

## Early-Stage Researchers (2) in Personalised Robotics

College of Business, Technology and Engineering

Department of Computing / Centre for Autonomation and Robotics Research

Fixed term for 36 months

Full time – 37 hours per week

€54,852 (~£48,000) per annum plus additional mobility and family allowances (if applicable) in accordance with the funder conditions

Job number

Closing date 01/04/21 at 23 (GMT)

### The Post

The successful candidates will be two of the fifteen Early-Stage Researchers (ESRs) funded by the Marie-Sklodowska-Curie European Training Network on "PErsonalized Robotics as SErvice Oriented applications" (PERSEO) within the Horizon 2020 Programme of the European Commission.

The network will train 15 early-stage researchers in the context of research and development for "PErsonalized Robotics as SErvice Oriented applications". The consortium is formed by 10 beneficiaries including 8 academic and 2 non-academic organisations plus 9 partner organisations to cover a full training programme on scientific, technical and personal development skills which will include secondments in current world-leading countries (Spain, Germany, Austria, UK, Italy, Denmark, and Netherlands) to gather the necessary knowledge and implement it in Europe. Thus, collaboration within the network is strongly encouraged.

These posts will commence in June 2021 with the successful candidate offered a 36-month full-time employment contract, with a monthly salary of €4571 (average gross salary, before statutory deductions); plus, an additional mobility allowance (600€ per month, unconditional), and an additional family allowance (500€ per month, if applicable).

### Eligibility criteria

To be eligible, the candidate:

- must be in the first four years of her/his research career. Candidates should ideally possess a master's degree in a relevant academic field or a degree that allows them to embark in a PhD (applications from candidates who already possess a doctoral degree cannot be considered).
- must not have resided or carried out their main activity (work, studies, etc.) in the country of the institution that recruits the student for more than 12 months in the 3 years immediately before the recruitment date. Short stays such as holidays and/or compulsory national service are not considered.
- must be willing to spend a prolonged time in another institute/country of the network during the PhD thesis period.

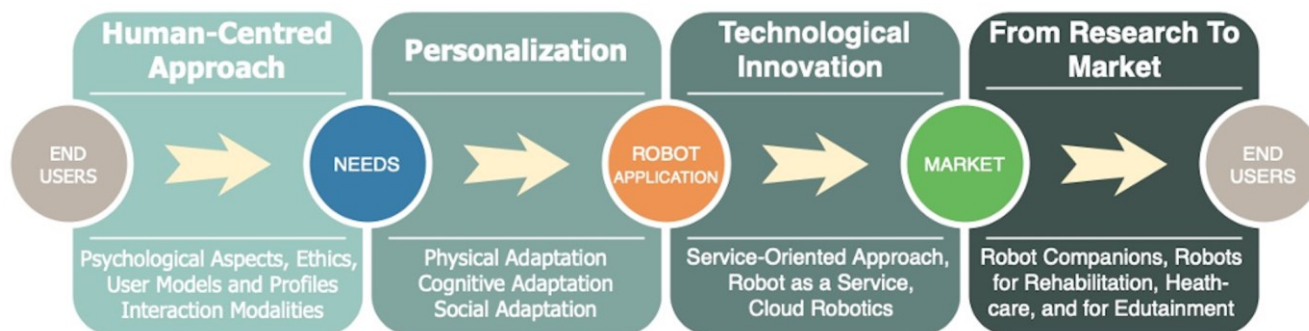
For further details on eligibility criteria please check in the Information [Note for ITN Fellows](#).

## The PERSEO Project

The [European Training Network on PErsonalized Robotics as SErvice Oriented applications – PERSEO](#) – aims at training and creating a new generation of interdisciplinary researchers and professionals with an entrepreneurship ethos and transferrable skillset to face both societal and technological research challenges of this forthcoming market of personal robots. These consist respectively in the development of personalized and acceptable robot's perceptual and interaction capabilities to be distributed as Cloud Services personal robot applications as companions, in rehabilitation, and for edutainment.

