

Scheda di dottorato 37 ° ciclo – Bando PON “Ricerca e Innovazione” 2014 – 2020



UNIONE EUROPEA
Fondo Sociale Europeo



PROGRAMME'S NAME	BIOMEDICAL AND NEUROMOTOR SCIENCES
DURATION	3 years
PROGRAMME START DATE	01/01/2022
LANGUAGE	Italian, English
COORDINATOR	Matilde Yung Follo (matilde.follo@unibo.it)
CURRICULA	N/A
RESEARCH TOPICS	Detailed list at the bottom of the present document
PhD POSITIONS	6
ADMISSION PROCEDURE	Qualifications and research proposal evaluation

Available Positions and Scholarships

Actions	Position n.	Financial Support	Research Topic
Action IV.5 – “PhDs on green topics”	1	PhD Scholarship	New green bone substitutes from marine resources
	2	PhD Scholarship	Unraveling the role of extracellular vesicles-driven senescence in myeloproliferative neoplasms
	3	PhD Scholarship	Central Nervous System Sodium MR imaging: “Green” for the Patient and the Environment”
	4	PhD Scholarship	Lactic acid bacteria of the intestinal microbiota: promising vectors for in vivo production of recombinant proteins for biomedical purposes, with no harmful effects for the ecosystem
	5	PhD Scholarship	Reduction of the environmental impact in the production of joint arthroplasty implants
Action IV.4 “PhDs on innovation topics”	6	PhD Scholarship	Artificial intelligence for personal disease risk prediction

Required and Supporting Documents to be attached to the application

(only documents in Italian, English, French, German and Spanish shall be considered as valid and be assessed by the Admission Board)

Only qualifications obtained during the last 5 calendar years shall be taken into consideration, except for the University Degree. **The Admission Board will assess the relevance of the supporting documents to the criteria listed in Art. 3 of the Ministerial Decree 1061/2021 (see also Art. 4 of the Call for applications).**

REQUIRED DOCUMENTS	
Identity document	Valid identity document with photo (i.e. identity card, passport)
Curriculum Vitae	No specific CV format is required
Degrees	Documents attesting the awarding of the first and second cycle degrees (see Art. 3 of the Call for Applications)
Research proposal	Multi-annual research proposal, with special emphasis on the activities to be completed during the first-year course. The proposal must meet the following requirements:

AFORM Settore Dottorato di ricerca

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	<ul style="list-style-type: none"> - it cannot exceed 20,000 characters, including spaces and formulas, if present. This figure does not include: the title, the outline, references and images (such as graphs, diagrams, tables etc. - where present); - it must be written following the templates provided for Action IV.4 – “PhDs on Innovation topics” and Action IV.5 “PhDs on Green topics”. The templates are attached to the Call for Application and available for download on the University website.
SUPPORTING DOCUMENTS	
Publications	Lists of publications (i.e. monographs, articles on scientific journals), minor publications (conference papers, etc.), abstracts and posters presented during national and international conferences, etc.

Evaluation criteria

The **results of the admission exams** will be available from 03/11/2021 on [Studenti Online](#) (select “summary of the requests in progress” > “see detail” and open the .pdf file at the bottom of the page). **No personal written communication will be sent to applicants concerning the examinations results.**

Scores will be expressed in points out of 100, as follows.

Minimum score for eligibility: 60 points, Maximum score: 100 points

Qualifications evaluation	University degree final mark.	10 points max: <ul style="list-style-type: none"> - 10 points for 110 and Lode - 8 points for 109 to 110 included - 6 points for 105 to 108 included - 4 points for 101 to 104 included - 3 points for 95 to 100 included
	Publications	10 points max (only qualifications related to the topics of the Doctorate will be evaluated with the following maximum scores): <ul style="list-style-type: none"> - 3 points for each publication in ISI / Scopus and class A journals; - up to a maximum of 1 point for participation at conference proceedings, conferences posters or other publications
Research proposal evaluation	Scientific value and innovative nature of the proposal	20 points max.
	Ability of the project to foster the synergy between research and the productive world	20 points max.
	Identification of parameters allowing the measurability of expected results	20 points max.
	Adherence of the proposal to the objectives of the Action PON R&I 2014-21	20 points max.

Research Topics

n. 1 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: regenerative, predictive and personalized medicine
PNR 2021-2027*	Research field: 5.1 health Area of application: 5.1.4 Technologies for health Section 7. Medical devices, artificial organs and neuromorphic technologies for medicine Section 9. Nanotechnologies for nanomedicine
Project title	New green bone substitutes from marine resources
Project description	The clam shells constitute a significant part of the fish and food supply chain and their disposal has a significant environmental impact. However, they have a complex composition and structure at the micro- and nano-scale that is impossible to replicate artificially, making them promising also in the biomedical sector (as bone substitutes). The waste will be converted into hydroxyapatite and used to obtain advanced devices for orthopedic and dental applications (3D printing scaffolds and nanostructured coatings).
Mandatory traineeship	6 months
Company type	3d printing company
Stay abroad	6 months

