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IUSS
Scuola Universitaria Superiore Pavia

MUR

PhD in THE HADRON ACADEMY
Risk and Complexity in High Tech Medical Innovation

Coordinator	Prof.ssa Annalisa Bonfiglio e-mail: annalisa.bonfiglio@iusspavia.it
Scientific fields	ICAR/09; ICAR/03; IUS/02; FIS/07; ING/INF/06; FIS/01; MED/36; FIS/02; MED/06; BIO/13
Brief description	The extraordinary increase of technologies available in the biomedical field induces as a consequence the need of controlling the adequacy of medical procedures and their prescription, the preparation of medical staff for the informed use of technologies and the management of risks associated to their use with patients. The increasing complexity of this topic requires the harmonization of different competences in order to optimize all phases of the therapeutic route of the patient. In addition, the technological development in medicine is a complex procedure also under the legal and ethical point of view, aspects essential for allowing innovation reaching the patient. In this scenario, the PhD program in Risk and Complexity in High Tech Medical Innovation aims at the education of medical doctors, medical physicists, biologists, engineers, physicists with a program whose goal is building a common language and integrating different skills and competences. The agreement between the Scuola Universitaria Superiore IUSS (IUSS), the University of Cagliari and Fondazione CNAO (CNAO) ensures the right synergy of scientific, methodological, technological, legal/ethical competences needed for considering the mentioned topics in the specific scientific/technological area of Hadrotherapy. The PhD course, characterized by a high degree of interdisciplinarity, proposes every year to the candidates, research topics and activities characterized by interdisciplinarity and complexity that can be dealt with by motivated students coming from different disciplines, i.e. biomedical disciplines (medical doctors, radiotherapists, biologists, biotechnologists), technological disciplines (physicists, engineers, data scientists), humanities/social disciplines (lawyers, economists, philosophers). The research activities will be accompanied by a curriculum including both common and specialistic courses. Common courses will deal with general topics related to hadrotherapy (the main focus of the PhD) and to risks associated to the technological innovation in the biomedical field, including those related to legal and ethical implications of innovations.
Language	English
Duration	3 years
Number of positions available	5 positions, of which: - 2 positions with scholarships funded by IUSS - 1 position with scholarship funded by University of Cagliari - 2 positions with scholarships funded by Fondazione CNAO
Submission deadline for the online application	**9 September 2022 at 13:00 (CEST)**
Mandatory	a) a PDF copy of a valid identity document;

documentation to be attached to the online application	b) self-certification of the Master Degree Certificate (Italian or UE educational qualification), or Copy of the MSc Degree Certificate (NON-EU educational qualification); c) self-certification of the Bachelor Degree Certificate (Italian or UE educational qualification), or Copy of the Bachelor Degree Certificate (NON-EU educational qualification); d) diploma Supplement/Transcript/or similar document of Master Degree Certificate; e) diploma Supplement/transcript/or similar document of Bachelor Degree Certificate; f) a proposal of research project (see guidelines on the IUSS website) related to one or more of the following topics: 1. Experimental radiobiology of neurotropic tumours in radio- and hadrontherapy 2. Innovative particle therapies based on He and O2 3. Non oncologic applications of hadrontherapy 4. Advanced imaging in particle therapy 5. Precision systems for tumour tracking in particle therapy 6. Artificial Intelligence classification and prediction models applied to hadrontherapy 7. Radiation physics in hadrontherapy environment: production, transport, measurement of radiation fields 8. Beam transport and delivery (gantries, dose delivery, Ion arc distribution etc) 9. Target stability and reproducibility (range verification, delivered dose distribution etc) 10. Health risk and benefit assessment in the context of radio- and hadron therapy
Qualification assessment	a) diploma Supplement/Transcript/or similar document of Master Degree Certificate; b) diploma Supplement/transcript/or similar document of Bachelor Degree Certificate; c) research project (see guidelines on the IUSS website); d) academic and professional CV; e) publications; f) recommendation letters (maximum n. 3), sent by the referees through the online system, within the deadline of the call.
Interview and evaluation	The selection will be performed through the assessment of the qualifications listed in the section "Qualification assessment" **(maximum 50 points)** and through an interview **(maximum 50 points).** The Selection Board will therefore award **a final score from 1 to 100**.
	The Selection Board will assess the submitted scientific qualifications awarding a score up to 50 points. The candidates obtaining a score of at least **36/50** in the assessment phase, will be accepted to the interview. Candidates are not required to be present during the assessment of qualifications. The interview may also be carried out online, as long as the candidate can be identified. The interview will entail a discussion about the scientific background and skills of the candidate and about the research that the candidate would like to conduct, as well as technical/scientific questions, with the aim of ascertaining the candidate's background, vocation and aptitude for

	research. Candidates obtaining a score below **36/50** in the interview will not be eligible to be admitted to the programme hence not part of the ranking list. IUSS Pavia will notify the scholarship holders of their admission to the programme using the e-mail address provided in the application.
Test schedule	The results about the evaluation process will be published on the IUSS website http://www.iusspavia.it The interviews will be carried out on **10 October 2022 at 11:30am CEST**, at the IUSS building or online, via Zoom.
Information	e-mail: postlaurea@iusspavia.it