Personal robots are used in domestic and public environments to perform interaction tasks in support and collaboration with people. They are already available on the market at reasonable costs, making their large-scale adoption feasible in principle. However, the foreseen market success of such a technology is still far to be realized. There are several research challenges for personal robotics, which are mainly related to the need of a high degree of personalization of the robot behavior with respect to the specific user's needs and preferences. The user's experience of personalized and adaptive interaction with the robot is key to its large-scale adoption. Companies need to build solutions rooted in a deeper analysis of humans' specificities before developing products for people. Policymakers need to base their regulations on the view of possible long-term interaction, and not only on possible contingent needs. At the same time, academia needs to nurture the development of an extended research community with a set of interdisciplinary skills to investigate different robot's capabilities for understanding and modeling the interaction with human beings, for decision mechanisms to appropriately adapt the robot's behavior to the context, and software integration mechanisms that allow an easy, personalized configuration approach to limit the hard and costly processes for customizing novel robotic system.

The PERSEO research and training program is organized into three Research Themes aimed at investigating personalization of robot capabilities at different levels of possible Human-Robot Interaction (HRI), namely “Physical”, “Cognitive”, and “Social”. This requires a set of research skills ranging from computer science and AI to automation, ethics, and psychology, and the use of a collaborative design approach. Integration Milestones, will provide co-working societal problems where collaborative design/implementation is fostered and supported by partner organizations.



The project is funded by the European Commission, Marie Curie Grant Agreement Number: 955735

## The research environment – the Centre for Automation and Robotics Research; Sheffield Robotics; the Advanced Wellbeing Research Centre.

The successful candidate will join the [Centre for Automation and Robotics Research \(CARR\)](#), which has a focus on Artificial Intelligence and Robotics. [Established 11 years ago](#), CARR staff has led projects funded by EPSRC, Innovate UK and the EU of over £16m. The centre has a vibrant postgraduate community, currently hosting over 20 PhDs on a variety of topics, and is a member of the EPSRC-funded UK Robotics and Autonomous Systems (UK-RAS) Network. CARR is a founding partner of [Sheffield Robotics](#), a collaboration between the University of Sheffield and Sheffield Hallam University, which is one of the leading international groups in intelligent systems and robotics and which has received considerable investment in equipment (EPSRC £825K) as well as in facilities and staff at both Universities, including state-of-the-art robotics equipment such as the iCub (£200K), the

Care-o-bot 4 (£190K), and the Fetch Mobile Manipulator (£110K), plus many other robotic platforms like the humanoids Pepper and NAO.

CARR actively collaborates with The Advanced Wellbeing Research Centre (AWRC) to define innovative applications of robotics in the health and social care domain. Established through a £14M capital award from the Department of Health and Social Care, the vision of the AWRC is to provide a world-leading research and innovation environment for the co-production of interventions to improve health and wellbeing via physical activity. Launched in January 2020, the AWRC has attracted £900k of ERDF support, over £1M of direct support from industry and health organisations and has recently been awarded £885k from Research England to establish a University Enterprise Zone (UEZ). Part of the AWRC facility has space for the incubation of innovative products and interventions, including the Wellbeing accelerator for business supported by Research England through the UEZ. The investment will enable Prof. Di Nuovo to work with start-ups, SMEs, funders, and agencies to accelerate the development of AI-related health and wellbeing technologies and applications.

### Athena SWAN Bronze Award

The University is committed to the promotion of equality of opportunity and to sustaining an inclusive culture in which there is high quality, vibrant research experience unhampered by artificial barriers. The university signed up to the Athena SWAN charter in 2008 and has held a Bronze institutional award since 2010. We also hold five

department awards. SHU is committed to supporting the Concordat to Support the Career Development of Researchers. The Researcher Concordat Operations Group (RCOG) maintains oversight of the Concordat and the HR Excellence in Research Award. The University's Equality Objectives sets out our vision to be recognised as a University that adds value to the futures of all our students, staff and partners by drawing on their unique and diverse talents and providing an environment that allows everyone to flourish and succeed. This is reflected through the University's values of inclusion and supportiveness, with equality, diversity and inclusion acting as key enablers to the University Strategy.

