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

PROGRAMME'S NAME	GENERAL MEDICAL AND SERVICES SCIENCES
DURATION	3 years
PROGRAMME START DATE	01/01/2022
LANGUAGE	Italian
COORDINATOR	Fabio Piscaglia (fabio.piscaglia@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	Microbiome-based intervention strategies to counteract non-communicable diseases
	2	PhD Scholarship	Green care and Virtual Reality: the promotion of the psychophysical health of workers through physical education interventions in outdoors and the development of training devices in virtual reality (VR)
	3	PhD Scholarship	Development of a P4 approach in environmental medicine
	4	PhD Scholarship	Optimization of the approaches for liquid biopsy in ovarian cancer
	5	PhD Scholarship	Sustainable healthcare: appropriateness of drug use and relevant environmental impact
	6	PhD Scholarship	Application of artificial intelligence to large-scale epidemiology data on environmental risk factors of chronic diseases

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: - 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	Publications in full text (i.e. monographs, articles on scientific journals), minor publications in full text(conference papers, etc.) – max 8 Abstracts and posters presented during national and international conferences, etc. – max 10

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

Qualifications and publications evaluation	University degree final mark. Graduands shall be evaluated according to the Weighted Average Mark (WAM)	15 points max. - 15 points for 110 e Lode - 13 points for 110 - 11 points for 109 - 9 points for 107 to 108 - 7 points for 105 to 106 - 5 points for 101 to 104 - 3 points for 97 to 100 - 1 points for 90 to 96 The graduation final mark consists of the final grade for single-cycle degrees and the mathematical average of the two degrees in the case of a three-year course followed by a two-years course/Master degree. The weighted average of the marks is calculated by dividing the value by 3 and multiplying by 11 (for example average 27, thesis score = 99 score received 3 points) and adding the value of 4 points for the theoretical discussion of the thesis.
	Publications (related to the topics of the PhD)	10 points max - 3 points for each publication in ISI / Scopus and class A journals, - 3 points for each publication in a journal with Impact Factor to first, second, last and corresponding author, - 2 points for each journal publication on PubMed but without IF, - 1 point for every other position for every publication in PubMed journals, - 0.25 points for each publication that is a conference document, oral communication or poster of a conference or other publication in full, only if it is not published on PubMed. Each abstract can be presented only once even if submitted to different conferences.
Research proposal evaluation	Scientific value and innovative nature of the proposal, proposed methodology	45 points max Each scientific research proposal must specify which specific research topic, among those listed below, it refers to. It will be up to the Commission to evaluate the coherence with the topics in the Call.
	Ability of the project to foster the synergy between research and the productive world	5 points max

	Identification of parameters allowing the measurability of expected results	15 points max
	Adherence of the proposal to the objectives of the Action PON R&I 2014-21	10 points max

Research Topics

n. 1 - 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: 5.1.3 Biotechnologies Section 4 Microorganism-host interactions in human and animal health and diseases
Project title	**Microbiome-based intervention strategies to counteract non-communicable diseases**
Project description	The project aims to define variation drivers, biomarkers, and mechanisms of action of the gut microbiota in the context of NCDs (e.g., obesity, allergies, and cancer) for the development of microbiome-based intervention strategies. To this end, subjects with NCDs will be enrolled, to be followed over time for the profiling of the gut microbiota, as well as the measurement of a series of host parameters, including biochemical and clinical variables, and factors related to the exposome (i.e., the totality of exposures that each individual faces in the course of life) (Wild, 2005), including lifestyle habits, environmental and xenobiotics exposure. The data will be compared with those of healthy subjects matched by microbiota-associated confounding factors (Vujkovic-Cvijin et al., 2020), also exploiting publicly available data from existing cohorts. The stratified data will be used in artificial intelligence approaches, to model the full complexity of microbiota-host interactions, with the ultimate goal of deriving dysbiotic variation drivers and biomarkers, as well as providing some insights into possible mechanisms of action, including identification of specific bioactive molecules. These mechanisms may eventually be validated in in vitro/ex vivo studies. All this knowledge will guide the design of novel microbiome-based intervention strategies to combat the risk of NCDs in industrialized societies. Based on the project results, strategies could involve the use of prebiotics, probiotics, synthetic microbial communities or postbiotics, to achieve microbiota and clinically relevant endpoints (i.e., reversal of dysbiosis and improvement of health).
Mandatory traineeship	6 months
Company type	Pharmaceutical company
Stay abroad	NO

n. 2 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectories: E-health, advanced diagnostics, medical devices and minimal invasiveness Regenerative, predictive and personalised medicine
PNR 2021-2027*	Research field: 5.1 Health Area of application: 5.1.1 General Topics Section 7. Health Promotion, Disease Prevention and Access to the National Health Service
Project title	**Green care and Virtual Reality: the promotion of the psychophysical health of workers through physical education interventions in outdoors and the development of training devices in virtual reality (VR)**
Project description	Motor activity has a protective effect for the development of psychophysical disorders. The WHO establishes the need to increase it in the general population, to reduce deaths and illnesses, and to implement Workplace Health Promotion practices. Objectives: to measure the effectiveness and feasibility of a health promotion model through physical activity in the workplace. In collaboration with KCL London, a VR software will be developed in preparation for motor training and to monitor the impact on psychophysical health

