

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



UNIONE EUROPEA
Fondo Sociale Europeo



PROGRAMME'S NAME	ONCOLOGY, HEMATOLOGY AND PATHOLOGY
DURATION	3 years
PROGRAMME START DATE	01/01/2022
LANGUAGE	Italian, English
COORDINATOR	Manuela Ferracin (manuela.ferracin@unibo.it)
CURRICULA	N/A
RESEARCH TOPICS	Detailed list at the bottom of the present document
PhD POSITIONS	7
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	A digital pathology approach to increase sustainability in diagnostics
	2	PhD Scholarship	Food waste as nourishment of in vitro cellular models
	3	PhD Scholarship	Environmental contamination by chlorinated solvents and impact on ecosystem and human health: Bussi sul Tirino area
	4	PhD Scholarship	Evaluation of SARS-CoV-2 Virus in working and community environments: study of air contamination and surfaces for a correct risk assessment and reduction of the environmental impact of sanitation
	5	PhD Scholarship	Environmental impact of molecular approaches in sentinel lymph node diagnosis
	6	PhD Scholarship	Screening of natural compounds on the membrane receptors stability by holotomographic microscopy, with low environmental impact
	7	PhD Scholarship	Development of tools for prediction of cancer treatments efficacy to reduce and prevent health costs for patients and social systems and reduce their environmental impact.

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)

AFORM Settore Dottorato di ricerca

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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: <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 template provided for Action IV.5 “PhDs on Green topics”. The template is 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 and other documents	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 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: E-health, advanced diagnostics, medical devices 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 and Systemic sustainability of products, processes, services
Project title	A digital pathology approach to increase sustainability in diagnostics
Project description	We intend to use digital pathology and artificial intelligence approaches to support the diagnosis of the origin of tumors of unknown primitivity, using the collection of hematoxylin-eosin slides available at the University of Bologna and slide images from public databases. Bioinformatics experts, pathologists and companies developing biomedical imaging products and image analysis software will have to work side by side to obtain new protocols for diagnostic and therapeutic purposes. The development of diagnostic algorithms for processing histopathological preparations will reduce the environmental impact of the medical-diagnostic routine, currently based on the use of toxic substances that are difficult to dispose of. The digital pathology approach will therefore make it possible to increase the environmental sustainability of essential but currently highly polluting processes.
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Healthcare sector: digital diagnostics and software development
Stay abroad	6 months

n. 2 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: Biotechnology, bioinformatics, pharmaceutical development
PNR 2021-2027*	Research field: 5.6 Food, bioeconomy, natural resources, agriculture, environment Area of application: 5.6.3 Bioindustry for bioeconomy. Articulation 2: Circular bioindustry 5.6.4 Knowledge and management of agricultural and forestry systems. Section 3: Integration between agriculture for food production and non-food agriculture
Project title	Food waste as nourishment of in vitro cellular models
Project description	The project aims to requalify waste from the agrifood chains by promoting their use in the field of cancer research and development of new in vitro cellular models. These products maintain a high nutritional value but can no longer be used as food and become waste, sometimes polluting, of the supply chains. Waste requalification fits with a circular economy vision and promotes the introduction into the market of reagents that can replace foetal bovine serum, currently the main source of nourishment for cells, that is obtained from the foetuses of slaughtered cows. Preliminary results produced in my laboratory show that whey is able to promote the growth of cancer and non-cancer cells. In this project it is proposed the collaboration with Lac2lab Srls, innovative start-up with a social mission located in Bologna, that develops innovative medium additives for the Life Sciences, starting from expired or expiring milk.
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Innovative start up with social vocation
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 devices and minimal invasiveness
PNR 2021-2027*	Research field: 5.1 Health Area of application: 5.4.1 Technologies for health Section 6: Lab-on-chip and biosensing for IVDs (TRL> 3)
Project title	Environmental contamination by chlorinated solvents and impact on ecosystem and human health: Bussi sul Tirino area
Project description	The proposal aims to study the environment and the human population of the territory of Bussi sul Tirino (Pescara, Italy) which has undergone significant contamination due to the environmental leak of industrial residues of chlorinated solvents. In particular, the project aims to: <ul style="list-style-type: none"> • Characterize the environmental impact: impact on the chemical and biological characteristics of water and soil • Integration of environmental data with epidemiological and molecular aspects (biological aging) of the resident population
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Biotechnology and diagnostics
Stay abroad	NO