Find out more at [shu.ac.uk/about-us/equality-and-diversity/what-is-athena-swan](https://shu.ac.uk/about-us/equality-and-diversity/what-is-athena-swan)



### The Supervisory team

The Principal Investigator is Professor Alessandro Di Nuovo, who leads the Smart Interactive Technologies Research Group, a vibrant research group composed of a number of doctoral researchers, postdoctoral researchers and research active academics.

Find out more at: <https://blogs.shu.ac.uk/shurobotics/>

Other keys Persons:

Dr Daniela Conti; <https://www.shu.ac.uk/about-us/our-people/staff-profiles/daniela-conti>

Richard Moore <https://www.shu.ac.uk/about-us/our-people/staff-profiles/richard-moore>

Dr Sergio Davies [https://www.researchgate.net/profile/Sergio\\_Davies](https://www.researchgate.net/profile/Sergio_Davies)

## Location

### City Campus

This job will be based at our City Campus, which has easy access to the train and bus station, the M1, and it is right at the heart of the busy city centre.

However due to the current COVID19 outbreak the team are working remotely following government guidance. We anticipate that upon appointment the successful candidate may need to undertake work either remotely, or on site, or a mixture of both. We will continue to monitor the government guidance and apply it appropriately to this recruitment.

## Enquiries

For informal enquiries about this job please contact Professor Alessandro Di Nuovo via:

**Email** [adinuovo@shu.ac.uk](mailto:adinuovo@shu.ac.uk)

**Staff profile** <https://www.shu.ac.uk/about-us/our-people/staff-profiles/alessandro-di-nuovo>

## How to apply and selection criteria

### 1<sup>st</sup> phase, remote pre-selection:

This phase will be carried out by the Supervisory Board of the PERSEO Network. Candidates should provide:

1. Application form (see Website)
2. a copy of the passport
3. a full CV
4. a 2-page motivation letter including a description of previous research experience (1 page) and current research interest, outlining the fit to the desired ESR (1 page)
5. one or more reference letters and names of 2 referees including contact details
6. Transcripts of grades obtained for B.Sc. and M.Sc. degrees, expected final grade
7. Certificates
8. List of Publications (if any)

Only documents in English language will be accepted.

Applicants should submit the documentation exclusively via e-mail in ONE PDF document to [applications@perseo.eu](mailto:applications@perseo.eu) (max file size 5 MB) **by 1 April, 2021 at 23 pm** (GMT).

The selection committee uses several indicators to evaluate the applicant's preparedness, motivation and potential. Among these, the Scientific, Technological & Academic excellence will be considered at first, based on:

- Quality of the CV, in general
- Any demonstrated research experience, particularly if supported by evidence such as scientific publications, patents, participation in scientific congresses, ...
- Undergraduate performance: overall, with a special focus on relevant field-specific courses
- Any demonstrated previous recognitions (grants, awards, ...)
- Reference letters provided by professors and senior scientists: Referees are asked to address analytical capabilities, technical proficiency, ability to work independently and motivation/commitment.
- Statement of purpose: past research experience, motivation for applying to the selected PhD project, academic fit, contribution of the project to the candidate's future careers plans, ...

- Additional relevant skills (field-specific): demonstrated, e.g. through previous projects, and or through previous participation in scientific contests, trainings.

### 2<sup>nd</sup> phase, interview(s):

Selection of candidates will be performed via **online interview**. In case the number of candidates for a position exceeds the number of open positions, shortlisted candidates will be selected on the basis of the fit of their CV and research interests with the chosen research project(s). These candidates will be invited for interview and positions will be offered after approval by the PERSEO Committee.

