



UNIVERSITY OF LEEDS

## CANDIDATE BRIEF

Research Fellow in Structural Biology, Astbury Centre for Structural Molecular Biology, Faculty of Biological Sciences



**Salary: Grade 7 (£33,797 – £40,322 p.a.) Due to funding limitations it is unlikely an appointment will be made above £35,845.**

**Reference: FBSAS1030**

**Fixed-term until 31 October 2022 (due to funding)**

## **Post-doctoral Research Fellow in Structural Biology, Astbury Centre for Structural Molecular Biology, School of Molecular and Cellular Biology**

**Are you looking to apply your skills in Structural Biology and Imaging to gain a new molecular understanding of the biogenesis of the outer membrane of Gram-negative bacteria, and help develop new routes to combat bacterial infections?**

We are looking for an outstanding postdoctoral research fellow to join our well-established, interdisciplinary team that is investigating how outer membrane proteins are folded by the  $\beta$ -barrel Assembly Machinery (BAM) complex of Gram negative bacteria. BAM is an integral membrane protein that is required for the folding and insertion of outer membrane proteins (OMPs) and hence is essential for cell viability. Despite this central importance, how BAM folds and inserts the multitude of different OMP sequences that comprise the OM, and how this is able to occur efficiently in the crowded OM in the absence of an obvious source of energy such as ATP or a proton gradient, remain unclear. We are looking for an outstanding postdoctoral research fellow to join an MRC-funded team investigating the mechanism of action of the BAM complex using structural biology biochemistry, and biophysics.

This post will primarily use structural biology, especially cryoEM and cryoET. The programme will also involve the use of molecular biology, OMP folding assays, fluorescence, FRET, MS cross-linking, and other biochemical/biophysical methods, so there are opportunities to hone a broad range of skills. We aim to:

- (1) Determine the structure of BAM and the complexes it makes in detergent, nanodiscs, other membrane mimetic systems using cryoEM.
- (2) Determine the structures of BAM and the complexes it makes in proteoliposomes, outer membrane vesicles (OMVs), and native outer membranes, using cryoET and/or sub-tomogram averaging.
- (3) Assist in the design and implementation of novel assays with which to monitor the folding of multiple OMPs of different size, using enzymology, fluorescence and FRET methods as appropriate
- (4) Investigate the mechanism of action of BAM using biophysics/biochemistry

Successful execution of this MRC-funded programme grant will thus result in a new molecular understanding of this fascinating complex that is vital for bacterial life.



You will be based in the laboratories of [Professor Neil Ranson](#) & [Professor Sheena Radford](#), and work closely with other members of the OMP team (funded by BBSRC and MRC) who are working on BAM structure and function, OMP folding, and the structure and function of periplasmic chaperones. You will have a PhD (or be close to completion) in Structural Biology, Biochemistry, Imaging or a related discipline. You will also have substantial experience in using cryo-electron microscopy/tomography to determine the 3D structures of protein complexes.

**Further information about the project and our recent publications are available within the additional information document**

## What does the role entail?

As a Research Fellow, your main duties will include:

- Designing, planning and conducting a programme of investigation, in consultation with [Professor Neil Ranson](#);
- Generating independent and original research ideas and methods in BAM Structural Biology with an aim to extend the [Ranson](#) and [Radford](#) research portfolios;
- Optimising the purification of BAM and its reconstitution into a variety of bilayer mimetics such as detergent, nanodiscs etc;
- Devising and creating BAM complexes with OMPs stalled at different stages of BAM-catalysed folding;
- Determining the structure of BAM and the complexes it makes, including stalled substrate complexes, using cryoEM and single particle analysis;
- Producing and site-specifically labelling outer membrane proteins (OMP) for analysis by cryo-EM and biophysical methods;
- Reconstituting BAM into proteoliposomes, using cryoET and sub-tomogram averaging to determine its structure;
- Determining the structure of BAM and the complexes it makes in outer membrane vesicles (OMVs) and in native outer membranes;
- Keeping informed of recent advances in the fields of OMP/BAM folding;
- Making a significant contribution to the dissemination of research results by publication in leading peer-reviewed journals, and by presentation at national and international meetings;





