZGT, NL)
Objectives	To customize and validate continuous health monitoring system for triggering alarms based on the detected symptoms of delirium and pneumonia which commonly occur among elderly patients after hip-fracture surgery, to collect data and develop signal/data processing methods on predicting recovery of patients after hip-fracture surgery in hospital environment.
Expected Results	documented relevance between recovery speed and human motion/vital sign data for the elderly after surgery, and a learning based episode tracking and prediction pipeline.
PhD enrolment	UT (NL)
Planned secondments	ZGT, NL (M18-20, mentor & co-supervisor: Prof. Johannes H. Hegeman): train DC08 hand-on experience with relevant patients, gathering real patients' data for later algorithm validation, and on dataset ethical aspects.
	VSB+BENET, CZ (M31-33, mentor: Prof. Martin Cerny): train DC08 on assistive daily living in living labs and ultra-wideband sensing, and on assistive knowledge for disabled or patient with chronic disease

DC09

Task	Remote monitoring of circadian rhythm for adult health resilience (WP3 and contributing to WP4/WP1)
Host institution	VSB
Country	(CZ)
Supervisor	Prof. Martin Cerny & Prof. Marek Penhaker (VSB, CZ)
Co-supervisors	Dr. Ben Hardy (REMCOM, USA)
Objectives	To customize and validate algorithm pipeline for recognizing daily living rhythm changes in application of ambient assisted living for elderly or living-alone adults suffering chronic disease changing daily habits.
Expected Results	Documented relevance of life style & chronic disease; classification/prediction fuzzy expert pipeline for intervention.
PhD enrolment	VSB (CZ)
Planned secondments	KUL, BE (M18-20, mentor: Prof. Dominique Schreurs): train DC09 on hardware aspects of human sensing. REMCOM, USA (M31-33, mentor & co-supervisor: Dr. Ben Hardy): train DC09 on radio based health monitoring emulation

DC10

Task	Generic energy model for ISAC based sensing and health monitoring (WP4 & contributing to WP1,2,3)
Host institution	UT
Country	(NL)
Supervisor	Prof. Andre Kokkeler & Prof. Yang Miao (UT, NL)
Co-supervisors	Dr. Barend van Liempd (PHARROW, BE)
Objectives	To develop and validate a generic energy model incorporating the system topology and configuration as well as beamforming techniques used, tailored for representing the resources required for dynamic communication and sensing tasks.
Expected Results	Creation and maintenance of dataset, and design of a generic energy model.
PhD enrolment	UT (NL)
Planned secondments	PHARROW, BE (M18-20, mentor & co-supervisor: Dr. Barend van Liempd): train DC10 on synchronization and signal processing for distributed/co-located systems/products, which can be further considered in the generic energy modelling. RDI, NL (M31-33, mentor: Loek Colussi): train DC10 on EMF experimentation and energy regulations

DC11

Task	Autonomous resource management for EMF reduction and energy efficiency maximization (WP4)
Host institution	KUL
Country	(BE)
Supervisor	Prof. Sofie Pollin & Prof. Yang Miao (KUL, BE)
Co-supervisors	Prof. Haibin Zhang (TNO, NL)
Objectives	To develop autonomous management of distributed radio units and its power/beam allocation for dynamic sensing and health monitoring tasks, in order to minimize the EMF and energy consumption while keeping the sensing/diagnosis accuracy.
Expected Results	Design of an algorithm, and validation in collective performance, power consumption and EMF energy transmission.
PhD enrolment	KUL (BE)
Planned secondments	TNO, NL (M18-20, mentor & co-supervisor: Prof. Haibin Zhang): train DC11 on commercial hardware regulation, radio resource management. SENTI, BE (M31-33, mentor: Gert Trekels): train DC11 on data path tracking and footprint, with practical industrial cases

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For More information

More information can be found on the following websites

[1] Project Website - https://dn-smarttest.eu/

[2] Project LinkedIn Page - https://www.linkedin.com/company/dn-smarttest/

[3] European Commission Website: https://cordis.europa.eu/project/id/101167834

Abbreviations

MSCA	Marie-Skłodowska-Curie Action
TMA	Training & Mobility Action(s)
DN	Doctoral Network
GA	Grant Agreement - 101167834.
CA	Consortium Agreement
WP	Work Package
WPL	Work Packager Leader
UT	University of Twente - Coordinator
KUL	Katholieke Universiteit Leuven
POLIMI	POLITECNICO DI MILANO
CNR	CONSIGLIO NAZIONALE DELLE RICERCHE
UMCU	University Medical Center Utrecht
VSB	Vysoká škola báňská - Technická univerzita Ostrava
ADANT	ADANT SRL

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