13 Early Stage Researcher positions (PhD students) are available in the European programme Multi-ITN (Marie Curie Initial Training Programme)

Advanced Radiotherapy, Generated by Exploiting Nanoprocesses and Technologies

(details: http://ec.europa.eu/research/mariecurieactions/about-mca/actions/itn/index_en.htm)

Abstract:
Cancer, the second most common form of death after cardiovascular diseases, is a major European health concern. In 2006, 3.1 million new cases were diagnosed and 1.7 million deaths were attributed to cancer within Europe. The European Commission has a "European Partnership for Action against Cancer" (IP/09/1380) with the aim of reducing the number of cancer cases by 15% by 2020. A key challenge is to "Develop a more coordinated approach to cancer-related research across Europe". Around 50% of patients receive radiotherapy as part of their cancer treatment and it is second only to surgery in its ability to cure cancer. However, radiotherapy is limited strongly by the effects induced in the surrounding healthy tissues, which are very harmful for the patients. New approaches that enhance radiosensitivity within tumours have the potential to provide a major impact on the delivery of radiotherapy to patients. Two of the most promising approaches (hadron and nanoparticle-enhanced therapies) are driven by nanoscale phenomena. This proposal brings together world-leading researchers from the academic and private sectors aiming at developing hadron and nanoparticle - enhanced therapies, united by the common purpose of optimising radiotherapy by understanding and exploiting nanoscale processes induced by radiation. Such an understanding will open up a new era in which radiotherapy is revolutionised to provide more successful cancer treatment with subsequent economic and 'quality of life' benefits for the EU population as a whole. The main objective of this intersectorial and multidisciplinary ITN is to ***create a new generation of researchers and experts able to create the platform on which next-generation cancer therapy will be built***. The consortium aims to train a cohort of 13 PhDs (Early Stage Researchers – ESRs) to subsequently act as leaders and ambassadors in the field.

The ITN ARGENT **strategy** relies i) on improving our understanding of the processes and mechanisms underlying radiation damage on a nanoscopic level, ii) on the application of the improved know-how in the production and development of functionalised radiosensitzers, and iii) on the developments of concepts and codes for clinical applications taking into account the new information.

For this purpose, 13 PhDs will embark in the programme which includes:
1) a ***core scientific training*** at University Paris Sud (Orsay France) with:

i. Tutorials in maths, physics, chemistry and biology (2 weeks) – (September 2014)
ii. Specialized courses in radiation science and nanoscience, experimental and theoretical tools (October-December 2014)

The PhDs will also be trained in ***complementary skills*** during a 3 weeks summer school in Genova (Italy) including:

- Patent law (following European regulation),
- Entrepreneurial skills (business, management, innovation, valorisation, safety at work, communication…)
- Scientific communication (writing of articles and projects, grant writing, oral presentations)
- Elaboration of a professional project
- Ambassadorship, dissemination and outreach activities
- (Option: European languages (other than English))

Each PhD will join the team of the supervisor to develop his/her main project. In addition, **it will be compulsory to stay at other laboratories, industrial partners or clinical environments during** the ***secondments*** (stay of 1 up to 6 months of length each). The PhD student will have to participate

actively to the promotion and visibility of the programme and network by participating and also taking part in the ***organisation of conferences and outreach activities*** all along the programme.

Main partners:

Institution	**Location**	**Person in charge**
CNRS, Univ Paris Sud	France (Orsay)	S. Lacombe
NanoH	France (Lyon)	C. Louis
CheMatech	France (Dijon)	F. Boschetti
CEA, CIMAP	France (Caen)	B. A. Huber
Queens Univ (QUB)	UK (Belfast)	K. Prise
Open Univ (OU)	UK (Milton Keynes)	N. Mason
Goethe Univ (GU)	Germany (Frankfurt)	A. Solov'yov
QuantumWise	Denmark (Copenhagen)	K.Stokbro
GSI	Germany (Darmstadt)	M. Durante
Agencia Estatal Consejo Superior de Investigationes Cientificas (CSIC)	Spain (Madrid)	G. Garcia

Associated partners:

Institutions	**Activities**	**Country**
Heidelberg Ionenstrahl Therapiezentrum (HIT)	Hadrontherapy Center (Hospital)	Germany (Heidelberg)
Centre de lutte contre le cancer François Baclesse	Hospital	France (Caen)
Hospital Universitario Puerta de Hierro (HPH)	Hospital	Spain (Madrid)
IBA	Constructor of Ion Beam Therapy Sources	Belgium (Louvain la Neuve)
Minerva	Outreach activities	UK (London)

Eligibility criteria

Candidates must be, at the time of recruitment by the host organisation, in the first four years (full-time equivalent) of their research careers and have not yet been awarded a doctoral degree. This is measured from the date when they obtained the degree which would formally entitle them to embark on a doctorate.
Eligible candidates may be of any nationality but **must not, at the time of recruitment have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 last years immediately prior to the reference date**. Short stays such as holidays and/or compulsory national service are not taken into account.

