

DC08

*Individual Research Project title - **Joint positioning and spatial resource allocation for cell free systems***

*Lead beneficiary (place of employment) – **NOKIA SOLUTIONS AND NETWORKS OY (NOF)**, KARAPORTTI 3, ESPOO 02610, Finland and **INSTITUTO DE TELECOMUNICAÇÕES (IT)**, CAMPUS UNIVERSITARIO DE SANTIAGO UNIVERSIDADE DE AVEIRO, GLORIA E VERA CRUZ, 3810 193, Portugal*

*Secondment at - **NOKIA SOLUTIONS AND NETWORKS SP ZOO (NOP)**, UL RODZINY HISZPANSKICH 8, WARSZAWA 02-685, Poland,*

Supervisory team - Academic: Prof. Marko Beko (IT); Industry: Dr. Karthik Upadhyya, (NOF); Mentor: Dr Michal Szczachor (NOP); Tutor: Marco Gomes (UCo)

Project tasks and objectives - Objectives: The main goal is to develop efficient, low complexity algorithms that provide accurate position and orientation of APs and UEs, and use this information to define which APs will be activated and which UEs will be associated to each of them. The communication between APs and UEs is then used to enhance positioning information. The resource allocation will be done as a multi-objective optimization problem that takes into account the overall sum rate, minimum user rate and power consumption. Adaptive algorithms that take into account UE movement will also be developed to minimize the overhead for resource allocation.

Expected Results - Low complexity, efficient positioning and multi-objective spatial resource allocation algorithms, including APs activation decision rules. Adaptive APs' and UEs' localization and tracking algorithms with spatial resource allocation update.

Planned secondment objectives - to define suitable channel models for the considered cell-free systems

Eligibility - University master's degree and be eligible to enroll in a PhD program. Knowledge in fields related to Telecommunications (or closely related disciplines) is appreciated. A high level of English language is required. International experience is appreciated. Research experience and good communication skills are appreciated. Not have resided or carried out their main activity (work, studies, etc.) in Poland for more than 12 months in the 36 months immediately before the recruitment date. Non EU-candidates should have preferably an EU working permit.

Evaluated criteria –

- Study records, including Bachelor and Master
- Work & research experience
- Motivation
- Letters of recommendation
- Positive attitude, previous mobility experience, good communication skills
- English proficiency and other languages

Preferred starting date- June 2024 (as soon as possible)

Trial period – 6 months

*Target degree - PhD degree from – **UNIVERSIDADE DE COIMBRA**, having its registered office or based in PACO DAS ESCOLAS, COIMBRA, 3004-531, Portugal*

Approximate gross salary –

The gross salary includes monthly allowances of EUR 3.400 (living), EUR 600 (mobility) and EUR 660 (family, if applicable), in agreement with the MSCA Doctoral Network financial regulations. These allowances are subject to compulsory deductions under national law, such as employer and employee social security contributions and direct taxes and also a country correction coefficient applies to the living allowance in order to ensure equal treatment and purchasing power parity for all researchers. Please check the applicable deductions in the respective country of the beneficiary

Working and living conditions –

Detailed information about Finland: <https://www.oecdbetterlifeindex.org/countries/finland/>

Detailed information about Portugal: <https://www.oecdbetterlifeindex.org/countries/portugal/>

Detailed information about Poland: <https://www.oecdbetterlifeindex.org/countries/poland/>

NOKIA SOLUTIONS AND NETWORKS is a Finnish multinational telecommunications, information technology, and consumer electronics corporation, established in 1865. Nokia's main headquarters are in Espoo, Finland, in the greater Helsinki metropolitan area, but the company's actual roots are in the Tampere region of Pirkanmaa. In 2020, Nokia employed approximately 92,000 people across over 100 countries, did business in more than 130 countries, and reported annual revenues of around €23 billion. Nokia is a public limited company listed on the Helsinki Stock Exchange and New York Stock Exchange. It was the world's 415th-largest company measured by 2016 revenues, according to the Fortune Global 500, having peaked at 85th place in 2009. It is a component of the Euro Stoxx 50 stock market index.

Website: <https://www.nokia.com>

INSTITUTO DE TELECOMUNICAÇÕES: Instituto de Telecomunicações (IT) is a private, non-profit organization of public interest, and a State Associate Laboratory since 2001. IT is a partnership of six universities, one polytechnic institute and two companies involved in research and development in the field of Telecommunications:

- * Instituto Superior Técnico (IST);
- * University of Aveiro (UA);
- * University of Coimbra (UC);
- * University Institute of Lisbon (ISCTE);
- * University of Porto (UP);
- * University of Beira Interior (UBI);
- * Polytechnic Institute of Leiria (IPL);
- * Altice Labs (AL);
- * Nokia Solutions and Networks (NSN).

IT's mission is to create and disseminate scientific knowledge in the field of telecommunications. It is actively involved in fundamental and applied research in telecommunications, both at national and international level, and is committed to fostering higher education and training, by hosting and tutoring graduate and postgraduate students. Scientific expertise in IT spans across the following areas:

- * Wireless Technologies
- * Optics and Photonics
- * Information and Data Sciences
- * Networks and Services
- * Basic Sciences and Enabling Technologies

web site: <https://www.it.pt/>