

Quote ref: **E&PS00398**

THE UNIVERSITY OF MANCHESTER

PARTICULARS OF APPOINTMENT

**Research Associate in
Time Integrated X-ray tomographic Imaging and Analysis**

(Ref: E&PS-00398)

- 1 The University invites applications for the above post, which is tenable for a fixed term period of up to three years.
- 2 Salaries will be within the range £29,099 - £35,788 per annum according to relevant experience and qualifications.
- 3 Informal enquiries may be made to Professor Philip Withers (Philip.withers@manchester.ac.uk), or Professor Peter Lee (peter.lee@manchester.ac.uk).
- 4 Applications should be made on line. If you are unable to apply on line please request an application form by emailing hrrecruitment@manchester.ac.uk quoting the reference number or by calling 0161 306 4058 (HR team recruitment line number).
- 5 The University of Manchester values a diverse workforce and welcomes applications from all sections of the community.

COPY OF ADVERTISEMENT

THE UNIVERSITY OF MANCHESTER

FACULTY OF ENGINEERING & PHYSICAL SCIENCES

**SCHOOL OF MATERIALS
(MXIF at DIAMOND, OXFORDHIRE)**

**Research Associate in
Time Integrated X-ray tomographic Imaging and Analysis**

(Ref: E&PS-00398)

Salary: £29,099 - £35,788 p.a.

Joining a dynamic partnership of academics supported by a dozen post-docs, and a team of beamline scientists, you will develop and apply world-leading image analysis algorithms to quantify multi-scale, time dependent tomographic data. You will become part of a unique 7-year partnership between The University of Manchester and Diamond Light Source, undertaking a series of novel X-ray 3D (tomography) imaging experiments of materials behaviour on the new I13I Beamline, and at the other beamlines. Funded by a large EPSRC grant we are located in the Research Complex at Harwell (RCaH), working with world-leading researchers in materials, energy materials, biomaterials, tissue regeneration, geology and image reconstruction from Manchester as well as Imperial College London, Open University and UCL.

The current team at RCaH comprises 11 people, and we are looking for a world-class researcher to augment the team's skills in image quantification and visualisation. The techniques developed will be used not just for synchrotron x-ray images, but also for analysis of projects running on the 3 nano-imaging, and 4 micro-imaging laboratory tomography machines in the Manchester X-ray Imaging Facility based primarily at the University of Manchester, strongly complementing the facilities at Harwell.

The post-holder will need to show a high level of initiative and visit the University of Manchester, and other collaborators, regularly. Applicants should have a relevant PhD (or equivalent experience) along with good team-working skills. Previous experience is required in imaging, as well analysing significant volumes of experimental data and visualising them using highly developed IT skills. The ability to act as lead author in scientific papers and reports and to present work at International conferences is also essential.

The University of Manchester

Job Description

Job Title	Research Associate in Time Integrated X-ray tomographic Imaging and Analysis
Reports to	Prof Philip Withers (Manchester) & Prof Peter Lee (Diamond)
Organisation Unit	School of Materials
Date	November 2011

Background:

The Manchester-Diamond collaboration is a unique collaboration between the University of Manchester (UoM) and the Diamond Light Source (DLS) to develop X-ray imaging to undertake a bold range of experiments across materials sciences, engineering, biomaterials and earth sciences. Manchester and DLS are partners in the building and development of the I13I beamline. I13I is a long beamline, dedicated to imaging. It will perform in-line phase contrast and attenuation imaging and tomography over a large field of view in the 6-30keV energy range. The beamline is currently under construction and will be capable of 1 micron resolution by Spring 2012 and 50nm one year later. The University of Manchester will receive a proportion of beam days, predominantly in I13I, but also to a lesser extent on other beamlines. The UoM will establish a growing team of scientists and engineers at DLS within a dedicated Manchester Imaging Centre. The UoM team have also been awarded a 5 year grant for residence at the *Research Complex at Harwell (RCaH)*, see www.rc-harwell.ac.uk. Situated alongside the Diamond Light Source, RCaH is a new, multidisciplinary laboratory that provides facilities for researchers to undertake new and cutting-edge scientific research in both life and physical sciences and the interface between them. At the same time, UoM has developed the Henry Moseley X-ray Imaging Facility (xray-imaging.org.uk) a complementary suite of 7 laboratory X-ray imagers situated in Manchester. Together, these facilities form the Manchester X-ray Imaging Facility, opening up a bold range of imaging experiments at low and high resolution over a very wide range of timescales. Across both facilities in situ experiments will be given significant emphasis. The team will be jointly directed by Prof. Phil Withers at Manchester and Prof. Peter Lee at Diamond.

