THE INSTITUTE OF CANCER RESEARCH

Joint Department of Physics
Division of Imaging and Radiotherapy
Chelsea, London

<u>Postdoctoral Training Fellow – Detectors for Spectral X-Ray Imaging</u>

The Institute of Cancer Research (ICR) is at the forefront of international cancer research and, with the Royal Marsden NHS Foundation Trust (RMH), forms the largest Comprehensive Cancer Centre in Europe. The division of Imaging and Radiotherapy is internationally recognised for its work in cancer imaging and molecular diagnostics and therapeutics.

A vacancy for a Postdoctoral Position exists in Multimodality Molecular Imaging Team (MMI). The STFC funded post will focus on high-flux multi-spectral x-ray imaging with energy-sensitive CdZnTe semiconductor detectors. Methods to be used in this project include complex computer simulations using a combination of state-of-the-art Monte Carlo codes (GEANT4/GATE), Finite Element Analysis software (COMSOL) and semiconductor device simulation tools (TCAD) as well as novel photon-counting multi-threshold CdZnTe detectors and a proof-of-concept multi-spectral x-ray imaging system.

This post is a collaborative venture between the MMI team at ICR/RMH, the Detector Development Group at University of Glasgow and Kromek Ltd. The MMI team has an international reputation for developing advanced detector technologies and innovative imaging platforms for multimodality molecular imaging. Kromek is the sole UK manufacturer of CdTe/CdZnTe materials and detectors using a proprietary innovative technology, which leads to a highly homogeneous material and is also a world leader in multi-spectral x-ray imaging technology.

The candidate should hold a PhD in Physics and have in-depth knowledge in detector physics and readout electronics. Familiarity with Medical Physics would be an advantage.

Appointment will be on a 1-year fixed-term contract in the first instance (with consideration of extension subject to future funding success) starting immediately. Salary £29,695 p.a. inclusive.

Informal enquiries can be made to Dr. Dimitra Darambara (email: <u>dimitra.darambara@icr.ac.uk</u>)

To apply please email your CV and covering letter (addressing where you meet the person specification and incl. the names and addresses of two referees), to: recruitment@icr.ac.uk, quoting job reference number B455. For a job description and person specification please visit our website www.icr.ac.uk. Alternatively, you may call our 24 hour recruitment line on 020 7153 5475.

In a separate email, please send your completed equal opportunities monitoring form http://www.icr.ac.uk/jobs/current_vacancies/4959.doc to the same email address quoting the job reference number above.

Closing date: 17th June 2011

JOB TITLE: Postdoctoral Research Position

SECTION/TEAM: Joint Department of Physics/ Multimodality Molecular Imaging

GRADE: Postdoctoral Training Fellow

RESPONSIBLE TO: Dr Dimitra Darambara

OBJECTIVE OF THE POST

The post involves the innovative design of a photon-counting multi-threshold CdZnTe detector and the optimum architecture(s) of a proof-of-concept spectral x-ray imaging system(s) based on optimised CdZnTe semiconductor detectors for high-flux x-ray CT and 3D x-ray breast imaging.

RESPONSIBILITIES/DUTIES

To develop and implement complex computer simulations using a combination of state-of-the-art Monte Carlo codes (GEANT4 and GATE), Finite Element Analysis software (COMSOL Multiphysics) and semiconductor process and device simulation tools (TCAD) with high-level SPICE models to provide an effective and dynamic framework to study:

- all the physics effects and current limitations involved in high-flux spectroscopic x-ray imaging over a wide range of CdZnTe detector geometries, biasing conditions and material properties
- requirements for fast readout electronics dedicated to CdZnTe detectors with optimal energy discrimination and multiple energy threshold capabilities
- various geometries of spectral CT and breast imaging systems based on optimised CdZnTe sensors to obtain the system architecture with the optimum overall performance.

To validate experimentally the simulation models by using 2 advanced spectroscopic systems based on Kromek CdZnTe detectors and readout electronics from Kromek/Nova R&D and Medipix

To respect the confidential nature of those parts of work that have commercial potential

To prepare papers to peer reviewed journals and presentations at scientific/technical meetings as required

To contribute to progress reports on research as required

To be willing and able to work closely with other members of the Team and specifically to liaise and collaborate with the Kromek industrial partners and the Detector Development Group members at Glasgow University

To be willing to spend time on the Kromek premises and/or Glasgow University as required

To carry out the above duties in accordance with the policies of the Institute of Cancer Research and Royal Marsden NHS Foundation Trust or other establishment in which the work is conducted

Any other duties that may be required which are consistent with the nature and grade of the post

This job description is a reflection of the present position and is subject to review and alteration in detail and emphasis in the light of future changes or development.

APPOINTMENT DETAILS

This is a full-time post and is offered initially on a fixed term contract of 1 year with consideration of extension. The position is based at ICR/RMH in Fulham Road, Chelsea, London.

Appointment will be to the Postdoctoral Training Fellow scale. The salary will be determined according to the qualifications and experience of the successful applicant. The terms and conditions are in accordance with those for Post Doctoral Training Fellow.

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INSTITUTE OF CANCER RESEARCH

<u>PERSON SPECIFICATION</u>

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POST: Postdoctoral Training Fellow

EDUCATION/KNOWLEDGE

<u>Essential</u>
PhD degree in Physics or Electrical/Electronic Engineering
In-depth knowledge in Semiconductor Detector Physics

<u>Desirable</u>
Good Knowledge of programming and Monte Carlo simulations
Knowledge of radiation physics / Medical Physics / Imaging
Good understanding of detector readout electronics
Familiarity with the concepts of x-ray medical imaging

SKILLS

<u>Essential</u>
Computer literacy in scientific modelling and programming
Ability to demonstrate competence with both theoretical and experimental work
Ability to be organised, to write scientific material succinctly and to be very self motivated for research
Good presentation skills
Good communication skills

EXPERIENCE

<u>Essential</u>
Hands-on experience in developing, characterising and optimising semiconductor detector systems
Advanced computer programming and Monte Carlo modelling experience

<u>Desirable</u>
Experience in detector readout electronics
Experience in programming control languages (LabVIEW) and data analysis languages (MATLAB)
Interest in and understanding of x-ray medical imaging
Experience in paper writing and presenting work in meetings/conferences

GENERAL

<u>Essential</u>
Enthusiasm for subject and ability to achieve goals
Ability to work independently and in a team
Flexibility to work outside normal working hours
Ability to work effectively with industrial partners
Ability to deal with pressure and deadlines

<u>Desirable</u>
Good time management
Able to explain problems and solutions clearly