Australian Government

Nuclear-based science benefiting all Australians

POST DOCTORAL FELLOWSHIP

In-situ neutron and X-ray diffraction methods for phase composition and microstructural investigations related to thermo-mechanical processes.

Salary $A66,451 (plus Super)
2 Year Term

The Australian Nuclear Science and Technology Organisation is Australia's national organisation for nuclear science and technology. Our mandate includes delivering scientific services, products and specialised advice to government, industry, academia and other research organisations.

We have an opportunity for a recent Ph.D graduate with a strong innovation focus, good communication skills and a proven publication record.

The aim of this research project is to develop and apply modern diffraction methods for structural investigation related to thermo-mechanical processes in metallurgy.

The successful candidate will interact closely with existing research collaborators in materials physics and mechanical engineering, in particular with the stakeholders of the project. The fellow should possess expertise in the application of X-ray or neutron scattering methods and data analysis for investigations in this field. The knowledge of in-situ experiments under complicated sample environment is an asset.

This position will also require international travel for the purpose of research and networking, therefore a willingness to travel is an essential requirement.

To be eligible for appointment, applicants will require a security and medical assessment and Australian Citizenship is preferred.

For further technical information relating to this position please contact Klaus-Dieter Liss on +61 (02) 9717 9479

TO APPLY visit www.ansto.gov.au and follow the links to the vacancies page or contact Megan Lusty on +61 (02) 9717 3094. Applications **must** address the selection criteria and should be submitted on-line via our website.

For further information please consult the vacancies page of our website www.ansto.gov.au

Applications close: 27 March 2009

Post Doctoral Fellowship

Neutron and X-ray diffraction methods for phase composition and microstructural investigations related to thermo-mechanical processes

SELECTION CRITERIA

Each Selection Criterion must be addressed in the application. The dot points are provided to explain or add meaning to the Selection Criteria within the context of this role and should be considered when providing evidence of demonstrated ability to meet each criterion. It is not necessary to address each point separately although applicants may be questioned on the points during selection interview.

ITEM	CRITERIA	LEVEL OF IMPORTANCE
Qualifications and experience:		
1.	Ph.D recently awarded*, or currently under examination, in Physics, Engineering or a related field. * Candidates should have no more than three years relevant Post-Doctoral experience	**ESSENTIAL**
2.	Practical experience in neutron and/or X-ray diffraction including data analysis	**ESSENTIAL**
3.	Practical experience or demonstrated skills in setting up novel data analysis, such as automated data reduction, Rietveld methods for quantitative phase analysis and texture analysis	**DESIRABLE**
4.	Technical skills in using instrumentation such as sophisticated sample environment like high-temperature devices, stress rigs, shear cells, extruders and the performance of in-situ experiments	**DESIRABLE**
5.	Practical experience in access to / operation in large user neutron or synchrotron radiation facilities	**DESRIABLE**
6.	Skills in complex thinking like single crystal reciprocal space mapping or the interpretation of 2D or 3D diffraction patterns	**DESIRABLE**
7.	Skills in learning and applying complementary techniques such as SAXS or SANS and their data analysis	**DESIRABLE**
Demonstrated ability to:		
8	Solve problems independently with a demonstrated high level of self-motivation.	**ESSENTIAL**
9	Communicate effectively – provide examples of: Published papers Effective written & oral expression of research progress or outcomes Liaison with colleagues and experts	**ESSENTIAL**
11	Use of different computer environments and general computer literacy.	**DESIRABLE**
12	Develop and maintain productive relationships Employ appropriate interpersonal skills when dealing with others. Participate as a member of a team	**DESIRABLE**
13	Willingness to participate in international travel for the purpose of research and networking purposes	**ESSENTIAL**

Additional Requirements

Applicants must meet security and medical clearances.
Australian citizenship preferred.

POSITION DESCRIPTION

Position Title:	Post Doctoral Research Fellowship
Institute / Division / Business Unit:	Bragg Institute
Section or Unit:	
Classification:	Band 5

Primary Objective

The primary objective of the Post Doctoral Research Fellow is to perform research which contributes to ANSTO Projects.

Organisational Environment

ANSTO is the national organisation for nuclear research and development. We focus on undertaking leading edge research, delivering innovative scientific services and specialised advice to government, industry, academia and other research organisations.

Position Environment

The Post Doctoral Fellow works independently to solve problems, whilst taking input from project leaders and other team members.

The position requires extensive liaison with clients, engineering professionals, workshops, external suppliers, contractors and manufacturers in relation to project specifications. The Post Doctoral Fellow may also be required to train, supervise and coach staff, students and other visitors in laboratory procedures.