Should the candidate be preselected for interview, they will be required to apply via Sheffield Hallam University online e-recruitment system. In addition to completing our online application form you should also upload the following documents (they can be the same submitted at the first stage):

- A brief motivation letter (no more than two A4 pages) that summarizes the documents and the nature of the information provided for the selection
- A full CV
- Two reference letters
- A cover letter / letter of purpose (no more than two A4 pages)

The second phase will consist in at least one interview through which the motivation, the proactive behaviour, the capacity to work collaboratively, the organizational skills, the communication skills and the capacity to engage in a scientific discussion and manage problems, will be assessed, among other aspects.

The final decision will be the result of a consensus of an evaluation committee that will consider the results of both recruitment phases 1 and 2.

## **Equality, diversity, and inclusion**

Equality, diversity, and inclusion are essential to our academic and business strengths. We believe that excellence comes through recognising the value of each individual.

Sheffield Hallam welcomes applications from all candidates irrespective of age, pregnancy and maternity, disability, gender, gender identity, sexual orientation, race, religion or belief, or marital or civil partnership status.

Find out more about equality and diversity at Sheffield Hallam at [shu.ac.uk/about-us/jobs/people/a-diverse-workforce](https://shu.ac.uk/about-us/jobs/people/a-diverse-workforce)

## **Job share**

Whilst this job is not suitable for work on a job share basis, we understand the need for a healthy work-life balance, so where possible we operate a number of flexible working schemes.

**If you'd like to work on a flexible basis please contact the recruiting manager to discuss options available for this job.**

## Job description

<b>Job title</b>	Early-Stage Researcher (PERSEO) – 2 positions
<b>College/Dept</b>	College of Business, Technology and Engineering / Department of Computing
<b>Grade</b>	Fixed salary
<b>Reports to</b>	Dr Alessandro Di Nuovo - Professor of Machine Intelligence
<b>Direct reports</b>	None
<b>Role purpose</b>	<u>ESR 9 - Modelling User Cognition for Adaptive HRI</u>

**OBJECTIVES:** This project aims at user cognitive modelling for improving robot collaborative behaviour and make the human-robot interfaces more intuitive for the individual user. To this end, it will create a general model of how the user think and make decisions, then, use the data collected during the HRI experiments to refine the model and customise the interaction to the specific person and task. Variables to be monitored are those that affect human cognition, such as fatigue, emotion, stress, and distraction. The final model will allow the cognitive architecture to have the capacity to infer inner user intents, which are not always consistent with behaviour, and call upon expert systems for advice when needed.

**EXPECTED RESULTS:** This project goal is to create a modular cognitive architecture of the robot able to assess the inner cognitive status of the user and use this to reduce the cognitive load of the user and make more effective the collaboration. The robot will have the capacity to infer user intent from the interaction, store information from experiences similarly to human memory, and increasingly personalise the interaction.

### ESR 10 - Robot as Schoolmate for Enhanced Adaptive Learning

**OBJECTIVES:** Exploit closer collaboration among cognitive robotics and education psychology for personalized robotic teaching assistants. Carry-out experiments in the classroom to collect data to build and train the robot's cognitive architecture while studying children's personal reactions to the robot. To this end, the project will mix neuro-cognitive modelling, computer vision and HRI interface design to provide robots of a controllable autonomy that can be programmed and supervised by teachers and parents.

**EXPECTED RESULTS:** A novel class of robotic teaching assistants that could behave like peers, i.e. capable to mimic the behaviours of children when learning mathematics. These robots can autonomously lead educational activities in form of a game, during which they interact with speech and gestures to guide the learner through learning procedures and prompt the children to identify errors in the robot behaviours. Raw data from children's experiment will constitute an open benchmark database for testing novel machine learning algorithm.



## **Main duties**

The post holder performs a range of duties and responsibilities from those listed below. The balance of these will vary between post holders.

