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UNIVERSITÀ DEGLI STUDI DI SASSARI



### Description of the position

University of Sassari and Porto Conte Ricerche Srl are seeking for **Early Stage Researchers (ESR)** to be enrolled as PhD student in the MSCA European Training Network (ETN) **INNOTARGETS** (INNOvative approaches to identification of metabolic TARGETS for antimicrobials, H2020 grant 956154). These ESR positions are three of twelve offered in INNOTARGETS (<https://innotargets.ku.dk/>)

### Three 3-year PhD fellowships are available:

- 2 fellowships at the **Department of Biomedical Sciences, University of Sassari**, Sassari, Italy;
- 1 fellowship at the **Proteomics and Immunodiagnostic, Laboratory of Porto Conte Ricerche Srl**, Alghero, Italy.

### About INNOTARGETS

Antimicrobial resistance is a growing medical challenge, hampering the effectiveness of existing drugs and threatening the lives of patients. Therefore, there is a pressing need for compounds that re-sensitise drug-resistant bacteria to existing antimicrobials. To address this problem, the EU-funded INNOTARGETS project will train early-stage researchers in the identification of novel metabolic drug targets in pathogenic bacteria. The project comes as a collaboration between academia and industry partners from Denmark, Italy, Spain, Netherland, Germany and the United Kingdom, and it will guide researchers to use innovative approaches to achieve their scientific goals. INNOTARGETS aims to provide ESRs who have scientific and technical skills that are attractive to both industry and academia are equipped with complementary skills deemed important for research team leaders, and who have an individual profile according to their career dreams and are capable of life-long self-directed learning. Twelve ESRs will work closely together in the INNOTARGETS network solving scientific questions related to metabolism of bacteria in the host, mathematical modelling for target identification and toxicity prediction, adaptation of resistant bacteria to treatment, the spread of resistance and improved methods for target identification.

### About ESR projects

The Early Stage Researchers (to be recruited respectively by the University of Sassari and/or Porto Conte Ricerche Srl), will contribute to the implementation of INNOTARGETS Work packages 1 and 3 which focus on the characterization of the *in vivo* metabolism of *Staphylococcus aureus* during infection and the identification of essential and redundant metabolic targets for novel or helper antimicrobials in this organism.

**ESR3 project: “Metabolism of *Staphylococcus aureus* during systemic and skin infection”**

*Staphylococcus aureus* is an important human and animal pathogen, and so-called MRSA variants of this bacterium are on the WHO list of bacteria for which novel drugs are urgently needed. The project aims to characterize the metabolism of an MRSA strain during systemic and skin infection with *Staphylococcus aureus* in mice, using a random transposon approach (TraDis) to identify metabolic enzymes, which are essential for growth in the host during the two types of infection. The work will be carried out at the Department of Biomedical Science of the University of Sassari, and the ESR candidate will be supervised by Professor Salvatore Rubino and co-supervised by Franca Mannu (Nurex Srl, Sassari, Italy) and Ana Herero Fresno (University of Copenhagen, Denmark). The position involves short secondments at the University of Copenhagen for animal experimentation and at the company NUREX to study the expression of metabolic enzymes in the host. The ESR will also participate in network-wide training activities.

Contacts: Professor Salvatore Rubino email: [rubino@uniss.it](mailto:rubino@uniss.it), Dr Bianca Paglietti email: [biancap@uniss.it](mailto:biancap@uniss.it)

#### **ESR4 Project: “In vivo proteome of *Staphylococcus aureus* during skin infection”**

Metabolic enzymes during infection of *Staphylococcus aureus* may be suitable targets for novel drugs. The first part of this work will be carried out at the Proteomics and Immunodiagnostic Laboratory of Porto Conte Ricerche Srl, and the ESR4 will be supervised by Dr Daniela Pagnozzi (Porto Conte Ricerche Srl, Alghero, Italy) and co-supervised by Professor Sergio Uzzau (University of Sassari). A proteomic approach will be used to characterize the changes in the expression of metabolic enzymes during skin infection with *Staphylococcus aureus* compared to growth in broth in the laboratory. Highly abundant proteins at the infection site compared to growth in broth will be assumed to be important for infections and will be subjected to further characterization for their role during infection. The ESR4 will have a primary focus on so-called redundancy in the metabolism of *Staphylococcus aureus*, i.e. which metabolic enzyme systems constitute back-up systems for each other during growth at the infection site since this is important for the selection of drug targets. Redundant enzymes will be identified using *in silico* approaches, and this part of the project will be carried out at Heinrich Heine University, Düsseldorf, Germany under the supervision of Professor Oliver Ebenhoeh. The student will also spend time at the company Nurex Srl (Sassari, Italy) to study protein expression in the host. The ESR4 will also participate in network-wide training activities.

Contact: Dr Daniela Pagnozzi, [pagnozzi@portocontericerche.it](mailto:pagnozzi@portocontericerche.it), Professor Sergio Uzzau, [uzzau@uniss.it](mailto:uzzau@uniss.it)

#### **ESR6 Project: “Re-sensitizing Methicillin-resistant *Staphylococcus aureus* (MRSA) to beta-lactam antimicrobials”**

WHO has included MRSA (methicillin-resistant *Staphylococcus aureus*) on the list of bacteria, for which novel antimicrobials and alternatives to antimicrobials are urgently needed. The ESR candidate will identify enzymes, which are not part of the *mecA*-gene cassette, responsible for methicillin resistance in *Staphylococcus aureus*, but which are newer-the-less essential for the expression of the

resistance, using a random transposon approach. Genes encoding enzymes in this group will be further characterized for their role in the expression of the resistance.

