



JOB TITLE	Postdoctoral researchers in molecular and cellular imaging of protein disaggregation machinery	
FACULTY & SCHOOL/ DEPARTMENT	Biological Sciences, Institute of Structural and Molecular Biology	
REPORTS TO	Professor Helen Saibil	
SUPERVISES	Not applicable	
POST REFERENCE	11538	
GRADE	Academic & Research, Grade 7	DATE April 2015

Birkbeck is a world-class institution, a vibrant centre of academic engagement and excellence and the UK's leading provider of part-time, evening education for mature students.

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Founded in 1823 as the London Mechanics' Institute, Birkbeck was incorporated in the University of London in 1920.

PURPOSE OF THE JOB

To contribute to the development of research proposals and/or objectives, and to conduct and write up both individual and collective research projects for publication.

PROJECT

Molecular and cellular mechanisms of protein aggregation and toxicity in models of neurodegeneration

Protein quality control systems normally prevent the accumulation of toxic, misfolded species that cause degenerative diseases, but quality control becomes less effective with aging, eventually resulting in late onset neurodegenerative conditions such as Alzheimer's and Parkinson's diseases. Certain molecular chaperones, notably those of the Hsp70 system, are able to rescue proteins from aggregates and prevent the toxicity associated with protein misfolding and aggregation. This Wellcome Trust-funded research project focuses on the molecular and cellular machinery for disaggregation and protein refolding. Taking advantage of recent advances in three-dimensional, molecular and cellular electron microscopy, the goals of the work are to capture structural snapshots of the disaggregation machinery at different stages of its operation; to determine the cellular location and fate of the aggregated species in yeast and mammalian cell models of misfolding diseases; to address the nature of the cytotoxicity, by comparing cellular structures in the presence of either toxic or non-toxic aggregates.

Key collaborators in this work include Prof Bernd Bukau, ZMBH Heidelberg and Prof Art Horwich, HHMI, Yale University. Super-resolution and time lapse fluorescence studies will be done in collaboration with Dr Alan Lowe at the ISMB. The work builds on our recent findings of yeast prion remodelling by the Hsp70-Hsp40-Hsp110 chaperone system, and will examine *in vitro* assembled protein complexes as well as yeast and mammalian cell models of misfolding diseases. A short description and references to our previous work in this area can be found at people.cryst.bbk.ac.uk/~ubcg16z/chaperone.html

RESEARCH ENVIRONMENT AND FACILITIES

The Institute of Structural and Molecular Biology (ISMB)

The ISMB (www.ismb.lon.ac.uk) is a centre of excellence, which jointly consists of the Department of Biological Sciences at Birkbeck, the Research Department of Structural & Molecular Biology at UCL, and the Chemical Biology section of the Department of Chemistry at UCL. The Institute provides a scientific environment conducive to world-class research in the field of biomolecular science. The ISMB (Director: Professor Gabriel Waksman) is organised along 5 research programmes: Structural Biology (Head: Professor Helen Saibil FRS), Chemical Biology (Head: Professor Helen Hailes), Biophysics and Proteomics (Head: Professor Steve Perkins), Bioinformatics (Head: Professor David Jones), and Biochemistry and Molecular Biology (Head: Dr Katherine Bowers). Major research facilities at the ISMB include laboratories for X-ray crystallography, cryo-electron microscopy (cryo-EM), NMR spectroscopy, biophysical methods, cell biology, optical microscopy, bioinformatics and ion mobility mass spectrometry. The ISMB organises multidisciplinary activities that are aimed at increasing collaborative, interdisciplinary research within specialty areas and between these areas and the vast body of biomedical research taking place at UCL, NIMR/Crick, and Birkbeck. ISMB activities include symposia, retreats, seminar series, and students/postdocs presentations. The ISMB also runs Wellcome Trust, MRC and BBSRC funded PhD programmes.

The Department of Biological Sciences and ISMB Cryo-EM laboratory at Birkbeck College

This multidisciplinary department (www.bbk.ac.uk/biology/) is composed of 38 academic staff (including 6 joint with UCL), 17 HEFCE support staff and around 40 research fellows and research assistants. It houses the ISMB Biophysics Centre, the **ISMB Cryo-EM laboratory**, and the ISMB X-ray Crystallography facility. The cryo-EM laboratory is equipped for high resolution cryo-electron microscopy and electron tomography, with direct electron detectors, high pressure freezing, cryo sectioning, freeze-substitution and correlative fluorescence/electron microscopy, along with all the necessary hardware and software for image processing and 3-dimensional reconstruction (people.cryst.bbk.ac.uk/~ubcg16z/empage.html). We are well placed to take advantage of the ongoing major advances in cryo-electron microscopy: Professor Saibil is a member of the management teams of the national Electron Bio-Imaging Centre (eBIC) currently under construction at the Diamond synchrotron and of the Collaborative Computing Project for EM (CCP-EM).

Main Duties of the Jobholder

Research and Scholarship

- To develop research objectives and proposals for own or joint research, with the assistance of a mentor if required.
- To conduct individual and collaborative research projects and write up research for publication

- To update knowledge and understanding in field or specialism.
- To translate knowledge of advances in the subject area into research activity.
- To ensure that research content and the methods used are in accordance with equal opportunities.