Applications and contact:

Candidates can apply for up to three positions (clearly indicate your preference and the ESR numbers).
The ITN activity will start in March 2014. The commencement dates for the open positions will lie, depending on the host organisation, between the 1st of May and the 1st of September 2014.
For your application please supply:

1. CV
2. copy of passport
3. marks, grades and system of evaluation (scales)
4. motivation letter
5. proof of English proficiency
6. two recommendation letters

The evaluation criteria and the corresponding weights are:

- 50%: academic workloads (including appropriateness of the curriculum (and diploma) to the present PhD subjects, marks and grade in studies),
- 10%: home institution ranking (Shanghai ranking and/or CHE),
- 10%: English,
- 10%: recommendation of professionals,
- 10%: motivation letter,
- 10%: professional experience.

Please send your application to both e-mail addresses:

sandrine.lacombe@u-psud.fr
huber@ganil.fr

Subjects of the PhD works
(Dominant character of the thesis work: experimental (E) or theoretical (T))

ESR 1: **Project title: Improvement of the hadrontherapy protocols using nanosensitizers (E)**
Host: CNRS; PhD enrolment: Univ Paris Sud, Orsay- FR ; Supervisor: Sandrine Lacombe
Objectives: New strategy to improve hadrontherapy by using nanoagents

ESR 2: **Project title: Uptake dynamics of nanoagents and effect on radio-enhancement (E)**
Host: CNRS; PhD enrolment: Univ Paris Sud, Orsay, FR ; Supervisor: Sandrine Lacombe
Objectives: Characterization of the role of the nanoagents as a function of its localization in the cell

ESR 3: **Project title: Development of new modules for ATK code for modeling radiosensitizing nanoagents (T)**
Host: GU and Quantum-Wise; PhD enrolment: Goethe-University Frankfurt, Germany. Supervisor: Kurt Stokbro (Quantum-Wise), co-supervisor: Andrey Solov'yov (GU)
Objectives: Develop computational methods and tools to predict the stability and structure of biocompatible nanoagents

ESR 4: **Project title: Bond-breaking as a descriptor for nanodosimetry (T)**
Host: CSIC; PhD enrolment: Universidad Computense de Madrid, Madrid – Spain; Supervisor: Gustavo Garcia
Objectives: Development of nanodosimetry methodologies based on bond-breaking

ESR 5: **Project title: Validation of models in medical radiation planning (E,T)**
Host: CSIC; PhD enrolment: Universidad Computense de Madrid, Madrid – Spain; Supervisor: Gustavo Garcia
Objectives: Incorporate nanoscale radiation damage models to treatment planning systems for specific therapies and nanoparticle-aided approaches

ESR 6: **Project title: Nanoagent functionalization aiming at tumor targeting and biocompatibility (E)**
Host: CheMatech; PhD enrolment: Université de Bourgogne, Dijon, FR ; Supervisor: Frederic Boschetti
Objectives: Develop effective new targeted molecules for nanoagents.

ESR 7: **Project title: Nanoscale understanding of cell signalling and biological response (E)**
Host: QUB. PhD enrolment: Queen's University, Belfast, UK; Supervisor: Kevin Prise
Objectives: Understanding of bystander effects and changes in cell signalling in the presence of nanoparticles

ESR 8: **Project title: Multiscale understanding of radiation biodamage (E,T)**
Hosts: GU and QUB; PhD enrolment: Goethe-Universität, Frankfurt, DE and Queen's University, Belfast, UK; Supervisors: Andrey Solov'yov (GU), Fred Curell (QUB)
Objectives: Set up and validation of a multiscale model for radiation damage

ESR 9: **Project title: Development of Lanthanides based nanosensitizers for theranostic (E)**
Host: Nano-H; PhD enrolment: Université Claude Bernard, Lyon I, FR; Supervisor: Cedric Louis
Objectives: Development of a new set of lanthanide based nanosensitizers to improve theranostic

ESR10: **Project title: Molecular efficiency of radiosensitizers in ion-induced radiation damage processes (E)**
Host: CEA; PhD enrolment: Université de Caen Basse Normandie, Caen, FR ; Supervisor: Lamri Adoui
Objectives: Improve the understanding of radiation damage on the local (molecular) scale, including the effect of radiosensitizers

ESR 11: **Project title: OER prediction on the nanoscale for a target tissue in different conditions of irradiation and oxygenation (T)**
Host: GSI; PhD enrolment: Technische Universität Darmstadt, DE; Supervisor: Marco Durante
Objectives: Determine the impact of nanoscale processes and agents on OER; Nanoscopic understanding of direct and indirect damage ratio as a function of LET, pO2 and nanoagents concentration.

ESR12: **Project title: Exploring site specificity, structure and sequence dependence of radiation-induced damage (E)**
Host: OU; PhD enrolment: Open University, Milton Keynes, UK; Supervisor: Nigel Mason
Objectives: Characterization of nanoscale processes, as a function of site specificity in cellular components

ESR 13: **Project title: Impact of nanoscale processes and agents on biodamage complexity in the presence of nanoagents (T)**
Host: GU; PhD enrolment: Goethe-University Frankfurt, DE; Supervisor: Andrey Solov'yov
Objectives: Determine the impact of nanoscale processes and nanoagents on RBE