n. 4 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: Systems for urban environment safety, environmental monitoring and prevention of critical events and risks
PNR 2021-2027*	Research field: 5.1 Health Area of application: 5.1.1 General issues Section 2 Pathogenesis, diagnosis, surveillance and therapy of infections, including emerging infections Research field: 5.2 Humanistic culture, creativity, social transformations, a society of inclusion Area of application: 5.2.4 Creativity, design and made in Italy Articulation 3 Systemic sustainability of products, processes, services
Project title	Evaluation of SARS-CoV-2 Virus in working and community environments: study of air contamination and surfaces for a correct risk assessment and reduction of the environmental impact of sanification
Project description	The recent COVID-19 pandemic has confronted us with an unknown virus, for which the study of its environmental prevalence in various work and community environments is of fundamental importance to make these environments safer and healthier. The aim of the study is therefore to evaluate the presence of the SARS-CoV-2 virus in high, medium and low risk environments by evaluating the airborne viral particles, their correlation with environmental parameters that can influence their permanence and with sanitation measures. The study will also allow the evaluation of alternative and innovative systems of environmental sanitation, to date exclusively focused on aggressive and toxic chemical agents (hypochlorite, ozone, etc.), with a high environmental impact, proposing their gradual replacement for the benefit of environmental sustainability and protection. of human and animal health.
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Mechanical engineering industry for packaging
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 devices and minimal invasiveness
PNR 2021-2027*	Research field: 5.5 Climate, energy, sustainable mobility Area of application: 5.5.4. environmental energy Section 4: Occupant behavior: models and impacts
Project title	Environmental impact of molecular approaches in sentinel lymph node diagnosis
Project description	The environmental impact of the clinical laboratory is characterized by the generation of large quantities of special waste and high consumption of energy and water, and has so far received little consideration. A molecular diagnostic approach has recently been introduced at our facility for the diagnosis of the sentinel lymph node in breast cancer to replace traditional histopathological methods. In addition to analytical advantages, the molecular method offers, at a first evaluation, evident advantages in terms of environmental impact. This technology is already applicable to numerous other types of cancer and can also be extended to other hospitals in the metropolitan area. The required role will deal, also in collaboration with the manufacturer, with the precise quantification of the environmental impacts of sentinel lymph node diagnostics and how these can be influenced by the large-scale introduction of molecular methods.
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Healthcare: laboratory diagnostics
Stay abroad	6 months

n. 6 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: Biotechnology, bioinformatics, pharmaceutical development
PNR 2021-2027*	Research field: 5.1 Health Area of application: 5.1.2 Pharmaceutical and Pharmacological Technologies Articulation 5. Identification of the determinants responsible for the pathogenesis of currently incurable diseases and the variability in the individual response to drugs
Project title	Screening of natural compounds on the membrane receptors stability by holotomographic microscopy, with low environmental impact
Project description	The aim of the project is to carry out a screening of substances of plant, microbial and mineral origin on the stability of membrane receptors, with consequent evaluation of the response to monoclonal antibodies. Colorectal cancer early detection markers will be evaluated: CELTIC in response to the panel of substances of natural origin. The project will exploit sustainable microscopy techniques, such as Tomocube holotomography, which uses optical diffraction tomography (ODT), which allows microscopists to do quantitative and non-invasive analyzes of biological cells and tissues avoiding the use of fluorochromes. antibodies and lasers, which could induce phenomena of phototoxicity with the production of toxic waste and difficult to dispose of with a high environmental impact.
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Molecular diagnostics
Stay abroad	6 months

n. 7 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: E-health, advanced diagnostics, medical devices 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 and systemic sustainability of products, processes, services

Project title	Development of tools for prediction of cancer treatments efficacy to reduce and prevent health costs for patients and social systems and reduce their environmental impact.
Project description	Cancer treatments are very expensive both in terms of side effects and health costs. Some of these treatments are also ineffective, especially in the adjuvant phase, or in terms of reducing the risk of relapse. The possibility of identifying signatures and / or tools that make it possible to predict the effectiveness of therapies is increasingly urgent. The next generation sequencing (NGS) technological platforms have allowed the biological study of cancer samples in a very sophisticated way. The production of data is of considerable complexity because it is characterized on the one hand by a very high number of information, on the other by the diversity of biological levels of origin. The integration and analysis of genomic data with the clinic is an essential approach to try to define the effectiveness of treatments. The final objective of this project is both to reduce costs in clinical and environmental terms, that is to propose effective treatments and avoid those that are useless and often toxic, and consequently reduce health costs both in terms of cost / drug and cost / health facility and their environmental impact.
Mandatory traineeship	Min. 6 months max. 12 months
Company type	Molecular diagnostics
Stay abroad	6 months

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