Project Description:

The PhD Course focuses on a highly integrated approach to the topic of "Brain, Mind and Body" and is characterized by excellence in research and education. The course is divided into the following subject areas: i) Neuroscience and neurological pathology (neurophysiology, neuropharmacology, neuroscience, developmental neurobiology, brain imaging, neurological pathophysiology, neurology, neuropathology, clinical neurophysiology, neurorehabilitation, experimental neurosurgery); ii) Psychological and psychiatric sciences (epidemiology, genetics, psychopharmacology, psychotherapy, analysis of predictors for the outcome of mental disorders; addiction to substances of abuse, neuropsychology, cognitive psychology, experimental, social and clinical psychology); iii) Movement sciences (determinants of motor performance, physiology of aging; models for the promotion of exercise aimed at lifestyle modification). Several research and training topics, moreover, bridge these areas and involve synergies among faculty members from multiple sectors (e.g., the study from neurodegenerative diseases, with basic, preclinical, and clinical research approaches). Faculty's multidisciplinar scientific expertise and modern laboratories offer the opportunity to train researchers in different dimensions. Studies developed within the doctoral program also aims to improve environmental sustainability; the acceleration of digital transformation processes; and the promotion of social inclusion.

Upon completion of the course, the student will be eligible for research fellow or postdoctoral positions in national and international academic and health system research institutions as well as research/development sectors of national and international biomedical, pharmacological, and diagnostic product companies.

Aims of the course:

The main objective is to provide students skills for highly qualified research activity at universities, public institutions and private entities. In general, the course aims to train student to develop and perform original studies inspired by the principle of "hypothesis driven" scientific research and "evidence-based medicine." In particular, students will acquire skills on:

A) Elaboration and communication of a research project based on relevant updated scientific literature, robust cultural foundations, correct methodological approach. The research project has to be carried out with adequate planning of experimental designs and protocols in the fields of neuroscience, physiological, cognitive, movement and clinical sciences;
On the basis of this goal, the educational activities of the doctoral course include:

- Workshops on bibliographic and scientific databases consultation;

- acquisition of fundamental knowledge and skills on Study designs and research planning in clinical, behavioral, cognitive, psychological and experimental fields;

- participation in drafting the application for institutional authorization of Ethical Boards, in particular, the principles behind ethical experimentation on humans and the role of informed consent;

B) Execution of individual experimental steps making use of the most advanced molecular, cellular, physiological, epidemiological, genetic, cognitive, psychological investigation techniques applicable to various experimental models (cells, in situ organs, animal and human laboratory) under various environmental stress conditions.
On the basis of this goal, the educational activities of the doctoral course include:
- Specific training, laboratory internships, and participation in local and international educational courses in the use of the instrumentation planned for the execution of the project, including new diagnostic, laboratory, or neuroimaging tools;

C) Execution of clinical and epidemiological studies making use of the most advanced experimental (phase III studies) and observational epidemiological (phase IV studies) methods including specific training in the tools of meta-analytic analysis of data extracted from randomized trials and observational studies according to the principles of evidence-based medicine.
On the basis of this goal, the training activities of the doctoral course include:
- Specific training for the acquisition of skills in clinical and epidemiological research methods;
- Specific training for the acquisition of skills on meta-analytic research methods;
- Participation in specific monographic courses provided in the educational plan on specific innovative methods
-methods for electronic management of clinical and epidemiological data;

D) Post-hoc analysis of experimental data.
On the basis of this goal, the educational activities of the doctoral course include:
- Specific monographic courses on statistical methods for data analysis in the field of experimental, medical, clinical, epidemiological sciences, inherent in longitudinal studies and meta-analysis and introduction to the use of the most popular statistical packages (SPSS, NCSS, Statistica, STATA);
- Planned monographic courses introductory to quantitative data analysis (MatLAb, Labview);

E) Effective and concise oral and written communication of experimental results.
On the basis of this goal, the training activities of the doctoral course include:
- Lab meeting for systematic reports on experimental activity and data analysis;
- Written and oral presentation at the end of each year of the research project and the state of the art on the topic, with discussion by experts;
- Participation in national and international conferences with communications (poster or oral) on the results obtained in the course of the project;
- Gradual acquisition of specific skills in writing scientific reports/articles.
- Involvement in the writing of scientific reports/articles and their revision.

Moreover, the course aims to show national and international funding opportunities, postdoctoral research, and European and international systems of exploitation of research results and intellectual property.
Finally, the course aims to raise awareness of the role of work well-being in individual and team productivity as well as promote an ethical, transparent and collaborative approach to research.

Employment and professional opportunities

i) Post-doctoral fellow at public and private national and international research institutions;

ii) Researcher in analysis laboratories in hospital neurophysiopathology services;

iii) Researcher in R&D sections of pharmaceutical and biomedical industries;

iv) Researcher within the NHS and IRCSS;

v) Consultant for epidemiological, clinical and pharmacological research;

vi) Post-graduate training officer of high specialization;

vii) Level I executive at NHS facilities.

Of particular interest to territorial stakeholders are projects aimed at promoting healthy behaviors and lifestyles of populations at-risk, like motor and cognitively impaired patients, neurological and psychiatric through behavioral therapy based on exercise and physical training. Also relevant will be the contribution made by the implementation of epidemiological projects that allow monitoring of current practices in mental health services, this a particular interest on the relationship between evidence and clinical choices: data on effectiveness and efficiency, selection of pharmacological and psychosocial interventions, and effects on clinical and disability outcomes.