Key Accountabilities

The key accountabilities for this position include:

- Initiate and conduct scientific research relevant to ANSTO projects by seizing opportunities for innovation and creativity in laboratory, field or computational tool development.
- Take research ideas through to conclusion by looking at solutions, investigating alternatives and selecting preferred options with the aim of producing scientific outputs and contributing to planned project outcomes.
- Responsible for the operation, maintenance and development of scientific instrumentation techniques or processes.
- Establish external networks and alliances with international organisations, research bodies, universities and other relevant parties, with the aim of identifying commercial opportunities and other project or development opportunities that may be beneficial to ANSTO.
- Contribute to applications for funding through external grant bodies and potential clients.

Challenges

The major challenges for this position include:

- Pro-activity in keeping up to date with best practice and new techniques/ technologies in relevant field.
- Exercise sensitivity to the complexity of varying issues and look to find innovative ways of seeking out possible alternative solutions.
- Willingness to challenge established ways of working in favour of more productive approaches

Special Requirements

The position may be required to perform work in radiation areas where radioactive materials are handled under tightly controlled safety conditions.

Delegations

The levels of authority delegated to this position are those approved and issued by the Executive Director. All delegations will be in line with the ANSTO Delegation Manual AS-1682 (as amended or replaced).

Occupational Health & Safety Environmental Responsibilities

Supervisors

Are responsible for ensuring the application of the ANSTO OHSE management system in the area under their control by ensuring;

- All plant and equipment is operating correctly;
- All staff are trained in work and OHSE instructions;
- Work hazards are identified and risk assessments conducted;
- Controls are implemented and followed;
- Required maintenance is carried out;
- Incidents reported and investigated; and
- All injured workers follow rehabilitation and return to work plans.

Individuals

Are responsible for undertaking their activities in a safe manner and cooperating with OHSE requirements of their division to improve OHSE in their workplace by;

- Reporting unsafe work practices, equipment, incidents and near misses;
- Working safely to reduce risk to self and others;
- Using appropriate controls; and
- Taking a proactive approach to OHSE.

Knowledge, Skills and Experience

1. Recently awarded Ph.D in related field. With no more than three years relevant Post-Doctoral experience.
2. Demonstrated ability to work in a team with particular focus on the sharing of knowledge and information with team members.
3. Ability to build and maintain effective working relationships and work in a collaborative way with ANSTO employees and with external suppliers/ partners.

4. Manage conflicting priorities by adopting a flexible approach to work and to the continual review and reorganisation of work plans and activities.
5. Highly developed written communication skills with ability to produce written work suitable for publication in refereed journals.
6. Flexible approach to working independently or as part of a team.
7. Computer skills including experience in use of computer modelling.

Additional information about the position – context – field of work

Background

Engineered properties of metals play an important role for future applications, where devices will have to be lighter, thinner, stronger, longer lasting or applied under more extreme conditions such as high temperatures, radiation fields and pressures. Such requirements can only be achieved with detailed understanding of the physical and chemical behaviour of the material during its thermo-mechanical processing or under thermo-mechanical load within its application.

Modern neutron and synchrotron radiation facilities with dedicated instrumentation offer the possibility to study multiple aspects in an un-preceded way, such as phase composition, grain correlations, texture, grain size, or strain, which can be in real-time, in-situ, local in a bulk environment, or with ultimate resolution.

ANSTO has expertise in both diffraction and materials science and has recently created the project 'Modern Diffraction Methods Applied to Thermo-Mechanical Processes in Materials Science'. The goal of the project is to be recognized as the leading group in the world using diffraction methods to study deformation processes in metals, particular related to high temperature processing and performance in extreme conditions.

So far not many groups in the world use these modern diffraction techniques in-situ for metallurgical characterization, since knowledge across different disciplines has to be combined for successful data evaluation. A whole range of different instruments or techniques with respective data treatment issues have to be mastered for complementary results, such as powder diffraction; small angle scattering; large beam integration versus small beam resolution; single crystal and multi crystallite techniques; diffuse scattering; imaging and tomography; neutron in complement to X-radiation to give some examples. This has to be married with expertise of the sample systems under study, in particular with focus of interest of the Institute of Materials Engineering (IME) at ANSTO, furthered with the knowledge of traditional metallurgical investigation methods.

The position

The goal of the work is to understand the physical evolution and transition of phases (composition, phase transitions, kinetics, crystallographic order / disorder) and microstructural properties (grain size, grain correlations, texture, strain, precipitates) as a function of external variables, such as temperature or mechanical stress. Sample systems will be metals and intermetallic compounds relevant for IME and other collaborators. The candidate will perform in-situ measurements using neutron and synchrotron X-ray powder diffraction techniques on polycrystalline solids and complementary, when available, small angle scattering, analyze the data. From the findings, the successful candidatewill identify new research opportunities in this field and propose / perform further measurements at national and international facilities. Results shall be published in highly recognized journals and presented on conferences and workshops.

The postdoc will be supervised by Dr. Klaus-Dieter Liss