n. 2 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: E-health, advanced diagnostics, medical device and minimal invasiveness
PNR 2021-2027*	Research field: 5.1 health Area of application: 5.1.1 General Issues Section 3. Implementation of diagnosis, therapy and follow-up systems for non-communicable and / or aging-related diseases
Project title	Unraveling the role of extracellular vesicles-driven senescence in myeloproliferative neoplasms
Project description	Within the main topic of the green, sustainable and personalized medicine, this project aims to study the potential of extracellular vesicles (EVs) to develop new diagnostic/prognostic tools or targeted drugs for myeloproliferative neoplasms (MPN). This will improve the patients' diagnosis (identifying disease-specific biomarkers using less reagents or materials for diagnostic analyses), prognosis (saving patients from unnecessary treatments) and therapy, by identifying new molecular target(s) to develop personalized and sustainable drugs.
Mandatory traineeship	6 months
Company type	Company that offers tailor-made separation, characterization and fractionation services for nano-bio products
Stay abroad	6 months

n. 3 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: E-health, advanced diagnostics, medical device and minimal invasiveness
PNR 2021-2027*	Research field: 5.1 health Area of application: 5.1.1 General Issues Section 3. Implementation of diagnosis, therapy and follow-up systems for non-communicable and / or aging-related diseases Subsection: Promote precision medicine

Project title	Central Nervous System Sodium MR imaging: “Green” for the Patient and the Environment
Project description	Clinical translation of an MRI sequence for the quantification of the endogenous sodium concentration in neuro-oncological and neuro-inflammatory patients. Sodium imaging may significantly reduce the need for intravenously injecting a gadolinium-based contrast agent which deposits in healthy tissues and in the wastewater/aquifers system. Thus, this novel technique may improve the environmental impact of MRI – reducing the need for a toxic rare earth element – and the safety – quashing the risk of allergic reactions and accumulation of gadolinium in tissues.
Mandatory traineeship	6 months
Company type	Medical technology company that deals with imaging diagnostics
Stay abroad	6 months

n. 4 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: biotechnology, bioinformatics and pharmaceutical development
PNR 2021-2027*	Research field: 5.1 health Area of application: 5.1.1 General Issues Section 4: Neurosciences and Mental Health
Project title	Lactic acid bacteria of the intestinal microbiota: promising vectors for in vivo production of recombinant proteins for biomedical purposes, with no harmful effects for the ecosystem
Project description	"Green Medicine" aims to develop strategies without harmful effects for patients, but also for the ecosystem, for the administration of therapeutic molecules. Lactic acid bacteria are becoming a promising option for oral delivery of personalized medications. In collaboration with a company specializing in the development of non-ecotoxic, sustainable and low environmental impact drugs, we intend to develop new combinations for the treatment of neurological diseases.
Mandatory traineeship	6 months
Company type	Pharmacological company operating in the field of toxicological risk assessment from environmental pollutants
Stay abroad	6 months

n. 5 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: E-health, advanced diagnostics, medical device and minimal invasiveness
PNR 2021-2027*	Research field: 5.1 health Area of application: 5.1.4 Health Technologies Section 12. Technology impact assessments and business models
Project title	Reduction of the environmental impact in the production of joint arthroplasty implants
Project description	The production of joint arthroplasty implants is constantly growing (1.5 million per year in the USA). The traditional production by forging or casting is associated to a severe impact on the environment. Additive manufacturing is an emerging technology that allows to build objects with greater efficiency in the consumption of materials. The aim of the project is to extensively transpose this latter technology into the production of arthroplasty implants, while respecting production standards, clinical requirements, and reducing the consumption of materials and the impact on the environment by at least 50%. At the end of the cycle, implant prototypes will be realized.
Mandatory traineeship	6 months
Company type	Company specialized in the design, production and marketing of joint prostheses and other orthopedic surgical devices

Stay abroad	No
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n. 6 - INNOVATION

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: E-health, advanced diagnostics, medical device and minimal invasiveness
PNR 2021-2027*	Research field: 5.1 health Area of application: 5.1.4 Health Technologies Section 1. Digital health: telemedicine, digital technologies and sensors for preventive, participatory and personalized medicine and for the innovation of health services and clinical engineering TRL> 4 Section 1a: Telemedicine: use of ICT technologies for the innovation of decentralized health services distributed throughout the territory. Section 2. Artificial intelligence for precision diagnostics, personalized therapies and for organizational and management innovation of healthcare processes
Project title	Artificial intelligence for personal disease risk prediction
Project description	The project aims at designing an artificial intelligence (AI) based tool that retrieves and analyzes the scientific literature to forecast the health impact of different lifestyle habits once essential, biochemical, anthropometric and genetic information of an individual user are provided. The tool uses AI also to improve the predictive ability of its algorithms by testing them on large-scale longitudinal data sets. The PhD student will collaborate with companies interested in co-developing and deploying this tool as well as organizations interested in disseminating it.
Mandatory traineeship	6 months
Company type	Company for the development of technological innovations that make it possible to extrapolate, evaluate and use information on the state of health of an individual for preventive purposes
Stay abroad	6 months

*The translation of PNR 2021-2027 references has been carried out by the PhD Unit.