Mandatory traineeship	6 months
Company type	Services
Stay abroad	6 months Psychological Dep, King's College London

n. 3 - GREEN

Thematic area SNSI 2014-20	Thematic area: Health, nutrition, quality of life Development trajectory: Regenerative, predictive and personalised medicine
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	**Development of a P4 approach in environmental medicine**
Project description	P4 (predictive, preventive, personalized and participative) medicine is an innovative approach aimed at developing a proactive rather than reactive attitude to health, with focus on disease prevention and regression to early stage, rather than treatment. The P4 approach is based on deep phenotyping and personalized data collections ("data clouds"), and aims at both body and mind, including psychological and cognitive well-being. P4 medicine has been developed within the framework of internal medicine; however, it would also represent an interesting approach in other areas of medicine. In particular, a framework for P4 environmental medicine has not been previously developed and represents the objective of the proposed PhD program. The program will comprise literature reviews, including case-studies, and the development of pilot projects to be tested in both public (University Hospital of Bologna) and private (SAMED Group) healthcare settings.
Mandatory traineeship	6 months
Company type	Healthcare delivery
Stay abroad	6 months at Stony Brook University, NY, USA

n. 4 - GREEN

Thematic area SNSI 2014-20	Thematic area: Smart and sustainable industry, energy and environment Development trajectory: Innovative and environmentally friendly materials Thematic area: Health, nutrition, quality of life Development trajectory: E-health, advanced diagnostics, medical devices and minimal invasiveness
PNR 2021-2027*	Research field: 5.6 Food, bioeconomy, natural resources, agriculture, environment Area of application: 5.6.1 Green technologies Section 4: Reduction of waste and the demand for critical raw materials through disassembling and materials recovery, remanufacturing and refurbishing approaches
Project title	**Optimization of the approaches for liquid biopsy in ovarian cancer**
Project description	The project intends to develop liquid biopsy approaches in the context of ovarian cancer that require the minimal use of reagents/plastic, to allow reduced biotechnological waste management. On one hand, the protocols for detection of circulating "cell free" tumor material will be adjusted to reduce repetitive use of reagents/plastic. Moreover, a novel tomography based "label free" approach for circulating tumor cell detection will be developed, which avoids the use of labelling/wash reagents.
Mandatory traineeship	6 months
Company type	Biotechnology (Production of kits for molecular biology analysis)
Stay abroad	NO

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: 5.1 Health Area of application: 5.1.4 Health technologies Section 1. Digital health: telemedicine, digital and sensor technologies for preventive, participatory and personalized medicine and for the innovation of health services and clinical engineering.
Project title	**Sustainable healthcare: appropriateness of drug use and relevant environmental impact**
Project description	This project will define the impact on environment of medicines on the basis of their actual utilisation and of the defined categories of risk for the environment established by the International medicines agencies. It will also assess if initiatives for improving appropriateness of drug use (by tools already proposed in the medical literature) a in each specific care settings (from hospital to nursing homes and primary care) would be able to limit that impact.
Mandatory traineeship	6 months
Company type	Pharmaceutical industry
Stay abroad	(possible for 6 months at KI-Svezia)

n. 6 - 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 5. Evaluation of the impact of the environment on the outcomes of acute and chronic-degenerative diseases
Project title	**Application of artificial intelligence to large-scale epidemiology data on environmental risk factors of chronic diseases**
Project description	Modern epidemiology studies typically collect a large number of variables on sociodemographic, behavioral, environmental and clinical characteristics of study subjects. Individual data can be matched on environmental factors, typically available at the ecologic level (micro-areas) to expand the understanding of the role of potentially relevant environmental factors. Current analytical approaches focus on one or a few aspects, and treats other characteristics as confounders or effect modifiers. The proposed project will apply artificial intelligence (AI) approaches to develop novel analytical strategies to identify and better quantify the role of environmental factors in determining risk and outcome of chronic diseases in longitudinal studies with detailed phenotyping, including the Golestan Cohort Study (Iran), NHANES (USA) and UK Biobank (UK).
Mandatory traineeship	6 mesi
Company type	Engineering, Artificial intelligence
Stay abroad	6 months at Stony Brook University, NY, USA

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