## **Research and scholarly or consultancy activity**

- Undertakes relevant literature search and is familiar with current developments within the field and the research activities of others.
- Uses a range of appropriate research methodologies and techniques.
- Produces/contributes to reports/research papers for publication.
- Analyses and interprets significant findings.

## **Project management**

- Plans the work in consultation with line manager.
- Prioritises tasks to meet deadlines.
- Contributes to achievement of project goals.
- Undertakes relevant administration, e.g. assists with organisation of conferences, seminars, workshops etc.
- Supports the research infrastructure, e.g. maintains web site, database systems etc.

## **Communication and networking**

- Maintains dialogue with managers in the performance of post responsibilities.
- Communicates effectively through appropriate channels/media.
- Identifies and uses a range of information sources and networks.
- Assists with the dissemination of research findings by contributing to the writing of research papers and reports.
- Develops networks of useful contacts across the project.
- Presents at relevant workshops and conferences.

## **Teamwork**

- Demonstrates ability to work independently and/or works effectively as part of a team.
- Develops collaborative relationships with team members.
- Develops collaborative relationships across teams and between the MSCA Network Partners.
- Engages with the network's training programme.
- Identifies individual development needs and routes by which to address them

## **Entrepreneurial activity**

- Identifies opportunities for income generation and entrepreneurialism through research, consultancy, or professional practice.

### **Quality management and enhancement**

- Demonstrates an understanding of quality assurance processes.

### **Health and Safety**

- Is fully compliant with University Health and Safety policies and works within these guidelines to complete required project research.

These duties may evolve in line with the changing strategic objectives of the college / department and University. Specific objectives will be agreed through the University's performance and development review (PDR) process.



## Person Specification

<b>Job Title</b>	Early-Stage Researcher (PERSEO)			
<b>College / Directorate</b>	College of Business, Technology and Engineering / Department of Computing			
(* <u>E</u> ssential or <u>D</u> esirable)	<b>Details</b>	<b>E*</b>	<b>D*</b>	<b>Evidence**</b>
<b>Attainment</b>  Evidenced achievements e.g. relevant qualifications (or equivalents), training, membership of professional bodies	Good honours degree (i.e. UK 2.1 or 1st Class) in a relevant discipline	E		CV + Q/C
	Master's Degree in a relevant discipline		D	CV + Q/C
	A good knowledge of the English language; fluent speaking and writing. An overall IELTS score of 7.0 or above, with at least 6.5 in each component, or an accepted equivalent qualification. Test score must be current, i.e. within the last two years.	E		CV + Q/C
<b>Experience</b>  Type of experience and specific knowledge required for this job	Ability to undertake project research	E		AF
	Advanced programming skills	E		CV / I / P
	Experience of robot programming		D	CV / I / P
	Experience of human-robot interaction research		D	CV / I / P
	Knowledge of machine learning methods		D	CV / I / P
<b>Competencies</b>  Skills and abilities required for effective performance e.g. numeracy, attention to detail, oral and written communication, planning and organising, leadership skills, ability to cope with conflicting demands/deadlines	Ability to work independently with an appropriate amount of supervision	E		I
	Ability to demonstrate the ability to communicate verbally and in writing	E		CV / I / P
	Ability to explain and discuss the objectives, results, and relevance of their project research	E		CV / I / P
	Ability to plan and organise experimental work and reports to meet deadlines	E		CV / I
	Self-motivated scientist with the drive to develop your abilities	E		AF / I / P
	Proactive in resolving research challenges	E		I
	Prepared to travel and collaborate with other research partners in the UK and in Europe	E		I
	Computer skills including Word processing, databases, and Statistical software	E		CV / I
<b>Other relevant information</b>	Willingness to work flexibly including some weekends and evenings, e.g. to support open days (occasional)	E		I
	Willingness to travel in the UK and overseas	E		I

### \*\*Evidence / Method of Assessment:

**CV** = CV / Cover Letter / Application

**P** = Presentation

**I** = Interview

**Q/C** = Qualifications / Certificates