The work will be carried out at the Department of Biomedical Sciences of the University of Sassari, and the ESR will be supervised by Professor Salvatore Rubino and co-supervised by Franca Mannu (Nurex Srl, Sassari, Italy) and Ana Herero Fresno (University of Copenhagen, Denmark).

Mobility between project partners is of high importance, and the candidate will carry out part of the project of approximately 2 months duration, at University of Copenhagen (transposon mutant work) and at the company NUREX, he/she will further study the expression of selected genes and proteins *in vivo*. The ESR will also participate in network-wide training activities.

Contacts: Professor Salvatore Rubino email: [rubino@uniss.it](mailto:rubino@uniss.it), Dr Bianca Paglietti email: [biancap@uniss.it](mailto:biancap@uniss.it)

### **Job description**

Your key tasks as a PhD student at the University of Sassari are:

- Carry through an independent research project under supervision
- Complete PhD courses or other equivalent education corresponding to approx. 30 ECTS points
- Participate in active research environments including secondments at other partners in the project
- Obtain experience with teaching or other types of dissemination related to your PhD project
- Teach and disseminate your knowledge
- Write a PhD thesis and publish scientific papers based on your research project

### **Eligibility criteria**

- The researcher must not have resided or carried out his/her main activity (work, studies, etc.) in Italy for more than 12 months in the 3 years immediately prior to the recruitment - unless as part of a procedure for obtaining refugee status under the Geneva Convention<sup>1</sup>.

- The researcher must be Early Stage Researcher (ESR): at time of recruitment, he/she must be in the first 4 years (full-time equivalent research experience)<sup>2</sup> of his/her research careers and must not have been awarded a doctoral degree.

### **Further requirements**

We are looking for a dedicated and skilled individual with the following qualifications:

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<sup>1</sup> 1951 Refugee Convention and the 1967 Protocol

<sup>2</sup> This is measured from the date when a researcher obtained the degree which would formally entitle him or her to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the researcher is recruited, irrespective of whether or not a doctorate is or was ever envisaged.

- Obtained a Master's degree or an equivalent university degree (at least 4 years of studies after high school), within medical or molecular microbiology, biology, biochemistry, biotechnology and any other related disciplines.

Fluency in English. A B2-level (Common European Framework of Reference for Languages - CEFR) is recommended.

Documented experience with handling biological samples in the laboratory

Some background experience in peptides/proteins handling and fractionation for ESR4 and bacterial genetics for ESR3 and ESR6.

Besides, the following will be considered an advantage (non-prioritized order)

- A passed course in *Laboratory Animal Science EU Function ABD (formerly FELASA Category)* for ESR3 and ESR6
- A passed course in Proteomics for ESR4
- Analytical skills in liquid chromatography and mass spectrometry of protein samples for ESR4
- Good communication skills
- Motivated and hard-working with ability to work independently as well as in groups

### **About University of Sassari (UNISS)**

The University of Sassari (UNISS) is a public university with deeply rooted traditions, a wide syllabus, multi-disciplinary courses and top-quality scientific research. UNISS is the second University in Sardinia, with close to 13,000 students, around 1,000 postgraduate students (Italians and foreigners) and more than 900 employees. UNISS is a space for free research and free teaching, critical sensibility towards knowledge and dissemination of scientific knowledge. The Department of Biomedical Sciences is active in several fields of research including anatomy, physiology, genetics, biochemistry, microbiology, histology, hematology, and pathology. The Department has also extended international collaborations with Universities of Developing Countries.

Our University/Department wish to reflect the diversity of society and invite all regardless of personal background to apply for the positions.

### **Terms of employment**

The employment as a PhD fellow is full time and for 3 years.

It is conditioned upon the applicant's successful enrolment as a PhD student at the Graduate School of Life Sciences and Biotechnologies (<https://en.uniss.it/study/post-graduate>), University of Sassari. This requires submission and acceptance of an application for the specific project formulated by the applicant in collaboration with the main supervisor.

The PhD study must be completed by the rules and regulations laid down by the European Union's Horizon 2020 Marie Skłodowska-Curie Action (MSCA) European Training Network and the UNISS's rules on achieving the degree.

Salary and additional benefits will be determined according to EU-standards for Marie Curie ESRs. Employment contract will be according to Italian labor laws.

### **More information**

More information about University of Sassari can be found at <https://en.uniss.it/>. For further information about the position, applicants may contact Professor Salvatore Rubino (email: [rubino@uniss.it](mailto:rubino@uniss.it)) or Dr Bianca Paglietti (email: [biancap@uniss.it](mailto:biancap@uniss.it)) for ESR3 and ESR6 positions, and Dr Daniela Pagnozzi (email: [pagnozzi@portocontericerche.it](mailto:pagnozzi@portocontericerche.it)) for ESR4 position. For problems with submitting applications may contact [rzallu@uniss.it](mailto:rzallu@uniss.it).

### **Application**

The application must be submitted electronically by clicking 'Apply now' below. The application must include the following documents in PDF format:

1. Covering letter (max. one page)
2. CV incl. education, experience, language skills and other skills relevant for the position
3. A copy of the degree certificate or a written statement from the institution if the certificate has not been issued
4. Publication list (if possible)
5. Letters of recommendation of two referees, of which one preferably from your academic institution

### **Application deadline: 25 January 2021, 23.59 pm CET**

We reserve the right not to consider material received after the deadline, and not to consider applications that do not live up to the above-mentioned requirements.

### **Selection Process**

After application within the established deadline, the selection process consists of evaluating the eligibility criteria and assessment of the academic qualifications and experience for the above-mentioned area of research, techniques, skills and other requirements listed in the advertisement. All applicants are then immediately notified whether their application has been passed for assessment. Selected candidates will be interviewed by a selection committee.

**APPLY NOW**