Overall Purpose of the Job:

The post-holders will be sited at Diamond and together they will develop a range of image quantification methods in materials science, engineering, biomaterials and Earth sciences. Linking with University of Manchester staff and their collaborators, the candidate will plan, execute and analyse a portfolio of exciting experiments benefiting from unique access to beamline I13I and equipment within the RCaH, as well as in UoM. The post-holder will need to show a high level of initiative and visit UoM regularly. The post-holder will be expected to develop collaborations with academics within Manchester to undertake world leading experiments that could not be undertaken under normal peer review access. Furthermore they will be expected to help develop the strong UoM presence at Diamond, being fully involved in the life of the DLS and working closely with our instrument scientists on I13I.

Key Responsibilities, Accountabilities or Duties:

The range of duties will include.

- To identify and exploit opportunities for X-ray imaging across materials science, engineering, biomedical and earth sciences; linking up with UoM academics, so as to capitalise on special access to the I13I beamline.
- To undertake world leading imaging experiments, both on I13I, and more generally at DLS, but also within the HM X-ray Imaging Facility at UoM.
- To visit UoM to give talks to publicise the opportunities and to draw in academics across the Faculties to access the Manchester-Diamond Facility.
- To mentor PhD students sited within the Manchester X-Ray Imaging Facility and to work with visiting teams during experiments.
- To help engender a team ethos within the Manchester X-Ray Imaging Facility at Diamond.
- To work with the Manchester and Diamond funded instrument scientists on I13I.
- To integrate fully in the scientific life at Diamond Light Source and to be a strong ambassador for the University of Manchester.
- To develop 3D visualisation and quantitative image analysis tools, both as part of their own research programme and to assist visitors.
- To support visiting experiments where necessary and to help complete safety documentation and training.

The specific role of this post is to spearhead the activity in *Multi-scale and Multi-dimensional Materials Imaging* by:

- Developing novel algorithms and analytical procedures.
- Using existing packages, including Avizo and Matlab, to quantify 3D and 4D data.
- Help design experiments for a range of applications utilising different imaging facilities.
- Apply, and develop algorithms to transform 3D, time dependent, or multi-modal data into finite element models.
- Help maintain the Linux and PC clusters used to perform this analysis.

Person Specification

Essential Knowledge, Skills and Experience:

- A PhD or equivalent in a scientific discipline relevant to image analysis and quantification.
- Previous experience of image analysis, involving programming in C, C++ and Matlab, or equivalent
- Experience in analysing large volume experimental data sets and visualising them using highly developed IT skills.
- Strong interpersonal and communication skills (both written and verbal) with the ability to explain and present complex information to non-experts.
- Ability to engage with University of Manchester academics through the full range of communication techniques e.g. talks, emails, Webex and other means to develop a world-leading research portfolio.
- Ability to act as lead author in scientific papers and reports and to present work at International conferences.
- Organisation and time management skills to effectively and efficiently plan and organise activities.
- Able to work as part of a team, leading activities where necessary and supporting others.

Desirable Knowledge, Skills and Experience:

- Experience in using ITK or a similar image analysis library.
- Experience of Avizo or other 3D imaging and analysis tools.
- Experience of administering and maintaining Linux and Windows workstations and clusters.
- Experience of using, maintaining and/or developing X-ray equipment.
- Experience in running experiments on a synchrotron.
- Experience of mentoring PhD students.