Teaching & Learning

- To contribute to the assessment of student knowledge and supervision of their projects.
- To assist in the development of student research skills.

Communication

- To deal with routine communication using a range of media.
- To communicate complex information, and material of a specialist or highly technical nature orally, in writing, and electronically.
- To prepare proposals and applications to external bodies, for example, for funding and contractual purposes.

Working Relationships and Contacts

People Management and Teamwork

- To manage own research and administrative activities, with guidance if required.
- To work with colleagues on joint projects, as required
- To collaborate with academic colleagues on areas of shared research interest.
- To attend and contribute to relevant meetings.

Liaison and Networking

- To liaise with colleagues and students.
- To build internal contacts, and participate in internal networks for the exchange of information and to form relationships for future collaboration.
- To join external networks to share information and identify potential sources of funds.

Dimensions

Problem Solving and Impact

- To use new research techniques and methods.
- To use own initiative and creativity to identify areas for research, develop new research methods, and extend the research portfolio.
- To use creativity to analyse and interpret research data and draw conclusions on the outcomes.
- To contribute to collaborative decision making with colleagues in areas of research.
- To understand equal opportunity issues as they may impact on areas of research content and methods.

Resource Management

- Plan and manage own research activity in collaboration with others.
- To use research resources, laboratories and workshops as appropriate.

Working Environment

- To balance, with help the competing pressures of research and administrative demands and deadlines.
- To carry out tasks that require the learning of certain skills.
- To engage in continuous professional development.
- To be aware of the risks in the work environment and their potential impact on their own work and that of others.

General Responsibilities

These are standard to all Birkbeck Job Descriptions

- To adhere to the College's Equal Opportunities policy in all activities, and to actively promote equality of opportunity wherever possible.
- To be responsible for your own health and safety and that of your colleagues, in accordance with the Health and Safety at Work Act (1974) and relevant EC directives.
- To work in accordance with the Data Protection Act and to ensure that all new systems are reported to your Data Protection Controller.
- To undertake such other duties as may be reasonably expected.
- To provide a healthy and comfortable working environment, smoking is prohibited throughout the College, except in specially designated areas.

FURTHER PARTICULARS & INFORMATION ON THE POST

Salary:	£32,277 rising to £37,394 per annum on Grade 7 of the salary scales, plus £3,066 London Allowance per annum.
Probation:	The appointment may be subject to a probationary period of twelve months.
Duration of post:	Fixed-term appointment, up to 5 years
Hours:	Full-time, 35 hours per week
Annual leave entitlement:	25 days per year, plus an additional six days when the College is closed during the spring and winter breaks. This is in addition to the eight bank holidays.
Superannuation:	The post is superannuable under the USS scheme (Universities Superannuation Scheme).
Closing date:	15 May 15, 2015
Interview date:	June 2015
Start date:	From October 2015

Informal enquiries can be made to:

Helen Saibil, Department of Biological Sciences/ISMB, Birkbeck, Malet Street, London WC1E 7HX. (tel: 020 631 6820, e-mail: h.saibil@mail.cryst.bbk.ac.uk, web page: people.cryst.bbk.ac.uk/~ubcg16z).

PERSON SPECIFICATION

Job Title: Research Level 2 **Post No:** 11538 **Dept/School:** Biological Sciences, School of Science

Attributes	Essential	Desirable	Method of Assessment
Knowledge	<ul style="list-style-type: none"> Possess sufficient breadth or depth of specialist knowledge in the discipline and of research methods and techniques to work within a structural, molecular and cell biology research programme. 	structural biology, protein biochemistry and specialist biochemical and biophysical methods Knowledge in cell biology	<i>Application Presentation Interview</i>
Technical/ Work-based Skills	<ul style="list-style-type: none"> Skills in structural, biochemical, molecular and/or cell biology methods Effective oral and written communication skills, to write up complex research findings and to convey specialist/technical material. Computer proficiency in standard office packages (e.g. word processing, spreadsheets, e-mail and internet use) 	Research skills in cryo-electron microscopy, electron tomography, image processing and 3-dimensional reconstruction, and in cell biology,	<i>Application Presentation Interview</i>
General Skills/ Attributes	<ul style="list-style-type: none"> Initiative and creativity to ensure research is effective Effective presentation skills. Organisation and administration skills Commitment to working with diversity Good networking and interpersonal skills Ability to work independently but also to cooperate and interact with other group members and outside collaborators Willingness to travel for meetings and collaboration 	Understanding of diffraction and imaging methods, and 3-dimensional structure determination Understanding of protein misfolding disease processes	<i>Application Presentation Interview</i>
Experience	<ul style="list-style-type: none"> Experience using or developing research methods and techniques, particularly in structural or cellular biology Previous experience of contributing to research 	Experience in structural molecular or cell biology, molecular chaperones, protein aggregation in cells Experience of writing scientific papers and reports	<i>Application Presentation Interview</i>
Qualifications	<ul style="list-style-type: none"> PhD (or equivalent) in a relevant subject area, such as structural or cell biology, biochemistry or biophysics. 		<i>Application</i>

To apply, use this link and enter reference number 11538:

http://jobs.bbk.ac.uk/fe/tpl_birkbeckcollege01.asp?newms=se