- Working independently and as part of a larger team of researchers , both internally and externally to develop new research links and collaborations and engage in knowledge transfer activities where appropriate;
- Contributing to the supervision of junior researchers and PhD students and acting as a mentor to less experienced colleagues.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

## What will you bring to the role?

As a Research Fellow you will have:

- A PhD (or be close to completion) in Structural Biology, Biochemistry, Imaging or a related discipline;
- Substantial experience in using cryo-electron microscopy/tomography to determine the 3D structures of protein complexes;
- Experience in working with scarce/high value samples to address mechanistic questions in biology;
- A developing track record of peer reviewed publications in international journals;
- Excellent communication skills, both written and verbal, and the ability to communicate your research at national and international conferences;
- The desire and drive to learn new skills and techniques;
- Imagination, creativity and ambition to drive new areas of science;
- Good data management, analytical and computer skills together with previous experience of using software for analysing data;
- The ability to design, execute and write up experimental work independently as well as a proven ability to work accurately, effectively and responsibly without close supervision;
- Experience of successful collaborations and team working.

### Desirable

- A BSc in Molecular Biology, Biochemistry or a related subject;
- Experience of working in the fields of membrane proteins, protein-protein interactions;
- Experience in computational analysis of complex 3D data.



## How to apply

You can apply for this role online; more guidance can be found on our [How to Apply](#) information page. Applications should be submitted by **23:59** (UK time) on the advertised [closing date](#).

Your application should include:

- A supporting statement providing evidence to support each requirement listed on the 'What will you bring to the role' section of the Candidate Brief (no more than two sides of A4, minimum font size 11);
- An academic curriculum vitae, including a list of your publications.

## Contact information

To explore the post further or for any queries you may have, please contact:

[Professor Neil A Ranson](#), **Professor of Structural Molecular Biology**

Tel: +44 (0)113 343 7065

Email: [n.a.ranson@leeds.ac.uk](mailto:n.a.ranson@leeds.ac.uk)

or

[Professor Sheena Radford](#), **Astbury Professor of Biophysics**

Tel: +44 (0)113 343 3170

Email: [s.e.radford@leeds.ac.uk](mailto:s.e.radford@leeds.ac.uk)

## Additional information

Find out more about the [Astbury Centre for Structural Molecular Biology](#) in the [School of Molecular and Cellular Biology](#) in the [Faculty of Biological Sciences](#). More information about the Radford research group can be found at:

<http://www.astbury.leeds.ac.uk/people/staff/staffpage.php?StaffID=NAR> and

<http://www.astbury.leeds.ac.uk/people/staff/staffpage.php?StaffID=SER>

## Working at Leeds

Find out more about the benefits of working at the University and what it is like to live and work in the Leeds area on our [Working at Leeds](#) information page.



### **A diverse workforce**

The University of Leeds and the Faculty of Biological Sciences are committed to providing equal opportunities for all and offer a range of family friendly policies. The University is a charter member of Athena SWAN (the national body that promotes gender equality in higher education), and the Faculty of Biological Sciences was reawarded a Bronze award in 2017. We are proud to be an inclusive Faculty that values all staff, and are happy to consider job share applications and requests for flexible working arrangements from our employees. Our Athena SWAN [webpage](#) provides more information.

### **Candidates with disabilities**

Information for candidates with disabilities, impairments or health conditions, including requesting alternative formats, can be found on our [Accessibility](#) information page or by getting in touch with us at [disclosure@leeds.ac.uk](mailto:disclosure@leeds.ac.uk).

## **Criminal record information**

### **Rehabilitation of Offenders Act 1974**

A criminal record check is not required for this position. However, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our [Criminal Records](#) information page.

